UTTAR PRADESH PUBLIC SERVICE COMMISSION

Combined State / Upper Subordinate Services (PCS) (General Recruitment / Special Recruitment) Examination, 2019 And

Assistant Conservator of Forest (A.C.F.) / Range Forest Officer (R.F.O.) Services **Examination - 2019**

Date of Commencement of On-line Application: 16/10/2019 Last Date for Receipt of Examination Fee On-line in the Bank: 11/11/2019 Last Date for Submission of On-line Application: 13/11/2019

IMPORTANT

1- Candidates applying for Assistant Conservator of Forest / Range Forest Officer Services Examination-2019 should note that they are required to appear in the Combined State / Upper Subordinate Services (General Recruitment / Special Recruitment) (Preliminary) Examination and qualify the same for going to the second stage of Assistant Conservator of Forest / Range Forest Officer Services Main Examination (Written) and Interview.

2- Candidates desirous of applying for Assistant Conservator of Forest / Range Forest Officer Services Examination as well as for Combined State/ Upper Subordinate Services (General Recruitment / Special Recruitment) Examination can apply through a Common Online Application Form subject to meeting the requisite Eligibility Criteria by them.

3- If a candidate comes to know about any error/errors in the submitted application form except in exam. name and type of recruitment, Registered Mobile Number, Email ID, Aadhaar Number and such cases where prescribed fee for modified category is higher (In case of error in these entries, candidate may submit new online application with prescribed fee only as previously deposited fee will neither be adjusted nor refunded.) he / she will be given only one opportunity to modify it / them according to the procedure provided in Point No. 4 of the advertisement before the last date of the submission of application form.

SPECIAL NOTICE: (a) On-Line Applications will be accepted only when prescribed fee is deposited in the Bank upto prescribed last date for fee deposit. If the fee is deposited in Bank after the last date prescribed for fee deposit, the on-line application of the candidate will not be accepted and the fee deposited in the Bank will not be refunded in any condition. It will be responsibility of the candidates to deposit fee in the Bank upto the last date prescribed for fee deposition and to 'submit' the application upto last date prescribed for submission of applications. It is also informed that any amount deposited in the form of examination fee shall not be refunded in any condition.

(b) In Online Application System, the candidates have to provide their Mobile No. and valid E-mail ID in prescribed column failing which their Basic Registration shall not be completed. All relevant informations / instructions shall be sent through SMS on that mobile and E-Mail on their vaild E-mail ID.

NECESSARY INFORMATIONS TO APPLICANTS FOR FILLING THEIR APPLICATIONS THROUGH ON-LINE

This advertisement is also available on the Commission's website http://uppsc.up.nic.in. The online application system is applicable for applying against this advertisement. Applications sent by any other mode shall not be entertained hence candidates are advised to apply On-line only. In connection with On-line application, candidates are advised to go through the instructions thoroughly given as under and apply accordingly: 1. When the candidate clicks "ALL NOTIFICATIONS/ADVERTISEMENTS" on the

Commission's website http://uppsc.up.nic.in the On-line advertisement shall be automatically displayed, wherein there shall be 3 parts as given below:

User instructions (i)

(ii) **View Advertisement**

(iii) Apply

A list of all the advertisements will be displayed in which "On-line System" is applicable. The Instructions for filling "On-line form" have been given in User Instruction. The Candidates desirous to see the advertisement will have to click before 'View Advertisement' to which they are desirous to see, full advertisement will be displayed along with sample snapshots of ON-LINE Application Procedure. Click on "Apply" for Online Application.

On-line application will be completed in three stages :

First Stage: On clicking "Apply", Candidate Registration will be displayed. Basic Registration form will be displayed on clicking the 'Candidate Registration' respective to Examination. After filling the Basic Registration form, the candidates must check all the informations filled by them. If any correction / modification is required, click on "Edit' button and ensure the required corrections / modifications. After being fully satisfied with all the informations filled, click on 'Submit' button. Consequently, the registration of first stage shall be over. Thereafter "Print Registration Slip" shall be displayed and Print of Registration Slip must be taken by clicking on Print Registration Slip.

Second Stage: After the completion of the procedure of first stage, 'Fee to be deposited [in INR]' shall be displayed with caption "Click here to proceed for payment". After clicking the above caption of "Click here to proceed for payment", home page of State Bank MOPS (Multi Option Payment System) shall be displayed comprising of 03 modes of payment viz. (i) NET BANKING (ii) CARD PAYMENTS and (iii) OTHER PAYMENT MODES. After depositing the required fee by any one of the above prescribed modes, "Payment Acknowledgement Receipt (PAR)" shall be displayed alongwith detail of fee deposition, the print of which must be taken by clicking on "Print Payment Receipt".

Third stage: On completion of the procedure of second stage, click on "Proceed for fina submission of application form" as a result of which 'format' shall be displayed. The candidates are required to enter all the required informations in the format. The photo and signature, duly scanned shall be uploaded also. The candidate should scan his/her

different categories is as under:-

- Other Backward Class
- (ii) Scheduled Caste/ Scheduled Tribe
- (iii) Handicapped
- (iv) Dependents of the Freedom Fighters/Ex-Serviceman/Women

3. The Basic Registration of such candidates will not be accepted who have been debarred from U.P. Public Service Commission and their period of debarment has not been completed. In addition to above, the applications submitted without requisite informations regarding debarment, if it is found at any stage in future that the applications have been submitted concealing this fact, his/her candidature will be rejected at any stage and the commission will consider to debar them from all future examinations/selections including extension of debarment period. In this regard if the claims of the candidates made in their On- Line applications are not found true, they can be debarred not only from the examination in question but from all the future examinations and selections made by the commission also including other appropriate penalties.

4. Modify Submitted Application: If a candidate comes to know about any error/errors in the submitted application form except in exam name and type of recruitment, Registered Mobile Number, E-mail ID, Aadhaar Number and such cases where prescribed fee for modified category is higher (In case of error in these entries, candidate may submit new online application with prescribed fee only as previously deposited fee will neither be adjusted nor refunded.) he / she will be given only one opportunity to modify it / them according to the following procedure before the last date of the submission of application form. "Candidate has to click on 'Modify Submitted Application' under 'Online application process' in Candidate Segment. After that 'Candidate Personal Details' will be displayed on the screen to fill in Registration No., Date of Birth, Gender, Domicile and Category. After filling the Verification code the candidate has to click on the 'proceed' button following which for 'Authentication' of the candidate OTP (One Time Password) will be sent on the registered Mobile No. of the candidate and the 'Option Box' will be displayed on the screen to fill in the OTP. After the candidate has filled in the OTP and clicks on the 'proceed' button his / her previously submitted on line application form will be displayed on the screen. The candidate can submit his / her on line application form after making required modifications in it. This facility will be available to the candidates only one time within the last date of submission of application form."

5. The U.P. Public Service Commission shall hold a Preliminary Examination at various Centres of the Districts mentioned in Appendix-2 of this advertisement for selecting suitable candidates for admission to the Combined State/Upper Subordinate Services (General Recruitment / Special Recruitment) Main (Written) Examination 2019 and Assistant Conservator of Forest / Range Forest Officer Main (Written) Examination, 2019 (The Main (Written) Examinations shall be conducted separately by the commission). The selection will be made on the basis of total marks obtained by the candidates in Main (Written) Examination and Interview. On some of these post, recruitment shall be made on the basis of total marks obtained in the written examination, according to be provision of concerned service rules of such posts. The Date and Centre of Examination, decided by the Commission, will be intimated to the candidates by means of their e-Admission Certificate. The no. of Districts/centers may be increased / decreased according to the decision of the Commission on the basis of final number of applications received.

6. No. of Vacancies: - Presently, the number of vacancies for the Combined State / Upper Subordinate Services Examination under General Recruitment are about 300 and for Special Recruitment number of vacancy is 09 and for the Assistant Conservator of Forest / Range Forest Officer Services Examination the number of vacancies for the post of Assistant conservator of Forest is 02 and for the post of Range Forest Officer the number of vacancies is 53

The details of approximate posts to be included in Combined State / Upper Subordinate Services (General Recruitment / Special Recruitment) Examination carrying the pay scale of Rs. 9300-34800 Grade Pay Rs 4600/- (except Naib Tehsildar whose grade pay is Rs. 4200/-) to Rs. 15600-39100/- Grade Pay Rs. 5400/- are as follows:-

Deputy Collector, Deputy Superintendent of Police, Block Development Officer, Assistant Regional Transport Officer, Assistant Commissioner (Commercial Tax), District Commandent Homeguards, Treasury Officer/Accounts Officer (Treasury), Cane Inspector and Assistant Sugar Commissioner, Superintendent Jail, Manager Credit (Small Industries), Manager Marketing and Economic Survey (Small Industries), Executive Officer Grade-I/Assistant Nagar Ayukta, District Basic Education Officer/Associate DIOS & other equivalent Administrative Posts, Assistant Director Industries (Marketing), Assistant Labour Commissioner, Senior Lecturer DIET, Designated Officer, Assistant Commissioner Industries. Statistical Officer, Assistant Accounts Officer, (Treasury), Commercial Tax Officer, District Minority Welfare Officer, District Food Marketing Officer, Executive Officer (Panchayati Raj), Deputy Secretary (Housing and Urban Planning), Area Rationing Officer, District Backward Welfare Officer, Naib Tehsildar, District Saving Officer, District Panchayat Raj Officer, District Social Welfare Officer, Accounts Officer (Nagar Vikas), District Supply Officer Grade-2, Additional District Development Officer (Social Welfare), Passenger/Goods Tax Officer, District Handicapped Welfare Officer, Assistant District Employment Assistance Officer, Accounts Officer (Local Bodies), Regional Employment Officer, Assistant Registrar (Cooperative), Sub Registrar, Assistant Prosecuting Officer (Transport), District Probation Officer, District Cane Officer, U.P. Agriculture Service Group-"B" (Development Branch), District Administrative Officer, District Audit Officer (Revenue Audit), Assistant Controller Legal Measurement (Grade-1 and Grade-2), District Programme Officer, District Youth Welfare and Pradeshik Vikas Dal Officer, Information

ADVT. NO. : A-2/E-1/2019 Date : 16/10/2019

- (i) Unreserved/Economically weaker sections/: Exam fee Rs. 100/-+ On-line processing fee Rs. 25/- Total = Rs. 125/-
 - : Exam fee Rs. 40/- + On-line processing fee Rs. 25/- Total = Rs. 65/-
 - : Exam fee NIL + On-line processing fee Rs. 25/- Total = Rs. 25/-
 - : According to their original category

must be latest passport size. In case the photo and signature, scanned in the prescribed size, are not uploaded, then the On-line system will not accept it. The procedure related for scanning of the photo and signature is laid down in the Appendix-1 . After filling in all entries in the format, the candidates may click "PREVIEW" to see for themselves that all entries and informations are correctly entered and after satisfying themselves should click "Submit" button to forward the same to the Commission. It is essential that the candidate should fill all informations On-line correctly according to the instructions given and click the 'Submit' button by the last date prescribed for submission of the application form. If the candidate does not click the "Submit" button, the ON-LINE application process shall not be completed finally and the candidate shall be accountable for this. After clicking the 'Submit' button, the candidate may take a print of the application to preserve it with them. In the event of any discrepancy, the candidate will be required to submit the said print in the	officer Labour college Jailor, Group Officer. Examir Officer, Develo the bas rules. Examir Under t	/ District Information Offi Enforcement Officer, E (Boys and Girls), Food s Tax Assessment Officer, -II, Law Officer, Senior Su Out of aforesaid posts nation from which post of I Marketing Officer, S pment Inspector and vete sic of only written examina The requisitions of the re nation may be added to this he Assistant Conservator	cer / Script Writer / Feature Writers / Incharge English, Excise Inspector, Principals, Government Intermediate afety Officer, Extension Service Officer Group-2, Deputy Account and Audit Officer, Marketing Officer, Secretary ugarcane Development Inspector, veterinary and Welfare , the requisitions received have been included in this Deputy Jailor, Tax Assessment Officer, Account and Audit ecretary Group-II. Law Officer, Senior Sugarcane erinary and Welfare Officer, the Selection will be made on ation according to the provisions of their relevant service st of the posts received before the result of Preliminary s examination. of Forest / Range Forest Officer Services Examination tus of Post are given as below:
 University is a playified to the condidates that at the store of publications			5
 examination, the hard copy of the documents including their On-Line application			Pay Scale / Grade Pay / Status of Post
 should not be sent to the Commission.	1.	Assistant conservator	Rs.15600/- to Rs.39100/-, Grade Pay- Rs.5400/-, (Level-
2. Application Fee: In the ON-LINE Application process, after completing the procedure		of Forest	10 in the pay matrix Group) Group "B", Gazetted.

of first stage, Category wise prescribed examination fee is to be deposited as per 2. **Range Forest Officer** instructions provided in second stage. The prescribed fee of preliminary examination for of Forest

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Rs.9300/- to Rs.34800/-, Grade Pay - Rs.4800/-, (Level-

8 pay matrix 47600 - 151100) Group "B", Gazetted

special circumstances. 7. Reservation: The result. U.P./Other Backward Class provisions of relevant Govias as Dependents of Freedo Women candidates shall be U.P. shall be permissible for Economically weaker Se not covered under the ex Scheduled Tribes and Oth Note : (1) शासनादेश संख संख्या–18/1/99/का–2/2	cies may increase or decrease on the request of the Govt. in ervation for Scheduled Castes of U.P./Scheduled Tribes of s candidates of U.P. shall be admissible in accordance with the t. Rules. Accordingly, reservation for category under horizontal om Fighters of U.P, Ex-Serviceman of U.P., P.H. of U.P. and e admissible on settlement of vacancies. Reservation for P.H. of or the notified / identified Posts. Similarly 10% reservation to ctions (EWSs) is admissible for such candidates who are isting scheme of reservation for the Scheduled Castes the her Back Word classes and who are domicile of U.P. State. या–39 रिट/का–2/2019 दिनांक–26 जून, 2019 द्वारा शासनादेश 2006 दिनांक–09 जनवरी, 2007 के प्रस्तर–4 में दिये गये प्राविधान, "यह भी In लोक सेवाओं और पदों पर सीधी भर्ती के प्रक्रम पर महिलाओं को अनुमन्य	Designate Food Safe	ety Officer	from a Un recognise (2) Atlea Recruitme A Bachelo or Biotech Veterinary Graduate recognise qualificati Provided manufacto	Graduate Degree in Chemistr iversity established by law i ad by the Government as equ list one of qualification ent to the post of Food Safety or's Degree in Food Technology or Oil Technology of y Sciences or Bio-Chemistry Degree in Chemistry or De ad University, or any other on notified by the Central Go that no person who has any ure, import or sale of any I to be a Food Safety Officer.	n India or a qualification ivalent thereto, or prescribed for Direct Officer given as below: ogy or Dairy Technology r Agricultural Science or or Microbiology or Post gree in Medicine from a equivalent/recognised vernment, financial Interest in the
उपरोक्त आरक्षण केवल उत्तर संख्या–11039 / 2018 विपिन क्	प्रदेश की मूल निवासी महिलाओं को ही अनुमन्य है" को रिट याचिका भगर मौर्या व अन्य बनाम उत्तर प्रदेश राज्य व अन्य तथा सम्बद्ध 6 अन्य रिट लय, इलाहाबाद द्वारा दिनांक—16.01.2019 को अधिकारातीत (ULTRA	Statistica	officer	Post Gra Statistics university	duate Degree in mathem or Statistics or Agricultu recognized by Law in	ral Statistics from an India or equivalent
विलोपित किए जाने का निर्णय दिनांक—16.01.2019 के विरूद्ध होने वाले अन्तिम निर्णय के	निर्णय के अनुपालन में शासनादेश दिनांक-09.01.2007 से प्रस्तर-04 को लिया गया है। उक्त निर्णय शासन द्वारा मा. उच्च न्यायालय के आदेश दायर विशेष अपील (डी) संख्या-475/2019 में मा. न्यायालय द्वारा पारित अधीन होगा। (2) The Candidates claiming for the benefit of	Labour E Officer	nforcement	Bachelor' and Post Labour re	on recognised by the Goverr s degree with Economics or Graduate Diploma or Post g elation / Labour welfare / La v / Social work / Social welfar	Sociology or commerce raduate Degree in Law / bour Law / Commerce /
competent authority on the p advertisement and shall sub category candidates of U.P.	must obtain, in support of their category a certificate issued by proforma available on Appendix-3 of the Website of this detailed omit the same to the Commission when asked for. (3) All Reserved must mention their Category/Sub Category in the Application. (4) ation/Age relaxation in more than one category will be entitled to	Group-2 G Extensior	iculture officer rade-1 n Service	B.Sc(Ag recognise B.Sc or I	I Management. priculture / B.Sc (Horticult d University or Institute. B.Sc. (Ag.) followed by 15	5 month Post-graduate
only one concession, which Scheduled Tribes, Other Dependents of Freedom F	chever is more beneficial to them. (5) The Scheduled Caste, Backward Class, Economically Weaker Section (EWSs), Fighter, PH. and Ex-Serviceman candidates who are not the shall not be given the benefit of reservation/age relaxation. Such	officer Gr		Institute, l diploma ir Institute, c	Course from Govt. Fruit Pre Lucknow or any other recogr h Hotel Management and Ca or M.Sc. in Food Technology. Or	nised Institute, or 3 years tering from a recognised
	d as the candidates of the unreserved. (6) In case of women cate issued from father side only will be treated valid. (7) For Ex-			Processir	0	
Army personnel, in case of a	availability of post in class-III, the reservation will be admissible as bry for the candidates to enclose self-attested copies of all the			-	bugh written examination s degree in Commerce or Eco	
certificates along with the a made by them in their appli category/ sub category, failin 8. Conditions of Eligibilit	application forms of Main Examination in support of the claims cation forms of Preliminary Examination regarding eligibility and ng which their claim shall not be entertained. y (For age relaxation only) : Eligibility in case of Emergency ice Commissioned Officers: In accordance with the provisions of	Law offic Works De	er (Public partment, and Mining ent)	(i) Bachel law in Indi (ii) Regist Bar Assoc two years	lor's degree in law from a u	niversity established by council or the affiliated Bar Council of India and
Service Commissioned Offi	armik-2-85, dated 30-1-1985 Emergency Commissioned / Short icers who have not been released from Army but whose period of ended for rehabilitation, may also apply for this examination on		arisad)	by Bar Co	in Law with Registered in B unsel of India and Certificate unsel /Bar Association.	
the following conditions: competent authority of Arm	(A) Such applicants will have to obtain a certificate of the ny, Navy, Air Force to the effect that their period of Service has tation and no disciplinary action is pending against them. (B)	Marketing Secretary (Mandi Pa	Group-II arisad)	Commerc recognize	in Agriculture, Agricultur e, Economics or Agricultu d university.	ure Economics from a
selected for the post applie	submit in due course a written undertaking that in case they are ed for, they will get themselves released immediately from the facilities will not be admissible to Emergency/Short Service		landi Parisad)	subjects a work in a r	in Commerce with Accou and having at least five years responsible capacity.	experience in Accounts
Commissioned Officers, if (a) he gets permanent Commission in the Army, (b) he has been tendering resignation, (c) He has been released from the Army		nent Inspector	Certificate	duate degree in Agricultur	
_	or physical disability or on his own request and who gets gratuity. Less all the requisite qualifications/Eligibility conditions till the last locations	officer		equivalen	in Veterinary Science (t degree recognised by the C ional Qualification posts;	Sovernment.
9. MARITAL STATUS: Male and female candidates who unless the Hon'ble. Govern	e candidates who are married and have more than one wife living have married a person already having a wife, shall not be eligible or has granted an exemption from this condition.	for the pos	sts bearing spece Assistant Co	cial educa	, in that conditions only th ition qualification." or of Forest / Range Fo	-
Upper Subordinate Se Examination- The candidate or equivalent qualification mentioned by the candidate	IFICATION: For the posts included in the Combined State / rvices (General Recruitment / Special Recruitment) es must possess Bachelors Degree of any recognised University upto the last date for receipt of application. This should be e in the relevant column of their application form but for some	Bachelor's Physics, M or Bachelo Foreign U	degree with at lathematics, Geo or's degree in Er niversity approv	least one blogy, Fore igineering ved by th	vator of Forest:- ESSENT of the subject namely Bota estry, Statistics or a Bachelo from a University establish be Central Government fro	ny, Zoology, Chemistry, r's degree in Agriculture ed by Law in India or a om time to time, or a
	have been prescribed of which the details are given below:- through written examination and interview :-	PREFERE	NTIAL QUALIF	ICATION	nment as equivalent thereto. : A candidate who has (1)	served in the Territorial
Sub Registrar, Assistant Prosecuting Officer (Transport)	Law Graduate	other thing	s being equal, be POST OF RAN	given pre	ears, or (2) obtained a "B" c ference in the matter of direc EST OFFICER:- re of the subjects, namely	t recruitment. AL QUALIFICATION- A
District Basik Shiksha Adhikari / Associate DIOS and Other equivalent administrative posts, District	Post Graduate Degree	Chemistry Environme Bachelor's possess a	Botany, Zoolog ent or Bechelor's degree in Veter qualification reco	y, Forestr Degree ir nary Scie ognized by	y, Geology, Agriculture, Sta Agriculture or Bachelor's d nce from a University establ the Government as equivale A candidate who has: (I)	tistics, Horticulture and egree in Engineering or ished by Law in India or ent thereto.
Administrative Officer District Cane Officer, U.P. Agriculture Service Group "B"	Agriculture Graduate	Army for a Corps, or (preference	minimum period III) Represented in the matter of c	of two yea the state i lirect recru	ars, or (II) Obtained a 'B' Cert n any game, shall, other thin	ificate of National Cadet gs being equal, be given
(Development Branch) District Audit Officer	Commerce Graduate	Forest:- (*	I) No candidate	for direct r	recruitment shall be appoint lard for height and chest girth	ed to the service unless
(Revenue Audit)		Sex	Height		st girth (Fully expanded)	Expansion
Assistant Controller Legal Measurement (Grade-I) / Assistant Controller Legal	Degree in Science with Physics or Mechanical Engg. As one subject.	1 Male Female	2 163 cms. 150 cms.		3 84 cms. 79 cms.	4 5 cms. 5 cms.
Measurement (Grade-II) Assistant Labour Commissioner	Degree in Arts with Sociology or Economics as a subject or Commerce/Law.	Scheduled	Tribes and to rac	ces such a	height standard in case of s Gorkhas, Nepalies, Assam e, Garhwalies, Kumaunies,	ese, Meghalayan Tribal,
District Programme Officer	Degree in Sociology or Social Science or Home Science or Social Work.		andidates, shall b			
Senior Lecturer, DIET	Post Graduate Degree with B.Ed.		1		2	
District Probation Officer	Post Graduate Degree in Psychology or Sociology or Social Work or any qualification equivalent thereto or Post Graduate Diploma in any Branch of Social Work from any recognised Institute of Social Work.		Male Female		152.5 cms. 145.0 cms.	

(2) The male candidates will be required to qualify in walking test of 25 kms. to be completed in Four hours and female candidates of 14 kms. to be completed in Four hours. The arrangement for conducting this test will be made by the Chief Conservator of Forests, Uttar Pradesh so as to synchronise with the sittings of the Medical Board.

(B) For the post of Range Forest Officer:-

(1) No candidate for direct recruitment shall be appointed to the service unless he/she possesses the minimum standard for height and chest girth as specified below:-

Sex	Height	Chest girth (Fully expanded)	Expansion
1	2	3	4
Male	163 cms.	84 cms.	5 cms.
Female	150 cms.	79 cms.	5 cms.
		andard of beight in case of candidates l	

Tribes and to races such as Gorkhas, Nepalis, Gardhwalis, Kumaonis shall be as follows:-

Sex	Height
1	2
Male	152.5 cms.
Female	145.0 cms.

(2) The male candidates will be required to qualify a walking test of 25 kms. to be completed in Four hours and female candidates of 14 kms. to be completed in 4 hours. The arrangement for conducting this test will be made by the Principal Chief Conservator of Forests, Uttar Pradesh so as to synchronise with the sittings of the Medical Board.

PHYSICAL FITNESS: For Assistant Conservator of Forest (1) No candidate shall be appointed to a post in the service unless he/she be in good mental and bodily health and free from any physical defect likely to interfere with the efficient performance of his/her duties. Before a candidate is finally approved for appointment by direct recruitment he/she shall be required to pass an examination by a Medical Board. (2) A female candidate who as a result of test is found to be pregnant of Twelve weeks duration or more should be declared temporarily unfit. She should be re-examined for fitness after Six weeks from the date of confinement.

For Range Forest Officer:-(1) No candidates shall be appointed to a post in the service unless he/she be in good mental and bodily health and free from any physical defect likely to interfere with the efficient performance of his/her duties. Before a candidate is finally approved for appointment he/she shall be required to pass an examination by a Medical Board. (2) A Female candidate who as a result of test is found to be pregnant of twelve weeks duration or more should be declared temporarily unfit. She should be re-examined for fitness after six weeks from the date of confinement

Note: candidates before applying for the above mentioned posts should ensure himself/herself that he/she possesses the above physical standard.

11. (i) AGE LIMIT: For the Combined State/Upper Sub-ordinate Services (General Recruitment / Special Recruitment) Examination and Assistant Conservator of Forest/ Range Forest Officer Services Examination:- Candidates must have attained the age of 21 years and must not have crossed the age of 40 years on July 1, 2019 i.e. they must have not been born earlier than 2nd July, 1979 and not later than July 1, 1998. For PH candidates, the maximum age limit is 55 years i.e. they must have not been born before 02 July, 1964. (ii) Relaxation in Upper Age Limit: (a) Upper age limit shall be greater by five years for candidates belonging to Scheduled Castes of U.P., Scheduled Tribes of U.P., Other Backward Classes of U.P., Skilled players of U.P. of Classified Games, State Govt. Employees of U.P. including Teachers/Staff of the Basic Shiksha Parishad of U.P. and Teachers / Staff of the Government Aided Madhyamik Vidyalayas of U.P. i.e. Parishad of 0.P. and feachers / Staff of the Government Aided Madnyamik Vidyalayas of 0.P. te. they must have not been born before 2nd July, 1974. (b) Upper age limit shall be greater by fifteen years for physically handicapped persons of U.P. (c) Upper age limit shall also be greator by five years for Group- 'B' posts for the Emergency Commissioned Officers / Short Service Commissioned Officers / Ex-Army Personnel's of U.P. who have rendered five years service in Army, but there shall be no reservation for Group- 'B' posts. In case of availability of Group-'C' posts in the Examination, the Age relaxation and reservation shall be given according to Rule.

Note- (i) राज्य कृषि उत्पादन मण्डी परिषद के विपणन अधिकारी, लेखा एवं संम्प्रेक्षाधिकारी, सचिव श्रेणी— | | एवं विधि अधिकारी पदों हेतु:— "सिविल अपील संख्या— 4092 / 2001 स्टेट आफ उ.प्र. पिटीशनर बनाम नीरज अवस्थी व अन्य में मा0 सर्वोच्च न्यायालय द्वारा पारित निर्णय दिनांक 16.12.2005 से आच्छादित मण्डी परिषद / मण्डी समितियों की सेवा से पृथक किये गये कार्मिकों को उक्त निर्णय से आच्छादित होने के साक्ष्य सहित आवेदन करने पर अधिकतम आयु सीमा में अधिवार्षिता आयु की सीमा तक छूट अनुमन्य होगी। किसी भी स्तर पर किसी आवेदक के वास्तव में उक्त निर्णय से आच्छादित न होना पाये जाने पर उसका आवेदन शून्य समझा जायेगा और अग्रेतर उसका कोई दावा मान्य नहीं होगा।" आयु सीमा तक छूट इस प्रतिबन्ध के साथ अनुमन्य होगी कि उनके पास अधिवर्षता आयु से पूर्व पर्याप्त समय उपलब्ध हो, जिससे कि चयन होने की दशा में वे अधिवर्षता से पूर्व चयनित पद पर योगदान कर सकें। (ii) For For the post of veterinary and welfare officer, "In the case of person who has already rendered one year's service or more in any of the centralised Services or in the Palika, the maximum age-limit shall be grater to the extent he has rendered continuous service or a period of seven years whichever is less".

12. SOME INFORMATION ABOUT COMBINED STATE / UPPER SUBORDINATE SERVICES (GENERAL RECRUITMENT / SPECIAL RECRUITMENT) MAIN (WRITTEN) EXAMINATION AND INTERVIEW, AND ASSISTANT CONSERVATOR OF FOREST / RANGE FOREST OFFICER SERVICES MAIN (WRITTEN) EXAMINATION AND INTERVIEW: (i) Only such candidates will be admitted to the Main (written) examination who are declared successful in the Preliminary Examination for which the successful candidates will have to fill up another application form according to instructions of the Commission and for this application, the examination fee for Unreserved (General), Economically weaker sections, Other Backward Classes and for Candidates of Other States is Rs. 200/- and Rs. 25/- as on-line processing fee = Rs. 225/- and for Scheduled Caste and Scheduled Tribe candidates of U.P. the fee is Rs. 80/-

candidates shall be shall be admissible as entered in High School Certificate. The candidate will have to attach his/her High School or equivalent examination certificate with the application form of Main Examination. No other certificate shall be acceptable for Date of Birth and if it is not attached with the application, it shall be rejected. (4) The candidates will have to enclose self attested copies of Mark sheets, Certificates & Degrees along with the application form of Main examination in support of their claims of Educational Qualifications. If they do not enclose self attested copies of certificates/documents in support of their claims, the applications shall be rejected. (5) The benefit of reservation to the categories of Handicapped persons of society shall be given only on the posts which shall be identified by the Government for their Sub category. For this benefit, the Handicapped persons must produce a certificate of being handicapped in that Sub category issued by prescribed Medical Officer/Specialist and counter signed by the Chief Medical Officer according to Rule 3 of U.P. Public Service (Reservation for physically Handicapped, Dependent of Freedom Fighters and Ex-Servicemen (Amendment) Act. 2018. It is worth while mentioning that as per section-3 of the said Act, the new identification of post has not yet been received from the government, however as per identification (Category/Subcategory) mentioned in requisitions received from the Appointing authorities the selection process will be completed accordingly. (6) The Ex-Army Personnels must be discharged from Army upto the last date prescribed for receipt of applications. (7) Date, time and venue etc. of examination along with Roll No. will be communicated to the candidates through e-Admit Cards. Candidates will have to appear at the centre/venue allotted to them by the Commission. No change in centre/venue is permissible and no application shall be entertained in this regard. (8) The candidature of such candidates who are subsequently found ineligible according to the terms laid down in advertisement will be cancelled and their any claim for the Main Examination will not be entertained. The decision of the Commission regarding eligibility of the candidates shall be final. (9) The Application/candidature will be rejected/cancelled if the application is not submitted on prescribed form, date of birth is not mentioned or wrong date of birth is mentioned, overage, under age, not mentioning optional subject in application of Main (Written) Examination, not fulfilling the minimum educational qualifications, applications received after last date and no signature under declaration in the format. (10) The Commission may admit the candidates provisionally after summarily checking of the applications but if it is found at any stage that applicant was not eligible or that his/her application should have been rejected or was not entertainable initially, his/her candidature will be rejected and if the candidate is selected, the recommendation of the Commission for the appointment shall be withdrawn. (11) The Commission reserves the right of cancelling the candidature of any candidate found indulging in any malpractice i.e. copying in examination hall or indiscipline, misbehavior or canvassing for his/her candidature. On violation of these instructions, the candidates may be debarred from this examination as well as future Examinations and selections. In this regard, decision of the commission shall be final. (12) In all communication to the Commission, the candidate must mention the name of examination. advertisement No., registration No., date of birth, father's/Husband's name and also the Roll Number, if communicated. (13) Candidates selected for appointment will have to undergo Medical Examination as required under the Rules. (14) On the basis of the Result of Preliminary Examination, thirteen times candidates to the number of vacancies shall be declared successful for the main examination and two times candidates to the number of vacancies shall be called for the interview. (15) Scaling System will remain applicable in the optional Subjects of the Main (Written) Examination. (16) The candidates who are appearing in the Examination of essential qualification prescribed for the posts need not apply, because they are not eligible. (17) While illing the OMR answer sheets, the candidates must use Black Ball Point Pen Only. Use of any other Pen or Pencil is strictly prohibited. (18) Candidates are directed to fill in all the entries correctly in the OMR Answer Sheet. In case of leaving them blank or filling them erroneously the candidate will be wholly responsible for the same & the commission will not evaluate his / her OMR Answer Sheet. The informations filled in the OMR Answer sheets must not be erased by whitener, blade or rubber etc. (19) Candidates shall be provided OMR answer sheets in duplicates i.e. original copy and candidate's copy. After completion of the examination, the candidates are required to hand over the original copy to the Invigilator and the candidate's copy to keep with them. (20) In the Preliminary Examination for the objective type Question papers, penalty (Negative Marking) shall be imposed for wrong answers given by the candidates which is as below:- (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one third (0.33) of the marks assigned to that question will be deducted as penalty. (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answer happens to be correct and there will be same penalty as above for that question. (iii) If a question is left blank i.e. no answer is given by the candidate, there will be no penalty for that question. (21) The minimum efficiency standard for S.C. & S.T. candidates is fixed 35% i.e. the Candidates of these Categories shall not be placed in the merit/select list if they have secured less than 35% marks in the Preliminary/Main examination. Similarly, the minimum efficiency standard for the candidates of other categories is fixed 40% i.e. such candidates shall not be placed in the merit/select list if they have secured less than 40% marks in the Preliminary/Main examination. All such candidates who have secured less marks than the marks of minimum efficiency standard as fixed by the Commission shall be treated disqualified. (22) The candidates shall be required to obtain such minimum marks in compulsory paper of General Hindi, as may be determined by the Govt. or the Commission, as the case may be. **(23)** Paper-II of the Preliminary Examination will be a qualifying paper with minimum qualifying narks fixed at 33%. It is mandatory for the Candidates to appear in both the papers of Preliminary Examination for the purpose of evaluation. Therefore a candidate will be disqualified in case he does not appear in both in papers. The merit of the Candidates will be determined on the basis of marks obtained in Paper-I of the Preliminary Examination.

14. Physical Measurement: Physical Measurements will be applicable according to Service Rules/ requisitions, in case of availability of posts e.g. Dy. Superintendent of Police, Superintendent of Jail, District Commandant Home Guards, Excise Inspector and Deputy Jailor etc. which is mentioned as below:

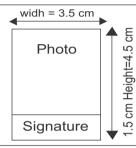
For the post of D.S.P.

Rs. 225/- and for Scheduled Caste and Scheduled Tribe candidates of 0.P. the fee is Rs. 60/-				
and Rs. 25/-as on-line processing fee = Rs. 105/-only. The candidates of Physically	Category of Candidates	Height	Chest	(Cm.)
Handicapped category of U.P. are exempted from fee but they have to pay Rs. 25/- only as on- line processing fee, but the candidates of D.F.F. and Ex-Army Personnel's category of U.P. shall		(Cm.)	Unexpanded	Expanded
have to deposit their fee according to their original category. (ii) For the Combined State/Upper	(i) For Male candidates only General,	165	84	89
Subordinate Services (General Recruitment / Special Recruitment) Main (Written) Examination	Other Backward Classes of Citizens			
and Assistant Conservator of Forest / Range Forest Officer Services Main (Written) Examination	and Scheduled Castes.			
the Candidates are required to fill up and submit their On Line Applications and deposit required	(ii) For Scheduled Tribes	160	79	84
ee separately. Both the Main (Written) Examinations shall be conducted separately by the	(iii) For Female candidates only	152		olicable.
ommission. (iii) Candidates should carefully note that they will have to appear in the main		152	Not ap	Jilcable.
examination against the same Roll No. allotted for the Preliminary Examination. (iv) The dates and venue for the Main examinations shall be informed by the Commission later on through e-	General, Other Backward Classes			
Admit cards. (v) Only such candidates will be called for interview who are declared successful on	of Citizens and Scheduled Castes.			
he basis of the main (written) examination. (vi) Candidates will have to fill up the prescribed	(iv) For Scheduled Tribes	147		olicable.
application form before the Interview (viva-voce test). (vii) Preferences for different posts will be	(v) Minimum weight for female	40 Kg.	Not ap	plicable.
asked at the time of Interview which will be treated final and no change therein will be admitted.	candidates of all categories			
n this regard no application for error correction/modification shall be acceptable. (viii) All original	For the post of District Co	mmanda	nt Home Guards	5.
certificates shall be verified at the time of Interview. Candidates will also be required to furnish	Category of Candidates	Height	Chest	(Cm.)
our passport size Photographs, two unattested and two attested by their Head of Department or Head of the Institution where they have received education or by a Gazetted Officer at the time of		(Cm.)	Unexpanded	Expanded
nterview. (ix) Candidates serving under the Central or State government will have to produce	(i) Male Candidates	165	84	89
No Objection Certificate' from their employer at the time of interview issued by the competent	(ii) Female Candidates	150	79	84
authority. (x) It is essential for the candidates to appear in the interview who qualify on the basis	(iii) For the candidates of Scheduled	160	84	89
of Main Examination.	Tribes and Male Candidates of			
NOTE: The candidates must enclose self attested copies of all certificates in support of their	Kumayun and Gadhwal Divisions.			
laims rendered in the application form for main examination of the Combined State / Upper	For the post of Su	perinten	dent Jail	
Subordinate Services (General Recruitment / Special Recruitment) Examination and Assistant Conservator of Forest / Range Forest Officer Services Examination. If they do not enclose self	(i) Height 168 cm and in the condition of candi			hwal Divisions
attested copies of all certificates in support of their claims, their candidature shall be cancelled.	less than 163 cm.		·····, ·····	
13. IMPORTANT INSTRUCTIONS FOR CANDIDATES: (1) As per decision of the UPPSC a	(ii) Chest 81.3 cm. (unexpanded) and 86.3 cm	. (expand	ed)	
candidate will be liable to be debarred from this examination and all other future examinations				
and selections upto a maximum period of five years for furnishing any wrong information in	For the post of E	Excise In	spector	
his/her application form which cannot be substantiated by relevant documents or for any other	Category of Candidates	Height	-	(Cm)
nalpractice. (2) The claim of category, subcategory, domicile, gender, date of birth, name and	outegory of outduties	(Cm.)	Unexpanded	Expanded
ddress will be valid only till the last date of online application. On submission of false/misleading	(i) Male Candidates	167	81.2	86.2
nformation, the candidature will be cancelled. In this regard no application for error		167	01.2	00.2
correction/modification shall be acceptable. Incomplete application form shall be summarily			1	
rejected and no correspondence shall be entertained in this regard. (3) The date of birth of the	(iii) For other Female Candidates	152		

	Fo	or the post of Deputy Jailo	r	page candidate can see interview and examination schedule details periodically. 4. On clicking
Category of	Height	Chest Measurement	Expansion of chest	"Key Answer Sheet" candidate can download key answer sheet. 5. On clicking "Admit Card/Hall Ticket" candidate can download their Admit Card using with some basic credential of candidate.
Candidates	(C.M.)	(unexpended) (C.M.)	(Minimum) (C.M.)	6. On clicking "List of Rejected Candidate" candidate can view rejected candidate list. 7. On
For Male 168 Candidates	168	81.3	0.5	clicking "Syllabus" candidate can view syllabus of particular examination. (Candidates applying On-line need NOT send hard copy of the On-line Application filled by them On-line or any other
For Female	450	Weight		document/certificate/testimonial to the Uttar Pradesh Public Service Commission. However
Candidates	152	45 to 58 k.g.		they are advised to take printout of the On-line Application and retain it for further communication with the UPPSC.) (The Candidates applying for the examination should ensure
In the case of a Ca under:-	andidate belong	ing to Scheduled Tribes the me Male - 160 cms.	asurement of height shall be as	that they fulfill all eligibility conditions for admission to examination. Their admission at all the
under		Female - 147 cms.		stages of the examination will be purely provisional subject to satisfying the prescribed eligibility conditions). UPPSC takes up verification of eligibility conditions with reference to original
		ENERAL INSTRUCTIONS		documents at subsequent stages of examination process.
			ed after the last prescribed date and without photograph and	LAST DATE FOR RECEIPT OF APPLICATIONS: On-line Application process must be
signature, even w	when received in t	time, may be summarily rejecte	ed. 2. In the On-line	completed (including filling up of Part-I, Part-II and Part-III of the Form) before last date of form submission according to advertisement, after which the Web. Link will be disabled.
			ations have been duly filled and Candidates must take the Print	APPENDIX-1
and keep it safe	ely. In any discre	epancy, the candidates will h	ave to produce the said print	The Procedure relating to upload Photo & Signature:-
reservation/age	relaxation must	obtain a certificate, issued b	willing to take the benefit of the by the competent authority, in	Guide Lines for Scanning Photograph with Signature1. Paste the Photo on any white paper as per the above required dimensions. Sign in the
			d in this detailed advertisement ever required to do so. Those	Signature Space provided. Ensure that the signature is within the box. 2. Scan the above
claiming more th	an one reserva	tion/age relaxation will be give	en only one such concession,	required size containing photograph and signature. Please do not scan the complete page. 3. The entire image (of size 3.5 cm by 6.0 cm) consisting of the photo along with the signature is
			nally domicile of U.P. belonging en, Skilled players and P.H. are	required to be scanned, and stored in * .jpg, .jpeg, .gif, .tif, .png format on local machine. 4.
			candidates will be treated as e caste certificate issued from	Ensure that the size of the scanned image is not more than 50 KB. 5. If the size of the file is more than 50 KB, then adjust the settings of the scanner such as the DPI resolution, no. colours etc.,
father side will be	treated valid. 4.	The Commission do not adv	vise to candidates about their	during the process of scanning. 6. The application has to sign in full in the box provided. Since
			tisement and when satisfied ment, only then apply. The	the signature is proof of identify, it must be genuine and in full; initials are not sufficient. Signature in CAPITAL LETTERS is not permitted. 7 . The signature must be signed only by the
candidates mus	t possess all th	he requisite qualifications til	I the last date for submitting	application and not by any other person. 8. The signature will be used to put on the Hall Ticket
daughters, grand	dsons (Son's so	on/Daughter's son) and gran		and wherever necessary. If the Applicant's signature on answer script, at the time of the examination, does not match the signature on the Hall Ticket, the applicant will be disqualified.
			advised that the candidates of the District Magistrate in terms of	Sample Image & Signature: widh = 3.5 cm
Govt. Order No. 4	453/79-V-1-15-1	(ka) 14-2015, dated 07.04.201	15 in the prescribed format and	
important inform	ation, pendency	y of any case / criminal cas	ate in the concealment of any e, conviction, more than one	Photo
			anner, malpractice, canvassing ht to reject the candidature and	
debar him from a	appearing in the	examination in question and i	n all other future examinations	leid leid
			"On-line Application" they may site clicking 'Contact us'. 8. The	
			ven in Appendix-1 . The names ertisement in Appendix-2 . and	Signature Signature
performance of ca	aste certificates f	for different reserved categorie	s are given in Appendix-3 . The	
and Instructions	ion on Appendi and syllabus for	x-4 , the syllabus for Preliminar the Combined State / Upper S	ry Examination on Appendix-5 Subordinate Services (General	The name of the districts in which the Preliminary Examination will be held are as follows -
Recruitment / Spe	ecial Recruitmer	nt) Main Examination is given or	n Appendix-6 respectively. For rvices Examination the Plan of	Agra, Aligarh, Ayodhya, Azamgarh, Barabanki, Bareilly, Gautambuddha Nagar,
	Syllabus for Mai	n (Written) Exam are available		Ghaziabad, Gorakhpur, Jaunpur, Jhansi, Kanpur Nagar, Lucknow, Mathura, Meerut, Mirzapur, Moradabad, Prayagraj, Rae Bareli, Sitapur and Varanasi.
At the top of the		Detailed Application Form Declaration. The candidates	are advised to go through the	APPENDIX - 3
contents of the D	eclaration carefu	ully. Candidate has the option e	either to agree or disagree with ot agree' buttons. In case the	
candidate opts f	to disagree, the	e application will be dropped	d, and the procedure will be	प्रमाणित किया जाता है कि श्री/श्रीमती/कमारी
		ly will submit the candidate's O n shows information relevant to		🕅 श्रीतहसील
Personal Detail	s: This section	shows information about ca	ndidate's personal details i.e.	नगरजिलाजाति के व्यक्ति है जिसे संविधान (अनुसूचित जाति) आदेश, 1950 (जैसा कि समय-समय) पर संशोधित हुआ) / संविधान (अनुसूचित
domicile, Catego	ry, Marital Status	s Name, Father/Husband's Na s, Email-ID and Contact Numbe	ame, Gender, Date of Birth, UP er.	जनजाति, उत्तर प्रदेश) आदेश, 1967 के अनुसार अनुसूचित जाति/अनुसूचित जनजाति के रूप में मान्यता दी गई है।
Other Details of	Candidate: Oth		he information details about UP	श्री/श्रीमती/कुमारीतथा अथवा उनका परिवार उत्तर प्रदेश
Education & Exp	perience Details	s: It shows your educational and	d experience details.	केग्रामग्राम
		Gignature details: Here o with your signature.	you will see your complete	तहसीलजिलामें सामान्यतया रहता है।
Declaration Seg	ment: At the bo	ottom of the page there is a 'D	Declaration' for the candidates.	स्थानहस्ताक्षर
above particulars	there is provisio	on for preview your detail before	aration carefully. After filling all final submission of application	दिनांक पूरा नाम
form on clicking o	on "Preview" butto try time if you are	on. Preview page will display al e sure with filled details then cl	I facts/particulars that you have ick on "Submit" button to finally	मुहरपद का नाम जिलाधिकारी/अतिरिक्त जिलाधिकारी/सिटी मजिस्ट्रेट/परगना मजिस्ट्रेट/तहसीलदार/
push data into ser	rver with success	sfully submission report that yo	u can print.	अन्य वेतन भोगी मजिस्ट्रेट यदि कोई हो/ जिला समाज कल्याण अधिकारी
	ARE ADVISED		PAGE BY CLICKING ON THE	उत्तर प्रदेश के अन्य पिछड़े वर्ग के लिए जाति प्रमाण-पत्र
For Other inform		RINT" OPTION AVAILABLE]		प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी
		are advised to select desired op	otion in 'Home Page' of	श्रीनिवासी ग्राम
		CANDIDATE SEGMENT		तहसीलजिलाउत्तर प्रदेश राज्य
NOTIFICATIO				की
	ns/Advertisem	ients		जातियों, अनुसूचित जन जातियों तथा अन्य पिछड़े वर्गों के लिये आरक्षण) अधिनियम, 1994 (यथासंशोधित) की अनुसूची एक के अन्तर्गत मान्यता प्राप्त है।
	M SUBMISSIO			एक के अन्तर्गत मान्यता प्राप्त ह। यह भी प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारीपूर्वोक्त अधिनियम, 1994
	Registration (FI			वह मा प्रमाणित किया जाता है कि आ/आमता/कुमारा
		ation (SECOND STAGE)		पिछड़े वर्गों के लिये आरक्षण) (संशोधन) अधिनियम, 2001 द्वारा प्रतिस्थापित किया गया है एवं जो उत्तर प्रदेश लोक सेवा
		THIRD STAGE)		(अनुसूचित जातियों, अनुसूचित जन जातियों और अन्य पिछड़े वर्गों के लिये आरक्षण) (संशोधन) अधिनियम, 2002 द्वारा
	N FORM STAT			संशोधित की गयी है, से आच्छादित नहीं है। इनके माता-पिता की निरंतर तीन वर्ष की अवधि के लिये सकल वार्षिक आय
Update your tr	ransaction ID b	y Double Verification mode		आठ लाख रूपये या इससे अधिक नहीं है तथा इनके पास धनकर अधिनियम, 1957 में यथा विहित छूट सीमा से अधिक
-				

APPENDIX-1

ide Lines for Scanning Photograph with Signature



APPENDIX-2

APPENDIX - 3

	त जाति तथा अनुसूचि			
प्रमाणित किया जाता है कि	श्री/श्रीमती/कुमारी			सुपुत्र/सुपुत्री
श्री	निवासी ग्र	ाम	तहसील	
नगरजिला	उत्त	तर प्रदेश राज्य की		जाति के
व्यक्ति है जिसे संविधान (अनुसूचित ज	ाति) आदेश, 1950 (जैस	ा कि समय-समय) प	गर संशोधित हुआ) / र	संविधान (अनुसूचित
जनजाति , उत्तर प्रदेश) आदेश, 1967 ह	के अनुसार अनुसूचित जा	ति/अनुसूचित जनज	गति के रुप में मान्यता	। दी गई है।
श्री/श्रीमती/कुमारी			.तथा अथवा उनका	परिवार उत्तर प्रदेश
के				
तहसील	नगर	f	जला	में सामान्यतया
रहता है।				
स्थान		हस्ताक्षर		
दिनांक		पूरा नाम		
मुहर				
f	जेलाधिकारी/अतिरिक्त र्ा			
	अन्य वेतन भोग	ी। मजिस्ट्रेट यदि क	गेई हो/ जिला समाज	। कल्याण अधिकारी

उत्तर प्रदेश के अन्य पिछडे वर्ग के लिए जाति प्रमाण-पत्र

प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारीसुपुत्र/सुपुत्री
श्रीिनवासी ग्राम
तहसीलजिलाउत्तर प्रदेश राज्य
कीपिछड़ी जाति के व्यक्ति हैं। यह जाति उत्तर प्रदेश लोक सेवा (अनुसूचित
जातियों, अनुसूचित जन जातियों तथा अन्य पिछड़े वर्गों के लिये आरक्षण) अधिनियम, 1994 (यथासंशोधित) की अनुसूची
एक के अन्तर्गत मान्यता प्राप्त है।
यह भी प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी
(यथासंशोधित) की अनुसूची-दो (जैसा कि उत्तर प्रदेश लोक सेवा) (अनुसूचित जातियों, अनुसूचित जन जातियों और अन्य
पिछड़े वर्गों के लिये आरक्षण) (संशोधन) अधिनियम, 2001 द्वारा प्रतिस्थापित किया गया है एवं जो उत्तर प्रदेश लोक सेवा
(अनुसूचित जातियों, अनुसूचित जन जातियों और अन्य पिछड़े वर्गों के लिये आरक्षण) (संशोधन) अधिनियम, 2002 द्वारा
संशोधित की गयी है, से आच्छादित नहीं है। इनके माता-पिता की निरंतर तीन वर्ष की अवधि के लिये सकल वार्षिक आय

View Application Status	सम्पत्ति भी नहीं है।
List of Applications Having Photo related Objections	श्री/श्रीमती/कुमारीतहसील
Print Duplicate Registration Slip	मं सामान्यतया रहता है।
Print Detailed Application Form	स्थान हस्ताक्षर दिनांक पूरा नाम
EXAMINATION SEGMENT	महर
Print Address Slip for sending Documents to Commission [Only for Direct Recruitment]	जिलाधिकारी/अतिरिक्त जिलाधिकारी/सिटी मजिस्ट्रेट/परगना मजिस्ट्रेट/तहसीलदार।
DOWNLOAD SEGMENT	(учя-і)
Download Admit Card	उत्तर प्रदेश सरकार
Download Interview Letter	कार्यालय का नाम
Download Syllabus	कायालय का नाम आर्थिक रूप से कमजोर वर्ग के सदस्य द्वारा प्रस्तुत किया जाने वाला आय एवं परिसम्पति प्रमाण-पत्र
Know your Registration No.	प्रमाण पत्र संख्या दिनांक
Click here to view Key Answer Sheet	वित्तीय वर्ष के लिए मान्य
Regarding application	प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी
1. On clicking "View Application status" option in candidate Segment page you can see current status of candidate. 2. On clicking "Result" option in candidate Segment page candidate can	पोस्ट ऑफिस थाना
see result status of periodically. 3. "Interview/Exam Schedule" option in candidate Segment	तहसील जिला जिला राज्य

सम्पत्ति भी नहीं है।

	कोड के स्थायी निवासी है, जिनव		अनुसार स्वतंत्रता संग्राम सेनानी हैं और श्री/श्रीमती/कुमारी (आश्रित)	पुत्र या
आर्थिक रूप से कमजोर वर्ग	के सदस्य है, क्योंकि वित्तीय वर्ष में इनके प	गरिवार की कुल वार्षिक आय 8 लाख	पुत्रों का पुत्र) पत्री (पुत्र की पुत्री या पुत्री की पुत्री) (विवाहित अर्थवा अविवाहित) उपरांकित अधिनियम 1993 (यथा संशोधि	रत) के
(आठ लाख रूपये मात्र) से क	म है। इनके परिवार के स्वामित्व में निम्नलिखित में से कोई	भी परिसम्पत्ति नहीं है :-	प्राविधानों के अनुसार उक्त श्री/श्रीमती (स्वतंत्रता संग्राम सेनानी)के आश्रित है।	
			स्थानहस्ताक्षर	
	कड़ कृषि योग्य भूमि अथवा इससे ऊपर।		दिनांकपूरा नाम	
II. एक हजार	वर्ग फीट अथवा इससे , अधिक क्षेत्रफल का फ्लैट।		मुहर	
III. अधिसत्तित	1 नगरपालिका के अंतर्गत 100 वर्ग गज अथवा इससे अधिव	n का आवासीय भरवण्ड।	्रिलाधिकारी	
			सील	
	1 नगरपालिका से इतर 200 वर्ग गज अथवा इससे अधिक व	C1	कुशल खिलाड़ियों के लिये प्रमाण-पत्र जो उ.प्र. के मूल निवासी हैं	
2. श्री/श्रीमती	।/कुमारी जाति	के सदस्य है जो	कुशल खिलाड़िया के लिय प्रमाण-पत्र जा उ.प्र. के मूल निवास ह	
अनसचित जाति अनसचित	जनजाति तथा अन्य पिछड़े वर्गों के रूप में अधिसूचित नहीं व	है।	शॉसनादेश संख्या-22/21/1983-कार्मिक-2 दिनांक 28ॅनवम्बर, 1985	
	-		प्रमाण-पत्र के फार्म - 1 से 4	
आवेदक का		(कार्यालय का मुहर सहित)	प्रारूप - 1	
	पूरा नाम		(मान्यता प्राप्त क्रीड्रा/खेलू में अपने देश की ओर से अन्तर्राष्ट्रीय प्रतियोगिता में भाग लेने वाले खिलाड़ी के वि	लूय)
पासपोर्ट साईज	पदनाम		सम्बन्धित खेल की राष्ट्रीय फेडरेशन/राष्ट्रीय एसोसिएशन को नाम	को
का अभिप्रमाणित		अतिरिक्त जिलाधिकारी / सिटी	सेवाओं/पदों पर नियुक्ति के लिए कुशल खिलाड़ियों के लिए प्रमाण-पत्र	
			प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी जात्मज/पत्नी/आत्मजा श्री नि	नेवासी
फोटोग्राफ	माजस्ट्रट / परग	ना मजिस्ट्रेट / तहसीलदार।	प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी ने दिनांक	ान का
			िनाम) में आयोजित(कोडा/खेल-कद का नाम) को प्रतियोगिता/टनमिन्ट में देश को ओर से भाग लिया।	
	(प्रपत्र-II)		उनके टीम के द्वारा उक्त प्रतियोगिता/दूर्नामेन्ट मेंस्थान प्राप्त किया गया।	
3	आर्थिक रूप से कमजोर वर्ग के लाभार्थ स्वयं घोष	ন্দা দর	यह प्रमाण-पत्र राष्ट्रीय फेडरेशन/राष्ट्रीय एसोसिएशन/(यहाँ संस्था का नाम दिया जाये)में उग	पलब्ध
	स्वयं घोषणा पत्र		उनके टीम के द्वारा उक्त प्रतियोगिता/टूर्नामेन्ट में	
<u>#</u>	पुत्र/पुत्री/पत्नी ग्राम/कस्बा	पोस्ट ऑफिस	स्थानहस्ताक्षर	
्राज्य आज्य व्याक	पुत्र/पुत्र/पुत्रा/परभा	ਪਾਵਰ ਗਾਪਾਰ	दिनांक	
	ि के प्रमाण पत्र हेतु आवेदन दिया है , एतद् द्वारा घोषणा कर	੨੦੦ ੨	पद	
न आयिक रूप स कमजार वग	न के प्रमाण पत्र हतु आवदन दिया है, एतद् द्वारा घाषणा कर		संस्था का नाम	
1. 4	जाति से सम्बन्ध रखत	ता/रखता हू, जा उत्तर प्रदश हतु		
	नुसूचित जाति, अनुसूचित जनजाति एवं अन्य पिछड़ा वर्ग व		मुहरमुहर नोट : यह प्रमाण-पत्र नेशनल फेडरेशन / नेशनल एसोसिएशन के सचिव द्वारा व्यक्तिगत रूप से किये गये हस्ताक्षर हो	ोने पर
2. मेरे परिवार	की कुल श्रोतों (वेतन, कृषि, व्यवसाय, पेशा इत	ऱ्यादि) से कुल वार्षिक आय रू	ही मान्य होगा।	1114
	(शब्दों में) है।	Ū.		
3. मेरे परिवार के	पास उल्लिखित आय के सिवाय अथवा इसके अतिरिक्त अ	न्यत्र कोई परिसम्पत्ति नहीं है।	<u>प्रारूप - 2</u> (मान्यता प्राप्त क्रीड़ा/खेल में अपने प्रदेश की ओर से राष्ट्रीय प्रतियोगिता में भाग लेने वाले खिलाड़ी के लि	
	अथवा		(मान्यता प्राप्त क्रीडा/खेल में अपने प्रदेश की ओर से राष्ट्रीय प्रतियोगिता में भाग लेने वाले खिलाड़ी के लिग	ये)
कर्त क्यानों पर	र स्थित परिसम्पत्तियों को जोड़ने के पश्चात् भी मैं (नाम) .	्याशिक	(सम्बन्धित खेल की प्रदेशीय एसोसिएशन का नाम)	पदों
का से का नो	र वर्ग के दायरे में आता/आती हूँ।		पर नियक्ति के लिए कशल खिलाडियों के लिये प्रमाण-पत्र	
राज से प्रमाण			प्रमाणित किया जाता है कि श्री/श्रीमर्ती/कमारी नि	नेवासी
4. म धाषणा कर	ता/करती हूँ कि मेरे परिवार की सभी परिसम्पत्तियों को 1 से अधिक नहीं है।	जाड़न क पश्चात् निम्नालाखत म स	(परा पता)	
			में (क्रीड़ा/खेल-कूद का नाम) की प्रतियोगिता (टूर्नामेन्ट स्थान का नामआयोजित र 	राष्टीय
	कृषि योग्य भूमि अथवा इससे ऊपर।		में (कीडा/खेल-कद का नाम) की प्रतियोगिता/टर्नामेन्ट में प्रदेश की ओर से भाग लिया।	X
	फीट अथवा इससे, अधिक क्षेत्रफल का फ्लैट।		उनके टीम के द्वारा उक्त प्रतियोगिता/टूर्नीमेन्ट में	
III. अधिसूचित नग	ारपालिका के अंतर्गत 100 वर्ग गज अथवा इससे अधिक क	ग आवासीय भूखण्ड।	यह प्रमाण-पत्र	या है।
IV. अधिसंचित नग	ारपालिका से इतर 200 वर्ग गज अथवा इससे अधिक का अ	भावासीय भखण्ड।	स्थानहस्ताक्षर	ii cii
मैं प्रमाणित कर	ता/करती हूँ कि मेरे द्वारा उपरोक्त जानाकरी मेरे ज्ञान और	र विश्वास के अनसार सत्य है और मैं	दिनांक	
थर्शिक ज्या से क्यू चोर त्या र	के लिए थारथांग स्वतिशा एगत करने हेत एतता शारण क	जना/करती हूँ। राटि मेरे दारा दी गर्द	ЧС-1142	
जानकारी थसत्य/गलत पार्य	के लिए आरॅक्षण सुविधा प्राप्त करने हेतु पात्रता धारण क ो जाती है तो मैं पूर्ण रूप से जानता हूँ/जानती हूँ कि इस	' आतेटन एव के आधार एर दिरो गरे	संस्था का नाम	
ן טוויועזיגו טוגופין זונוגן אוש				
ागगण पत्र के टांग षौधोगक			। । । । । । । । । । । । । । । । । । ।	
प्रामण पत्र के द्वारा शैक्षणिक जनमेगी (केंद्र नियम जनमेगा भा	5 संस्थान में लियाँ गया प्रवेश/लोक सेवाओं एवं पदों में प्र भारत का प्राप्त के आहम पर कोई अन्य महिला/ज्ञ	अप्ति की गई नियुक्ति निरस्त कर दा र प्राप्त किया गया है उससे भी बंचिव	Ч	
प्रामण पत्र के द्वारा शक्षणिक जायेगी/कर दिया जायेगा अ	े संस्थान में ।लया गया प्रवंश/लांक संवाआ एवं पदा में प्र थवा इस प्रामण पत्र के आधार पर कोई अन्य सुविधा/लाभ प्रवृक्ष के निष्ट्र प्रनं नियालें के अधीर की नियन की नार	प्राप्त का गई नियुक्ति निरस्त कर दा न प्राप्त किया गया है उससे भी वंचित जन्मी जन्मर्यस्य के जिस मैं जन्मन्यती	पता मुहर 	
जायेगी/कर दिया जायेगा अ किया जा सकेगा और इस स	े संस्थान में लिया गया प्रवंश/लोक संवाओं एवं पदी में 5 थवा इस प्रामण पत्र के आधार पर कोई अन्य सुविधा/लाभ म्बन्ध में विधि एवं नियमों के अधीन मेरे विरूद्ध की जाने	भारत की गई नियुक्ति निरस्त कर दो 1 प्राप्त किया गया है उससे भी वंचित वाली कार्यवाही के लिए मैं उत्तरदायी	पता मुहर नोट : यह प्रमाण-पत्र प्रदेशीय खेल-कूद संघ के सचिव द्वारा व्यक्तिगत रूप से किये गये हस्ताक्षर होने पर ही मान्य ह	
जायेगी/कर दिया जायेगा अ किया जा सकेगा और इस स रहूँगा/रहूँगी।	थवा इस प्रामण पत्र के आधार पर कोई अन्य सुविधा/लाभ ाम्बन्ध में विधि एवं नियमों के अधीन मेरे विरूद्ध की जाने	भाष्त्र को गई नियुक्त निरस्त कर दो 1 प्राप्त किया गया है उससे भी वंचित वाली कार्यवाही के लिए मैं उत्तरदायी	मुहरमुहर नोट : यह प्रमाण-पत्र प्रदेशीय खेल-कूद संघ के सचिव द्वारा व्यक्तिगत रूप से किये गये हस्ताक्षर होने पर ही मान्य ह प्रारूप- 3	
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(v) B-can perform work by bending		Yes/No	successive stages viz :-
 (vi) S-can perform work by sitting. (vii) ST-can perform work by standing 		Yes/No	(1) Preliminary Examination (Objective Type & Multiple choice). 2- Main Examination
(viii) W-can perform work by standing		Yes/No	(Conventional Type, i.e. Written examination). 3- Viva- Voce (Personality Test).
(ix) SE-can perform work by seeing.		Yes/No	PRELIMINARY EXAMINATION
(x) H-can perform work by hearing/sp		Yes/No	The Preliminary examination for the Combined State / Upper Subordinate Services
(xi) RW-can perform work by reading	0	Yes/No	(General Recruitment / Special Recruitment) Examination and Assistant Conservator of
)r)	(Dr)	Forest / Range Forest Officer Services Examination will consist of two compulsory papers
Member	Member	Chairperson	of which answer sheet be on OMR sheets. The syllabus for Combined State / Upper
Medical Board	Medical Board	Medical Board	Subordinate Services (General Recruitment / Special Recruitment) Examination and
		Countersigned by the	Assistant Conservator of Forest / Range Forest Officer Services Examination is mentioned
		Medical Superintendent/CMO/HQ	in Appendix-5 of this advertisement. The papers shall be 200 marks each and of two hours
		Hospital (with seal)	durations. Both the papers shall be objective Type & multiple choice in which there shall be
* Strike out which is not applicable.			150-100 questions Respectively. The timing of paper I will be from 9.30 to 11.30 A.M. and
उत्तर प्रदेश लोक सेवा (शारीरिक रूप से विकलां	ग स्वतंत्रता संग्राम सेन	ानियों के आश्रितों और भतपर्व सैनिकों के	paper II from 2.30 to 4.30 P.M.
लिए आरक्षण) अधिनियम, 1993 (यथासंशोधित) व			Note : (1) Paper-II of the Preliminary Examination will be a qualifying paper with
	ग्रमाण-पत्र	वित्रित रागाना के आजरा के लिए अनाम-भव	minimum qualifying marks fixed at 33%. (2) It is mandatory for the Candidates to
प्रमाणित किया जाता है कि श्री/श्रीमती/कुमारी		ग्राम	appear in both the papers of Preliminary Examination for the purpose of evaluation.
तहसील			Therefore a candidate will be disqualified in case he does not appear in both in
(शारीरिक रूप से विकलांग, स्वतंत्रता संग्राम सेनानिये			papers. (3) The merit of the Candidates will be determined on the basis of marks
			Contd

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	ed in Paper-I of the Preliminary Examination. CTS FOR THE COMBINED STATE / UPPE	R SUBORDINATE SER	VICES	Elementary Mathematics (Upto Class X Level) 1. Arithmetic:- (i) Number systems: Natural Numbers, Integers, Rational and Irrational
	RAL RECRUITMENT / SPECIAL RECRU			numbers, Real numbers, Divisors of an Integer, prime Integers, L.C.M. and H.C.F. of
-	NATION : The Written examination will consist of		-	integers and their Interrelationship.
•	I subjects. The syllabus whereof is mentioned in A			(ii) Average (iii) Ratio and proportion (iv) Percentage (v) Profit and Loss (vi) Simple and
	ndidates have to select any one subject from the	list of optional subjects fo	r main	Compound Interests (vii) Work and Time (viii) Speed, Time and Distance 2. Algebra :- (i) Factors of polynomials, L.C.M. and H.C.F. of polynomials and their
	ation which will consist of two papers.			Interrelationship, Remainder theorem, simultaneous linear equations, quadratic
(A) CO	MPULSORY SUBJECTS 1. General Hindi	150 marks		equations. (ii) Set Theory:- Set, null set, subsets and proper subsets of a set, operations
-		150 marks		(Union, Intersections, difference, symmetric difference) between sets, venn diagram.
-	2. Essay			3. Geometry:- (i) Constructions and theorems regarding triangle, rectangle, square,
-	3. General Studies (First Paper)	200 marks		trapezium and circles, their perimeter and area. (ii) Volume and surface area of sphere,
Ļ	4. General Studies (Second Paper)	200 marks		right circular cylinder, right circular Cone and Cube. 4. Statistics:- Collection of data, Classification of data, frequency, frequency distribution,
	5. General Studies (Third Paper)	200 marks		tabulation, cumulative frequency. Representation of data - Bar diagram, Pie chart,
	6. General Studies (Fourth Paper)	200 marks		histogram, frequency polygon, cumulative frequency curves (ogives), Measures of
Comp	Ilsory Subject viz: General Hindi, Essay and (General Studies (First, Se	econd,	Central tendency: Arithmetic Mean, Median and Mode.
	nd Fourth papers) Papers Shall be Conventional ty			General English Upto Class X Level
	ours time is allowed. For optional Question papers		d. Two	1. Comprehension
	d maximum marks has been allotted for each optio			 Active Voice and Passive Voice Parts of Speech
	1. Timing of examination paper of 3 hours i.e. 9 A candidate shall be required to obtain s			4. Transformation of Sentences
	Isory paper of General Hindi, as may be dete			5. Direct and Indirect Speech
	mmission, as the case may be. There shall be T			6. Punctuation and Spellings
	of Optional subject and each section v			 7. Words meanings 8. Vocabulary & Usage
	lates are required to answer only Five ques			9. Idioms and Phrases
minim	um Two questions from each section.			10. Fill in the Blanks
	(B) OPTIONAL SUBJECTS ARE A			्रसामान्य हिन्दी (हाईस्कूल स्तर तक) के पाठ्यक्रम में सम्मिलित किये जाने वाले विषय
1. Agri 2. Zool		21. Mechanical Engine 22. Electrical Enginee		(1) हिन्दी वर्णमाला, विराम चिन्ह (2) शब्द रचना, वाक्य रचना, अर्थ
3. Che	- 37	22. Electrical Enginee 23. English Lit.	nng	(2) शब्द रचना, वाक्य रचना, अथ (3) शब्द—रूप
4. Phys		24. Urdu Lit.		(4) संधि, समास
-	nematics 15. Statistics	25. Hindi Lit.		(5) क्रियायें
6. Geo	graphy 16. Management	26. Sanskrit Lit.		(6) अनेकार्थी शब्द
7. Ecol		27. Commerce &		(7) विलोम शब्द (8) पर्यायवाची शब्द
8. Soci	ology International Relations	Accountancy		(8) पंचायवाया शब्द (9) मुहावरे एवं लोकोक्तियां
	osophy 18. History	28. Public Administrat	ion	
10 . Ge	bsophy 18. History blogy 19. Anthropology	28. Public Administrat 29. Medical Science	ion	(10) तत्सम एवं तद्भव, देशज, विदेशी (शब्द भंडार) (11) वर्तनी
10 . Ge	Description18. Historyblogy19. Anthropologyvchology20. Civil Engineering	29. Medical Science	ion	(10) तत्सम एवं तद्भव, देशज, विदेशी (शब्द भंडार) (11) वर्तनी (12) अर्थबोध
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respect to problems and relationship between Population, Environment and Urban General Issues on Environmental ecology, Bio-diversity and Climate Change - tha require subject specialization, General awareness of the subject is expected candidates. General Science:- Questions on General Science will cover general appreciat	at do not ed from 5- History of the world will include events from 18 th century to middle of the 20 th century such as French revolution of 1789 industrial revolution. World Wars, redraw of national
understanding of Science including matters of every day observation and experied may be expected of a well educated person, who has not made a special study	ence, as 6. Salient features of Indian Society and culture
scientific discipline. Note:- Candidates are expected to have general awareness about the above subjection special reference to Uttar Pradesh.	ects with 8- Meaning of liberalization, privatization and globalization and their remedies.
Paper-II General Studies-II	polity and social structure. 9- Social empowernment, communalism, regionalism & secularism.
	o hours ks - 200 10- Distribution of major natural resources of World- Water, Soils, Forests in reference to South and South-East Asia with special reference to India. Factors responsible for the location of industries (with special reference to India).
 Interpersonal skills including communication skills. Logical reasoning and analytical ability. 	11- Salient features of Physical Geography- Earthquake, Tsunami, Volcanic activity, Cyclone, Ocean Currents, winds and glaciers.
 Decision making and problem solving. General mental ability 	 12- Oceanic resources of India and their potential. 13- Human migration-refugee problem of the World with focus on India. 14. Francisco and boundaries with reference to India and the continent.
 Elementary Mathematics upto Class X level-Arithmatic, Algebra, Geometry and Stat General English upto Class X level. General Hindi upto Class X level. 	 tistics. 14- Frontiers and boundaries with reference to Indian sub-continent. 15- Population and Settlements- Types and Patterns, Urbanization, Smart Cities and Smart Villages.

16- Specific knowledge of Uttar Pradesh - History, Culture, Art, Architecture, Festival, Folk-Dance, Literature, Regional Languages, Heritage, Social Customs and Tourism. 17- Specific knowledge of U.P.- Geography- Human and Natural Resources, Climate, compassion towards the weaker-sections. Soils, Forest, Wild-Life, Mines and Minerals, Sources of Irrigation. **GENERAL STUDIES-II** administration and governance. 1- Indian Constitution- historical underpinnings, evolution, features, amendments significant provisions and basis structure, Role of Supreme Court in evolution of basic provisions of Constitution. 2- Functions and responsibilities of the Union and the States: issues and challenges pertaining to the federal structure, devolution of powers and finances up to local levels and relations and funding, corporate governance. challenges therein . 3- Role of Finance Commission in Centre-State financial relations. 4- Separation of powers, dispute redressal mechanisms and institutions. Emergence and use of alternative dispute redressal mechanisms. 5- Comparison of the Indian constitutional scheme with that of other major democratic Case studies on above issues. countries. 6- Parliament and State legislatures- structure, functioning, conduct of business, powers and privileges and concerned issues. 7- Structure, organization and functioning of the Executive and the Judiciary: Ministries and Departments of the Government, Pressure groups and formal/informal associations and their role in the Polity. Public Interest Litigation (PIL). 8-Salient features of the Reperesentation of People's Act. 9- Appointment to various Constitutional posts, Powers, functions and their responsibilities. 10- Statutory, regulatory and various quasi-judicial bodies including NITI Aayog, thei features and functioning. 11- Government policies and interventions for development in various sectors and issues arising out of their design, implementation and Information Communication Technology (ICT). 12- Development processes- the role of Non Governmental Organizations (NGOs), Sel Help Groups (SHGs), various groups and associations, donors, charities, institutional and other stakeholders. 13- Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes, mechanisms, laws, institutions and Bodies constituted for the protection and betterment of these vulnerable sections. 14- Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources. 15- Issues relating to poverty and hunger, their implication on body politic. farming. 16- Important aspects of governance. Transparency and accountability, e-governance applications, models, successes, limitations, and potential, citizens, charters and institutional measures. 17- Role of Civil Services in a democracy in the context of emerging trends. 18-India and its relationship with neighbouring Countries. 19- Bilateral, Regional and Global groupings and agreements involving India and/ o affecting India's interest. 20- Effect of policies and politics of developed and developing countries on India's interests-Indian diaspora. 21- Important International Institutions, Agencies their structure, mandate and functioning 22- Specific knowledge of Uttar Pradesh regarding Political, Administrative, Revenue and Judicial System. 23- Current affairs and events of Regional, State, National and International importance. **GENERAL STUDIES-III** 1- Economic planning in India, objectives and achievements. Role of NITI Aayog, Pursuit of Sustainable Development Goals (SDG's). 2- Issues of Poverty, Unemployment, Social justice and inclusive growth. 3- Components of Government Budgets and Financial System. 4- Major Crops, Different types of irrigation and irrigation systems, storage, transport and marketing of agricultural produce, e-technology in the aid of farmers. 5- Issues related to direct and indirect farm subsidies and minimum support prices, Public Distribution System- objectives, functioning, Limitations, revamping, issues of buffer stocks and food security, Technology missions in agriculture. 6- Food processing and related industries in India- scope and significance, location upstream and downstream requirements, supply chain management. 7-Land reforms in India since independence.

8- Effects of liberalization and globalization on the economy, changes in industrial policy and their effects on industrial growth.

9- Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

10- Science and Technology-developments and applications in everyday life and ir National Security, India's Science and Technology policy.

11- Achievements of Indians in science & technology, indigenization of technology Developments of New technologies, transfer of technology, dual and critical use technologies

12- Awareness in the fields of Information and Communication Technology (ICT) and Space Technology, Computers, Energy resources, nano- technology, microbiology, biotechnology. Issues relating to intellectual property rights (IPR), and digital rights.

13- Environmental security and Ecosystems, Conservation of Wild life, Biodiversity Environmental pollution and degradation, environmental impact assessment,

14- Disaster as a Non-traditional security and safety challenge, disaster mitigation and

· Aptitude and foundational values for Civil Service, integrity, impartiality and nonpartisanship, objectivity, dedication to public services, empathy, tolerance and

Emotional Intelligence- concept and dimensions, its utility and application in

• Contributions of moral thinkers and philosophers from India and world.

 Public/Civil Service values and ethics in Public Administration: status and problems, ethical concerns and dilemmas in government and private institutions, laws, rules, regulations and conscience as sources of ethical guidance, accountability and ethical governance, strengthening of moral values in governance, ethical issues in international

 Probity in Governance: concept of public service, philosophical basis of governance and probity, information sharing and transparency in government. Right to Information, codes of ethics, codes of conduct, citizen's charter, work culture, quality of service delivery, utilization of public funds, challenges of corruption.

1. AGRICULTURE : PAPER-I (SECTION - A)

Ecology and its relevance. Natural resources and their conservation management. Environmental factors of crop distribution and production. Climatic elements as factor of crop growth. Impact of environment of changes on cropping pattern. Environmental pollution and associated hazards to crops, animals and human. Cropping patterns in different agro climatic zones of U.P. Impact of high yielding and short duration varieties on shifts in cropping patterns. Concepts of multiple, multistory, relay and intercropping and their importance in relation to sustainable crop production. Package of practices for production of important cereals, pulses, oilseeds, fibre, sugar and cash crops grown during Kharif and Rabi seasons in different regions of U.P. Important features, scopes and propagation of various type of forestry plants with reference to agro, forestry and social forestry, Weeds, their characteristics, dissemination, association with various field crops and their multiplication, cultural, biological and chemical control. Processes and factors of soil formation. Classification of Indian soils including modern concepts. Mineral and organic constituent of soils and their role in maintaining soil productivity. Problems soils, extent and distribution in India and their reclamation. Essential plant nutrients and other beneficial elements in soils and plants, their occurrence, factors affecting their distribution, function and cycling. Symbiotic and non symbiotic nitrogen fixation. Principles of soil fertility and its evaluation for judicious fertilizer use. Soil conservation planning on water shed basis, erosion and run off management in hills, foothills and valley lands and factors affecting them. Dryland agriculture and its problems. Technology for stabilishing agriculture production in rainsed agriculture area of U.P. Necessity and scope of organic

SECTION – B

Water use efficiency in relation to crop production. Criteria for scheduling irrigations, ways and means of reducing run off losses of irrigation water. Drainage of water-logged soils. Farm management its scope, importance and characteristics, farm planning and budgeting. Economics of different types of farming systems. Marketing and pricing of agricultural inputs and outputs, price fluctuations and their cost. Role of co-operatives in agricultural economy, Types and system of farming and factors affecting them Agricultural extension, its importance and role, method of evaluation of extension programmes, diffusion, communication and adoption of innovations, people's participation and production and motivation. Farm mechanization and its role in agricultural production and rural employment. Training programme for extension workers and farmers, Extension systems and programmes. Training & Visits. KVK. KGK, NATP and IVLP.

AGRICULTURE

PAPER-II (SECTION-A)

Heredity and variation, Mendel's law of inheritance, Chromosomal theory of inheritance, Cytoplasmic inheritance, Sex linked, Sex influenced and sex limited characters. Spontaneous and induced mutations. Role of chemicals in mutation. Origin and domestication of field crops. Morphological patterns of variations in varieties and related species of important field crop. Cause and utilization of variation in crops improvement. Application of the principles of plant breeding to the improvement of major field crops, Methods of breeding to self and cross-pollinated crops. Introduction, selection, hybridization, male sterility and self incompatibility, utilization of mutation and polyploidy in breeding. Seed technology and its importance, production, processing, storage and testing of seeds. Role of national and state seed organization in production, processing and marketing of improved seeds. Physiology and its significance in agriculture, Physical properties and chemical constitution of protoplasm, inhibition, surface tension, diffusion and osmosis. Absorption and translocation of water, transpiration and water economy.

SECTION – B

Enzymes and plant pigments, Photosynthesis - modern concepts and factors effecting the process. Aerobic and anaerobic respiration, Growth and development. Photoperiodisms and vernalization. Plant growth regulators and their mechanism of action & importance in crop production. Climatic requirements and cultivation of major fruits, vegetable and ornamental crops; package of practices and the scientific basis for the same. Pre and post harvest physiology of fruits and vegetables crops, Principles and methods of preservation of fruits and vegetables. Processing techniques and equipment. Landscape and Floriculture including raising of ornamental plants. Garden and its parts, Design and layout of gardens, Diseases and pests of vegetables, fruits and ornamental crops of U.P. and measures to control plant diseases. Integrated management of pests and diseases. Pesticides and their formulations, plant protection equipment, their care and maintenance.

management.	Storage pest of cereals and pulses, hygiene of storage, godowns, preservation and
15- Challenges of International Security: Issues of Nuclear proliferation, Causes and	remedial measures, Food production and consumption trends In India, National and
spread of extremism, Communication networks, role of media and social networking	, International food policies, Procurements, distribution, processing and production
Basics of cyber security, money laundering and human trafficking.	constraints.
16- India's internal security challenges: Terrorism, corruption, insurgency and organized	<u>2. ZOOLOGY</u>
crimes.	PAPER-I
17-Role, kind and mandate of security forces, Higher defense organizations in India	(Non Chordata, Chordata, Ecology, Ethology, Biostatistics and Economic
18- Specific knowledge of Uttar Pradesh Economy:-	Zoology)
Overview of UP Economy: State Budgets. Importance of Agriculture, Industry	Section A. Non-chordata and chordata
Infrastructure and physical resources. Human Resources and Skill development	1. Animal Divercity: General survey, Classification and Interrelationships of following
Government Programmes and Welfare Schemes.	Phyla.
19- Issues in Agriculture, Horticulture, Forestry and Animal Husbandry.	
20- Law and Order and Civil Defence with special reference to U.P.	2. Protozoa: Locomotion, Nutrition and Reproduction, Human parasitic protozoa and
GENERAL STUDIES-IV	diseases.
• Ethics and Human Interface: Essence, determinants and consequences of Ethics in	
human action, dimensions of ethics, ethics in private and public relationships. Human	4. Cnidaria: Polymorphism; Coral reefs; Metagenesis.
Values-lessons from the lives and teachings of great leaders, reformers and	5. Platyhelminthes: Parasitic adaptations and host-parasite relationships.
administrators, role of family, society and educational institutions in inculcating values.	6 Annelida: Adaptive radiation in Polychaeta
• Attitude: Content, structure, function, its influence and relation with thought and behavior	7. Arthopoda: Larval forms and parasitism in crustacean; Appendages of prawn; Vision
moral and political attitudes, social influence and persuasion.	1. Al liopoda. Laivanonnis and parasilisinin clusiacean, Appendages of prawn, vision

and respiration in Arthopoda; Social life and metamorphosis in insects.	Principles of
8. Mollusca: Respiration, Pearl formation.	their compou
9. Echinodermata: General organization, larval forms and affinities.	Coordinatio
10. Chordata: Origin; Origin of tetrapods.	nomenclatur
11. Pisces: Respiration; Migration; Lung fishes.	Valence bon
12. Amphibia: Neoteny and paedogenesis; parental care.	orbitals in o
13. Reptilia: Skull type; Dinosaurs	affecting its r
14. Aves: Aerial adaptations, Migration, Respiration, Flightless birds.	d9 weak an
15. Mammalia: Dentition; Prototheria and Metatheria; Skin derivatives of Eutheria.	spectra of d
SECTION-B- Ecology, Ethology, Biostatistics and Economic Zoology	electronic tra
1. Ecology: Abiotic and biotic factors; Interspecific and intraspecific relations, Ecological	Bio-Inorgan
succession; Different types of biomes; Biogeochemical cycles; Food web; Ozone layer	Metalloporph
and Biosphere; Pollution of air, water and land.	alkali and alk
2. Ethology: Types of animal behaviour; Role of hormones and pheromones in behaviour;	Preparation
Methods of studying Animal behaviour; Biological Rhythms.	Water, Bori
3. Biostatistics: Sampling methods; frequency distribution and measures of central	potassium pe
tendency; standard deviation and standard error; correlation and regression; chi- square	
and t-tests.	osmotic pres
4. Economic Zoology: Insect pests of crops (Paddy, Gram and Sugarcane) and stored	elasticity and
grains; Apiculture, Sericulture, Lac culture; Pisciculture and Oyster culture.	polymers.
ZOOLOGY	Chemical T
PAPER-II	thermodynar
(Cell Biology, Genetics, Evolution and Systematics, Biochemistry, Physiology	summation,
and Developmental Biology)	Helmholtz ec
SECTION-A: Cell Biology, Genetics, Evolution and Systematics	to various p
1. Cell Biology: Prokaryotic and Eukaryotic cells, Electron microscopic structure of	equation. C
eukaryotic cells; Cell membrane- structure, functions and transport mechanisms cell	properties of
organelles- structure and function; Cytoskeleton; Cell cycle; Cell division-Mitosis and	Chemical K
Meiosis; Spindle formation and chromosome movement. 2. Genetics: Mendelian laws of	constant, zei

inheritance; Structure of eukaryotic chromosome; giant and lamp- brush chromosomes; Linkage; concept of gene, gene mapping; Sex chromosomes and sex determination; Sex linked traits; Gene interactions (codominance, multiple alleles, Lethal genes, Epistatic and Hypostatic genes, Polygenic inheritance); Variation-its types and sources; chromosomal and gene mutations; Human genetic diseases (Sickle cell anaemia, Down's, Turner's and Klenefelter's syndromes); Regulation of gene expression in prokaryotes and eukaryotes; Recombinant DNA technology-basic principles, tools, vectors and applications; Transgenic animals. 3. Evolution: Origin of life- Theories and experimental evidence; Evolution- theories; Natural selection; Variation; Calculating allele frequencies (Hardy-Weinberg Method); Concept of species and sub-species; Mechanisms of speciation, Island species; Crypsis- Overview and varieties of crypsis. 4. Systematics: Principles of Taxonomy; Zoological nomenclature; Fossils; Geological eras; Phylogeny of horse and elephant; Origin and evolution of man; Continental distribution of animals; Zoogeographical realms of the world and their characteristic fauna.

SECTION-B- Biochemistry, Physiology and Development Biology

Biochemistry: Structure, classification and biological functions of Carbohydrates, Proteins, Lipids and Nucleic acids, Watson and Crick model of DNA; Genetic code; Protein- biosynthesis; Biological oxidations; High energy compounds; Electron transport chain; Oxidative phosphorylation; Glycolysis and Krebs/TCA cycle; Enzymes-Nomenclature, classification, Factors affecting enzyme activity and mechanism of action, Vitamins- dietary sources, biochemical functions, deficiency symptoms, Hypervitaminosis A; Innate and Aquired immunity; immune cells; Immunoglobulins; cytokines (Interleukins). 2. Physiology (with special reference to mammals): Homeostasis; open and closed circulatory system, Neurogenic and Myogenic hearts; Blood composition, functions clotting and blood-groups; Oxygen and carbon dioxide transport; The cardiac cycle; Neural and Hormonal regulation of heart rate; Mechanism of breathing and its regulation, formation of urine; Homeostatic functions of kidney; Thermoregulation in thermoconformer and thermoregulator animals; Nerve impulseaxonal and synaptic transmission; neurotransmitters; Digestion and absorption of carbohydrate, protein, fats and nucleic acid, control of secretion of digestive juices; Muscle-types, structure and mechanism of contraction; structure and functions of human eye and ear; the mechanism of photoreception, hearing and balance; Hormones-Endocrine, Paracrine and Autocrine; Types of hormone; Mechanisms of hormone action; Types of hormone receptors; Roles of hypothalamus, pituitary, thyroid, parathyroid, pancreas, adrenal, gonad and pineal hormones; Regulation of Menstrual cycle; Menarche and Menopause. 3. Development Biology: Gametogenesis, fertilization, cleavage and gastrulation in Branchiostoma, frog and chick; Types of eggs; Fate maps of gastrula of frog and chick; Metamorphosis in frog and insects and its hormonal control; Formation of extra embryonic membrance in chicks; Types of placenta in mammals, Organiser phenomenon, Organogenesis of brain, eye and heart; Regeneration; Genetic control of development.

3. CHEMISTRY: PAPER-I

Atomic Structure: de Broglie equation, Heisenberg's uncertainty principle, quantum mechanical operators and the Schrodinger wave equation, physical significance of wave function and its characteristics (normalized orthogonal), radial distribution and shapes of s.p. & d orbitals, particle in one-dimensional box, quantization of electronic energies (v) Substitution Reactions: (qualitative treatment of hydrogen atom), Pauli's Exclusion principle. Hund's rule of (a) SN1, SN2 mechanism maximum multiplicity. Aufbau principle, electronic configuration of atoms, Long form of (b) Electrophilic aromatic substitution reactions: orientation and reactivity in

of separation of lanthanides and actinides. Magnetic and spectral properties of ounds.

ion Chemistry: Werner's Theory of coordination compounds. IUPAC system of ire, effective atomic number (EAN), Isomerism in coordination compounds. nd theory and its limitations. Crystal field theory. Crystal field splitting of doctahedral, tetrahedral and square planar complexes. Δ Value and factors magnitude, calculation of Crystal field stabilization energies (CFSE) for d1 to nd strong field. Octahedral complexes, spectrochemical series electronic transition metal complexes, types of electronic transitions, selection rules for ansitions

nic Chemistry: Essential and trace elements in biological processes, phyrins with special reference to haemoglobin and myoglobin, Biological role of Ikaline earth metal ions with special reference to calcium ion.

n, Properties and Uses of the following Inorganic Compounds: Heavy ric acid, diborance, hydrazine, hydroxylamine, potassium dichromate, permanganate, Ce (IV) sulphate and titanium (III) sulphate.

Molecular weight of polymers by sedimentation, light scattering viscosity and essure methods, Number average and weight average molecular weights, nd crystallinity of polymers, Borazines: Silicons and phosphonitrillic halide

Thermodynamics: Thermodynamic functions, first and second Laws of amics, heats of formation neutralization and combustion, Hess's Law of heat variation of entropy with change of temperature, pressure and volume, Gibbsequation, criteria of equlibirium and spontaneity, application of thermodynamics physico- chemical processes, concept of chemical potential Gibbs-Duhem Classius-Clapeyron equation. Thermodynamic treatment of colligative of dilute solutions.

Kinetics: Order and molecularity of reaction, Rate constant and specific rate ero-order, first order and second order reactions, half life period. Methods for determining the order of a reaction, temperature coefficient, Arrhenius equation, Energy of activation, Collision theory of reaction rate. Steady state approximations. Transition state theory of reaction rates, kinetics of side, reversible and consecutive reactions.

Phase Equilibria: Phase, Components, degrees of freedom, phase diagram of one component (water and sulphur) and two component (Pb-Ag) systems, Nernst's distribution law, Applications of distribution law:

Electrochemistry: Theory of strong electrolytes, Debye-Huckel theory of activity coefficient laws of electrolytic conduction, transport number and its determination by Hittorf's method and moving boundary method. Electrodes and Electrode potential, Hydrogen electrode, Calomel electrode. E-M-F of galvanic cells, concentration cells with and without transference, liquid junction potential and fuel cell.

Solid State Chemistry: Elements of symmetry in crystals, space lattice and unit cell. The close packing of sphares, hexagonal close packing, cubic close packing and body centered cubic packing, co-ordination number and redus ratio effect. Bragg's law of X-ray diffraction, powder pattern method of crystalline structure of NaCl, KCl and ZnS.

Surface Chemistry: Coagulation, Hardy-Schulze Rule, Stability of colloids and origin of charge on colloids, Electrokinetic potential, adsorption, Various types of adsorption isotherms, catalysis, enzyme catalysis (Michelis-Menten equation).

Spectra: Raman Spectra: Raman effect, stokes and antistokes lines and their intensity difference. Rule of mutual exclusion. Electronic Spectra, Electronic transitions, Frank condom Principle, Phosphorescene and fluorescence.

Equilibrium: Equilbrium in physical and chemical process, dynamic nature of equilibrium, law of chemical equilibrium, equilibrium constant, factors affecting equilibrium, Lechatelier's principle, strong and weak electrolytes, common ion effect, ionization of polybasic acids, acid strength, concept of pH and hydrolysis of salts, buffer solutions, Henderson's equation, solubility and solubility product of sparingly soluble salts. **CHEMISTRY PAPER-II**

1. General Organic Chemistry

Hyperconjugation, Delocalisation and their applications, Electrophiles, Nucleophiles, Hydrogen Bonding, and Aromaticity and Antiaromaticity.

2. Reaction Mechanism:

(i) General methods of study of mechanism of organic reactions: Kinetic Isotope effect, Crossover Experiment, Intermediate trapping, and Thermodynamic vs Kinetic control of reactions.

(ii) Reactive Intermediates: Generation, geometry, nature, (electrophilic or nucleophilic character), reactions and stability of carbocations, carbanions, free radicals, carbenes and benzynes

(iii) Addition Reactions: Electrophilic addition to carbon- Carbon double bond with bromine and carbenes, hydroboration-Oxidation, oxymercuration- demercuration, addition of peracids (formation of oxiranes) and iodolactonisation.

1,2 and 1,4 addition of conjugated diene with bromine, free radical addition of HBr.

Nucleophilic addition to carbonyl group with carbon, oxygen, sulphur and nitrogen nucleophiles.

(iv) Elimination Reactions: E1, E2 and E1 cb reaction mechanism, orientation in E2 reaction (Saytzeff and Hofmann), Cope elimination.

periodic table including translawrencium elements. Periodicity in properties of the	monosubstituted benzenes.
elements such as atomic and ionic ionization potential, electron affinity, eletronegativity	3. Reactions and Rearrangements:
and hydration energy.	(i) Reactions: Aldol condensation, Claisen condensation, Knoevenagel reaction, Witting
Nuclear and Radiation Chemistry: nuclear forces, nuclear stability, N/P ratio, nuclear	reaction, Michael addition, Mannich reaction, Perkin reaction, Riemer- tiemann reaction,
binding energy, Artificial transmutation of elements and nuclear reactions, nuclear fission	Cannizzaro reaction and Benzoin condensation.
& fusion, Kinetics of radioactive decay, radioactive isotopes and their applications. Radio	(ii) Rearrangements: Pinacol-Pinacolone, Hoffman, Beckmann, Curtius rearrangements
carbon dating. Elementary ideas of radiation chemistry.	and Rearrangement given by carbocations.
Chemical Bonding: Valence bond theory (Heitler-London and Pauling- Slater theories),	4. Stereochemistry:
hybridization, VSEPR theory and molecular orbital energy level diagrams for homo and	Optical activity due to chiral centre, R-S nomenclature of compounds having chiral centre
hetero nuclear diatomic molecules, bond order, bond length and bond strength, sigma and	(one or two chiral centres). Properties of enantiomers and diastereomers, Separation of
pi bonds, hydrogen bond, characteristics of ionic compounds, Lattice energy, born-haber	racemic mixture using chemical method.
cycle, Characteristics of covalent bond.	Geometrical isomerism: E-Z nomenclature,
Chemistry of s- and p-Block Elements: General properties of s-and p- Block elements,	Conformation of open-chain compounds (n-butane, 2-fluoroethanol, 1,2-ethanediol, 1,2-
chemical reactivity of elements and group trends. Chemical behaviour with respect of their	difluoroethane) Cyclohexane and monosubstituted and disubstituted cyclohexanes.
hydrides, halides and oxides.	5. Spectroscopy
Chemistry of Transition Elements: General Characteristics, variable oxidation states,	(IUV Spectroscopy: Types of electronic transitions, chromophore, auxochrome,
complex formation, colour, magnetic and catalytic properties, Comparative study of 4d and	bathochromic and hypsochromic shift, Woodward-Fieser rule for the calculation of max
5d transition elements with 3d analogues with respect to their ionic radii, oxidation states	conjugated polyenes and carbonyl compounds.
and magnetic properties.	(ii) Infra-red Specroscopy: Factors affecting vibrational frequencies.
Chemistry of Lanthanides and Actinides: Lanthanides contraction, oxidation states,	(iii) 1HNMR Spectroscopy: Basic principles, chemical shift, spin-spin interaction and
	Contd



coupling constant.

Problems based on UV, IR and 1HNMR Spectroscopy of simple organic compounds. 6. Organic Polymers:

Mechanism of polymerization, Polymers of industrial importance (Polyamides, Polyesters, Orlon, PVC, Teflon, SBR, NBR).

7. Carbohydrates

Chemistry of Monosaccharides (Glucose and Fructose), Ring structure of glucose and fructose, Mutarotation, Epimerisation, Amadori rearrangement, Disaccharides (Maltose and Sucrose).

8. Pericyclic Reactions

Classification and examples, Woodward-Hoffmann Rule, Electrocyclic Reactions and Cycloaddition reactions ([2+2] and [4+2] cycloaddition reaction)

9. Heterocyclic Compounds :

Preparations, Aromaticity and Reactions of Pyrrole, Furan and Thiophene.

10. Environmental Chemistry

Air pollutants and their toxic effects, Depletion of Ozone layer, Oxides of nitrogen, Fluorocarbons and their effect on ozone layer, Greenhouse effect, Acid rain.

4. PHYSICS: PAPER-I:

Mechanics, Thermal Physics, Waves & Oscillations and Optics

1. Mechanics: Conservation law, collisions, impact parameter, scattering cross- section, centre of mass and lab systems with transformation of physical quantities, Rutheford Scattering. Motion of a rocket under constant force field. Rotating frames of reference, Coriolis force, Motion of rigid bodies, Dynamics of rotating bodies. Inertia tensor, Moment of inertia, Moment of inertia of sphere, ring cylinder, disc. Angular momentum. Torque and precession of a top. Gyroscope. Central forces, Motion under inverse square law. Kepler's Laws. Motion of Satellites (including geostationary). Elastic constants and their interrelationship, Galilean Relativity. Special Theory of Relativity. Michelson-Morely Experiment, Lorentz Transformations-addition of velocities. Variation of mass with velocity. Mass- Energy equivalence. Fluid dynamics. Streamline and turbulent flow, Reynold number, Viscosity, Poiseulle's formula for the flow of liquid through narrow tubes, Bernoulli's equation with simple applications.

2. Thermal physics: Laws of thermodynamics, Entropy, Canot's cycle, Isothermal and Adiabatic changes, thermodynamic Potentials, Helmboltz and Gibbs functions. Maxwell's relations. The Clausius-Clapeyron equation, reversible cell, joule-Kelvin effect, Stefan Boltzmann Law, Kinetic Theory of Gasses, Maxwell's Distribution Law of velocities, Equipartition of energy, specific heats of gases, mean free path, Brownian Motion, Black Body radiation, specific heat of solids, Einstein and Debye theories. Weins Law, Planck's Law, solar constant. Saha's theory of thermal ionization and stellar spectra, Production of low temperatures using adiabatic demagnetization and dilution refrigeration. Concept of negative temperature.

3. Waves and Oscillations: Simple harmonic motion, mass, spring and LC circuits Stationary and progressive waves, Damped harmonic motion, forced oscillation and Resonance, Sharpness of resonance, Wave equation, Harmonic solutions, Plane and Spherical waves, Superposition of waves. Two Prependicular simple harmonic motions. Lissajous figures, fourier analysis of periodic waves-square and triangular waves. Phase and Group velocities, Beats.

4. Optics: Huygen's principle, Division of amplitude and wave front, Fresnel Biprism, Newton's rings, Michelson interferometer, Fabry-Perot inter-ferometer. Diffraction-Fresnel and Fraunhoffer's Diffraction as a Fourier Transformation. Fresnel and Fraunhoffer diffraction by rectangular and circular apertures. Diffraction by straight edge, Single and multiple slits.

Resolving power of grating and optical instruments. Rayleigh crirterion. Polarization Production and Detection of polarized light (Linear, circular and elliptical) Brewster's law, Huygen's theory of double refraction, optical rotation, polarimeters. Laser sources (Helium-Neon, Ruby and semi conductor diode). Concept of spatial and temporal coherence. Holography, theory and application, Doppler effect.

Physics PAPER-II:

Electricity and Magnetism, Modern physics and Electronics

1. Electricity and Magnetism: Coulomb's Law, Electric Field, Gauss's Law and applications, Electric Potential, Poisson and Laplace equations for homogeneous dielectric, uncharged conducting sphere in a uniform field, point charge and infinite conducting plane. Bio-Savart law and applications. Ampere's circuital law and its applications, Magnetic induction and field strength, Magnetic shell, Magnetic field on the axis of circular coil, Helmholtz coil, Electromagnetic induction, Faraday's and Lenz's law, self and mutual inductances. Current electricity, Kirchoff's laws and its applications; Wheatstone bridge, Kelvin's double bridge, Carey foster's bridge Alternating currents L.C.R. Circuits, series and parallel resonance circuits, quality factor. Maxwell's equations and electromagnetic waves. Transverse nature of electromagnetic waves, Poynting vector Magnetic fields in Matter. Dia, para, Ferro, Antiferro and Ferrimagnetism (Qualitative approach only). Hysteresis.

2. Modern Physics: Bohr's theory of hydrogen atom, Electron spin, Stern-Gerlach experiment and spatial quantization, Vector model of the atom spectral terms, Optical and X-Ray Spectra, fine structure of spectral lines. J-J and L-S coupling Zeeman effect. Pauli's exclusion principle, spectral terms of two equivalent and non-equivalent electrons. Gross and fine structure of electronic band spectra. Raman effect, Photoelectric effect, Compton effect. De-Broglie waves. Wave Particle duality, uncertainty principle, postulates of motion across a step potential, One dimensional harmonic oscillator, eigen values and formula with error terms

Rank of Matrix, Echelon form, Equivalence, congruence and similarity, Reduction to canonical form, orthogonal, symmetrical, skew-symmetrical, Hermitian and skew-Hermitian matrices, their eigen values, orthogonal and unitary reduction of quadratic and Hermitian form, Positive definite quadratic forms, simultaneous reduction.

Calculus : Limits, continuity, differentiability, mean value theorems, Taylor's theorem, indeterminate forms, maxima and minima, tangent and normal, Asymptotes, curvature, envelope and evolute, curve tracing, continuity and differentiability of function of several variables Interchangeability of partial derivatives, Implicit functions theorem, double and tripple integrals. (techniques only), application of Beta and Gamma functions, areas, surface and volumes, centre of gravity.

3. Analytical Geometry of two and three dimensions: General equation of second degree, system of conics, confocal conics, polar equation of conics and its properties. Three dimensional co-ordinates, plane, straight line, sphere, cone and cylinder. Central conicoids, paraboloids, plane section of conicoids, generating lines, confocal conicoids.

4. Ordinary differential equations: Order and Degree of a differential equation, linear, and exact differential equations of first order and first degree, , equations of first order but not of first degree, Singular solutions, Orthogonal trajectories, Higher order linear equations with constant coefficients, Complementary functions and particular integrals.

Second order linear differential equations with variable coefficients: use of known solution to find another, normal form, method of undetermined coefficients method of variation of parameters.

5. Vector and Tensor Analysis: Vector Algebra, Differentiation and integration of vector function of a scalar variable gradient, divergence and curl in cartesian, cylindrical and spherical coordinates and their physical interpretation, Higher order derivates, vector identities and, vector equations, Gauss and stoke's theorems, Curves in Space, curvature and torsion, Serret-Frenet's formulae.

Definition of Tensor, Transformation of coordinates, contravariant and covariant tensors, addition and outer product of tensors. Contraction of tensors, inner product tensor, fundamental tensors, Christoffel symbols, covariant differentiation, gradiant, divergence and curl in tensor notation.

6. Statics and Dynamics: Virtual work, stability of equilibrium. Catenary, Catenary of uniform strength, equilibrium of forces in three dimensions.

Rectilinear motion, simple harmonic motion, velocities and accelerations along radial and transverse directions and along tangential and normal directions, Motion in resisting Medium, constrained motion, motion under impulsive forces, Kepler's laws, orbits under central forces, motion of varying mass.

MATHEMATICS Paper-II

1. Algebra: Groups, Cyclic groups, subgroups, Cosets of a subgroup, Lagrange's theorem, Normal subgroups, Homomorphism of groups, Factor groups, basic Isomorphism theorems, Permutation groups, Cayley's theorem.

Rings, Subrings, Ideals, Integral domains, Fields of quotients of an integral domain, Euclidean domains, Principal ideal domains, Polynomial rings over a field, Unique factorization domains.

2. Real Analysis : Metric spaces and their topology with special reference to sequence, Convergent sequence, Cauchy sequences, Cauchy's criterion of convergence, infinite series and their convergence, nth term test, series of positive terms, Ratio and root tests, limit comparison tests, logarithmic ratio test, condensation test, Absolute and conditional convergence of general series in R, Abel's Dirichlet's theorems. Uniform convergence of sequences and series of functions over an interval, Weierstrass M-test, Abel's and Dirichlet's tests, continuity of limit function. Term by term integrability and differentiability. Riemann's theory of integration for bounded functions, integrability of continuous functions. Fundamental theorem of calculus. Improper integrals and conditions for their existence, ν - test.

3. Complex Analysis: Analytic functions, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula, Power series representation of an analytic function. Taylor's series. Laurent's series, Classification of singularities, Cauchy's Residue theorem, Contour integration.

4. Partial Differential Equations: Formation of partial differential equations. Integrals of partial differential equations of first order, Solutions of quasi linear partial differential equations of first order, Charpit's method for non-linear partial differential equations of first order, Linear Partial differential equations of the second order with constant coefficients and their canonical forms, Equation of vibrating string. Heat equation. Laplace equation and their solutions.

5. Mechanics: Generalized co-ordinates, generalized velocities, Holonomic and nonholonomic systems, D'Alembert's principle and Lagrange's equations of motion for holonomic systems in a conservative field, generalized momenta, Hamilton's equations. Moments and products of inertia, Pricipal axes, Moment of inertia about a line with direction cosines (I,m,n), Momental ellipsoid, Motion of rigid bodies in two dimensions.

6. Hydrodynamics: Equation of continuity, Velocity Potential, Stream lines, Path Lines, Momentum and energy.

Inviscid flow theory: Euler's and Bernoulli's equations of motion. Two dimensional fluid motion, Complex potential, Momentum and energy, Sources and Sinks, Doublets and their images with respect line and circle.

7. Numerical Analysis: Solution of algebraic and transcendental equations of one variable by bisection, Regula-Falsi and Newton-Raphson methods and order of their quantum machanics. Schrodinger wave equation and application. (i) particle in a box. (ii) convergence. Interpolation (Newton's and Lagrange's) and Numerical differentiation

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eigen functions. Radioactivity, Alpha, Beta and Gamma Radiations. Elementary theory of	Numerical Integration: Trapezoidal and Simpson's rules.
the Alpha Decay. Nuclear binding energy. Mass spectroscopy, semi empirical mass	Numerical solutions of Ordinary differential Equations: Euler's method.
formula. Nuclear fission and fusion. Elementary Reactor Physics, Elementary particles	Rune-Kutta method.
and their classification, strong and weak interactions. Particle accelerators, cyclotron.	6. GEOGRAPHY: PAPER-I
Linear accelerators. Elementary ideas of superconductivity.	SECTION-A – PHYSICAL GEOGRAPHY
3. Electronics: Classification of solids into conductors, insulators and semiconductors on	1. Geomophology: Origin and structure of the Earth, Earth movements, Plate tectonics
the basis of energy bands. Intrinsic and extrinsic semiconductors, P.N. junction, Reverse	and Mountain Building, Isostasy; Vulcansim; Weathering and Erosion; Cycle of Erosion,
and forward based P.N. junction, Thermistor, Zener diode, solar cell. Use of diodes and	Evolution of landforms; fluvial, glacial, aeolion, marine and karst Rejuvenation and
transistors for rectification, amplification, oscillation, modulation and detection of r.f.	Polycyclic Land form features.
waves. Transistor receiver. Boolean Algebra, Logic Gates and their truth table, some	2. Climatology: Composition and structure of Atmoshphere, Insolation and Heat Budget
applications, Adder and subtractor.	Atmospheric pressure and winds; Moisture and Precipitation; Air masses and Fronts
5. MATHEMATICS: PAPER-I	Cyclone: Origine, Movements and associated weather; Classification of world climates
1 Linear Algebra and Matrix : Vector spaces, Sub Spaces, basis and dimensions,	Koppen and Thomthwaite.
Quotient. space, co-ordinates, linear transformation, rank and nullity of a linear	3. Oceanography: Configuration of Ocean floor, Salinity, Ocean Currents, Tides Ocean
transformation, matrix representation of linear transformation, linear functionals, dual	deposits and coral reefs.
space, transpose of a linear transformation, characteristic values, annihilating	4. Soil and Vegetation: Soils-geneisis; classification and world distribution, Soil-
polynomials, Cayley-Hamilton theorem, Inner product spaces, Cauchy-Schwarz	Vegetation Symbiosis; Biotic Communities and Succession.
inequality, Orthogonal vectors, orthogonal complements, orthonormal sets and bases,	5. Ecosystem: Concept of Ecosystem, structure and functioning of Ecosystem, Types of
Bessel's inequality of finite dimensional spaces, Gram-Schmidt orthogonalisation process.	Ecosystem; Major Biomes; Man's impact on the Ecosystem and Global Ecological issues.
	Contd

 SECTION-B – HUMAN GEOGRAPHY	Curve, Gains from Trade, Trade as an Engine of Growth.
6. Evolution of Geographical Thought: Contributions of Indian, German, French,	8. Theories of Exchange Rate Determination, Balance of Payments Adjustment:
British and Soviet Geographers; Traditional Paradigms:- Determinism, Possiblism,	Alternative Approaches, Free Trade vs. Protection, Tariffs and Quota, Foreign Debt and
Regionalishm and Contemporary Paradigms of Geography – positivism and quantitative	Debt Management, International Monetary and Trade Institutions.
revolution, models and systems in Geography, Recent trends in geographic thought with	Economics: Paper II- Indian Economy
special reference to behavioural radical, humanism, post-modernism in Feminism and	
ecological paradigms.	1. Basic Characteristics of Under-development & Indian Economy- National Income and
7. Human Geography: Human habitat in major natural regions; Emergence of Man and	
Races of Mankind; Cultural evolution and stages; Major cultural realms, Growth and	Inequalities and Regional Imbalances in India.
contemporary population problems.	India's Population, Demographic Dividend and Population Policy, Human Resource
8. Settlement Geography: Concept of Settlement Geography; Rural settlements -	Development in India. Urbanisation and Economic Development in India, Gender &
Nature; Origin, Types and patterns; Urban settlements: Origin, Patterns, Processes and	Development.
consequences, Central place theory; Classification of towns; Hierarchy of Urban Centres,	3. Infrastructure and Economic Development in India- Recent Strategy & Performance,
Morphology of Towns; Rural-Urban nexus, Umiand and urban finges; Futuristic trends.	Urban Infrastructure Development & Private Public Partnership, Energy Sector- Sources
9. Economic Geography: Fundamental concepts; Concepts of Resources:	of Energy: Conventional and Non- Conventional Energy, Energy Crisis.
Classification, Conservation and Management; Nature and Types of Agriculture,	4. Natural Resources in India and Economic Development, Ecological Imbalances and
Agricultural land use; Location theories; World Agricultural Regions; Major crops; Mineral	Environmental Pollution, Environmental Degradation and Measures to Control.
and Power Resources; Occurrence, Reserve, Utilization and Production patterns; World	5. Indian Agriculture : Production and Productivity. Changes in Cropping Pattern.
Energy crisis and search for alternatives; Industries- Theories of Industrial location, Major	Institutional Reforms in Agriculture, New Agricultural Strategy, Agricultural Credit and
	Subsidies, Food Processing, Agricultural Price Policy, Food Security, WTO and Indian
Automobiles, Ship building- their location patterns, International Trade, Trade Blocks,	Agriculture.
Trade routes; Ports and Global Trade Centres; Globalization and World Economic	6. Industrial Growth and Structure in India: Strategy of Industrialization, Privatization,
Development Patterns, Concepts and approaches to Sustainable Development.	Disinvestment, MSMEs, Industrial Policy Resolutions and Changes therein, Foreign
10. Political Geography: Concept of Nation and State; Frontiers, Boundaries and Buffer	Capital, Technology and Growth of Indian Industry, Labour Reforms in India.
zones; Concepts of Heartland and Rimland; Federalism, Contemporary world Geo-	7. Services Sector & its Development in India- Its Importance & Performance,
political issues.	
	International Comparisons.
<u>GEOGRAPHY: PAPER-II – GEOGRAPHY OF INDIA</u>	Section B
SECTION (A) PHYSICAL & HUMAN GEOGRAPHY	1. Monetary Institutions of India- RBI, Commercial Banks, Banking & Non-Banking
1. Physical Features: Geological systems and structure: Relief and drainage, soils and	Financial Institutions, Objectives And Techniques of Monetary Policy in India, Role of RBI
natural vegetation; soil degradation and deforestation, origin and mechanism of Indian	under New Regime, E-Banking in India.
Monsoon, climatic region, physiographic region.	2. Budgetary Trends and Fiscal Policy in India, Trend of Major Sources of Public Revenue
2. Wild Life, National Park, Sanctuaries, biospheric reserves, biodiversity hot-spots.	and Public Expenditure of the Union Government & Government of Uttar Pradesh. Various
3. Wetland, tourism-resource and economy, natural hazards, disasters and management,	Deficits in the Union Budget and Fiscal Consolidation, Indian Tax Structure, GST in india,
environmental issues.	FRBM Act, Fiscal Federalism and Centre-State Financial Relations in India.
	3. Foreign Trade of India- Volume, Composition & Direction, Balance of Payments
population, Rural Settlements- types, patterns and morphology, urban settlement- criteria	Position, Foreign Trade Policy & measures, Convertibility of Rupee, Agri- Export Zones,
and classification of urban Settlement, hierarchy and umland, Urbanisastion, Urban	SEZ etc.
Policy, Urban Planning, role of Small Towns, Smart City and Smart Village.	4. Indian Economy & WTO- Issues & Progress. Implications of TRIPs, TRIMs, GATS etc.
5. Political organization: historical perspective on unity and diversity, states	
reorganization; regional consciousness and national integration, geographical basis of	
	5. Economic Planning in India Rationale, Performance and Evaluation, Decentralized
India and the geopolitics of Indian ocean, India and the SAARC.	Planning, NITI Aayog: Its Functions & Working, Relation between Planning & Market for
<u>SECTION (B) ECONOMIC & REGIONAL GEOGRAPHY</u>	Growth and Development, Swadeshi Approach.
	Growth and Development, Swadeshi Approach.
6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their	Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA,
6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity,	Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements.
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6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity, impact of green revolution, agricultural regions, agro-ecological regions, land holding patterns, land reforms, crop combination regions, modernization of agriculture and	 Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements. 7. New Economic Policy-Second Generation Reforms, Poverty & Unemployment Nexus in India, Poverty Alleviation Programmes, Rural Wages and Rural Employment, Progress
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 6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity, impact of green revolution, agricultural regions, agro-ecological regions, land holding patterns, land reforms, crop combination regions, modernization of agriculture and agricultural planning. 7. Resources: Distributional patterns, reserves and production trends, complementarity of minerals, energy resources- coal, petroleum, hydro-power, multipurpose river valley projects, energy crisis and search for alternatives, marine resources and biotic resources. 	 Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements. 7. New Economic Policy-Second Generation Reforms, Poverty & Unemployment Nexus in India, Poverty Alleviation Programmes, Rural Wages and Rural Employment, Progress of Economic Reforms in India, Recent Initiatives by the Union Government. <u>8. SOCIOLOGY: PAPER-I</u> GENERAL SOCIOLOGY (SECTION-A) 1. Fundamentals of Sociology and Study of Social Phenomena : Emergence of Sociology,
 6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity, impact of green revolution, agricultural regions, agro-ecological regions, land holding patterns, land reforms, crop combination regions, modernization of agriculture and agricultural planning. 7. Resources: Distributional patterns, reserves and production trends, complementarity of minerals, energy resources- coal, petroleum, hydro-power, multipurpose river valley projects, energy crisis and search for alternatives, marine resources and biotic resources. 8. Industries: Industrial development, major Industries- Iron & Steel, Textiles, Paper, 	 Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements. 7. New Economic Policy-Second Generation Reforms, Poverty & Unemployment Nexus in India, Poverty Alleviation Programmes, Rural Wages and Rural Employment, Progress of Economic Reforms in India, Recent Initiatives by the Union Government. <u>8. SOCIOLOGY: PAPER-I</u> <u>GENERAL SOCIOLOGY (SECTION-A)</u> 1. Fundamentals of Sociology and Study of Social Phenomena : Emergence of Sociology, its nature and scope. Methods of study; Problems of objectivity and issues of
 6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity, impact of green revolution, agricultural regions, agro-ecological regions, land holding patterns, land reforms, crop combination regions, modernization of agriculture and agricultural planning. 7. Resources: Distributional patterns, reserves and production trends, complementarity of minerals, energy resources- coal, petroleum, hydro-power, mulitipurpose river valley projects, energy crisis and search for alternatives, marine resources and biotic resources. 8. Industries: Industrial development, major Industries- Iron & Steel, Textiles, Paper, Cement, Fertilizers, Sugar and Petro-Chemicals, Industrial Complexes and regions, 	 Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements. 7. New Economic Policy-Second Generation Reforms, Poverty & Unemployment Nexus in India, Poverty Alleviation Programmes, Rural Wages and Rural Employment, Progress of Economic Reforms in India, Recent Initiatives by the Union Government. <u>8. SOCIOLOGY: PAPER-I</u> <u>GENERAL SOCIOLOGY (SECTION-A)</u> 1. Fundamentals of Sociology and Study of Social Phenomena : Emergence of Sociology, its nature and scope. Methods of study; Problems of objectivity and issues of measurement in Social Science; Sampling and its types: Research Design: Descriptive,
 6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity, impact of green revolution, agricultural regions, agro-ecological regions, land holding patterns, land reforms, crop combination regions, modernization of agriculture and agricultural planning. 7. Resources: Distributional patterns, reserves and production trends, complementarity of minerals, energy resources- coal, petroleum, hydro-power, mulitipurpose river valley projects, energy crisis and search for alternatives, marine resources and biotic resources. 8. Industries: Industrial development, major Industries- Iron & Steel, Textiles, Paper, Cement, Fertilizers, Sugar and Petro-Chemicals, Industrial Complexes and regions, industrial policy. 	Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements. 7. New Economic Policy-Second Generation Reforms, Poverty & Unemployment Nexus in India, Poverty Alleviation Programmes, Rural Wages and Rural Employment, Progress of Economic Reforms in India, Recent Initiatives by the Union Government. <u>8. SOCIOLOGY: PAPER-I</u> <u>GENERAL SOCIOLOGY (SECTION-A)</u> 1. Fundamentals of Sociology and Study of Social Phenomena : Emergence of Sociology, its nature and scope. Methods of study; Problems of objectivity and issues of measurement in Social Science; Sampling and its types: Research Design: Descriptive, Exploratory and Experimental, Techniques of data collection: Observation, Interview
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 6. Agriculture: Salient Features of Indian Agriculture, problem of wastelands and their reclamation, cropping patterns and intensity, agricultural efficiency and productivity, impact of green revolution, agricultural regions, agro-ecological regions, land holding patterns, land reforms, crop combination regions, modernization of agriculture and agricultural planning. 7. Resources: Distributional patterns, reserves and production trends, complementarity of minerals, energy resources- coal, petroleum, hydro-power, mulitipurpose river valley projects, energy crisis and search for alternatives, marine resources and biotic resources. 8. Industries: Industrial development, major Industries- Iron & Steel, Textiles, Paper, Cement, Fertilizers, Sugar and Petro-Chemicals, Industrial Complexes and regions, industrial policy. 9. Transport and Trade: Railways and Roads networks, problems and prospects of Civil 	Growth and Development, Swadeshi Approach. 6. Rural Development and Transformation in India- Various Programmes, MGNREGA, Skill Development Programme: Mission & Achievements. 7. New Economic Policy-Second Generation Reforms, Poverty & Unemployment Nexus in India, Poverty Alleviation Programmes, Rural Wages and Rural Employment, Progress of Economic Reforms in India, Recent Initiatives by the Union Government. <u>8. SOCIOLOGY: PAPER-I</u> <u>GENERAL SOCIOLOGY (SECTION-A)</u> 1. Fundamentals of Sociology and Study of Social Phenomena : Emergence of Sociology, its nature and scope. Methods of study; Problems of objectivity and issues of measurement in Social Science; Sampling and its types: Research Design: Descriptive, Exploratory and Experimental, Techniques of data collection: Observation, Interview
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Scitovsky, Social Welfare Function. 6. National Income: Concept, Components and Methods, Theories of Employment, Income and Interest Rate Determination- Classical, Keynesian and Post- Keynesian (IS-LM) Approaches, Theories of Trade Cycles.

LM) Approaches, Theories of Trade Cycles.	modern societies. Ethos of science, Social responsibility and control of science; Social
7. Money: Quantity Theory of Money-Various Versions (including Don Patinkon, Milton	
Friedman), Theory of Money Supply, Money Multiplier, Theories of Inflation- Types &	Trends, Composition, Growth by Migration, population Problems in India, Population
Control.	Education.
8. Monetary and Banking System: Central Bank, Commercial Banks, Money and Capital	SOCIOLOGY: PAPER-II
Markets-Functions, Creation and Control, Techniques of Monetary Management.	Indian Social System (Section-A)
<u>Section-B</u>	1. Bases of Indian Society: Traditional Indian Social Organisation: Dharma, Doctrine
1. Measures of Economic Development, Process of Economic Development of	of Karma. Ashram Vyavastha, Purushartha and Sanskars; Socio-Cultural Dynamics:
Developing Countries- Myrdal & Kuznets.	impact of Buddhism, Islam and the west. Factors responsible for continuity and change. 2.
2. Planning and Economic Development: Changing Role of Planning and Markets, Public-	Social Stratification: Caste system: Origin, Structural and Cultural views. Changing
Private Partnership.	patterns of Caste; Caste and class: Issues of equality and social justice; - Agrarian and
3. Theories of Economic Growth- Harrod & Domar Models, Lewis Model of Development,	industrial Class structure in India, Emergence of middle classes. Classes among the
Stages of Growth-Rostow, Balanced & Unbalanced Growth Theories.	Tribes, Emergence and growth of Dalit consciousness. 3. Marriage Family and Kinship:
4. Human Capital and Economic Growth, Research & Development and Economic	Marriage among different ethnic groups and its changing trends and future; Family: it's
Growth, Low Level Equilibrium Trap, Critical Minimum Effort Thesis.	structural and functional aspects and their Changing Pattern, Impact of legislations and
5. Public Finance: Public Goods and Externalities, Public Expenditure- Theories and	socio-economic changes on marriage and family, Kinship: Regional variations in kinship
Effects, Theories of Taxation, Incidence, Impact and Shifting of Taxes, Effects of Taxation.	system and its changing aspects. 4. Economic and Political System: Jajmani System,
6. Fiscal policy and Economic Development, Types of Budget Deficits and their Effects on	land tenure system, Social and economic consequences of land reforms, liberalization
the Economy, Public Debt and its Management.	and globalization; Social Determinats of economic development, Green revolution,
7. Theories of International Trade-Comparative Advantage, Terms of Trade and Offer	functioning of democraitic political system. Political parties and their compostion,
	Contd

Structural change and orientation among political elites, Decentralisation of power and political participation, Political implications of development. 5. Education and Society: Dimensions of education in traditional and modern societies, Educational inequalities and change; Education and social mobility. Problems of education among the weaker sections of society.

SECTION-B

6. Tribal, Rural and Urban Social Organisation: Distinctive features of tribal communities and their distribution; Tribe and caste, Processes of change: Acculturation, Assimilation and integration. Problems of tribals: social identity, Socio-cultural dimensions of village community; traditional power structure, Democratisation and leadership, Community development programme and Panchayti Raj, New strategies for rural transformation change in Kinship, caste and occupation in urban areas. Class structure and mobility in urban community; Ethnic diversity and community intergration, urban neighbourhood rural urban differences, Demographic and socio-cultural practices. 7. Religion and Society: Size, Growth and Regional distribution of different religious groups; inter religious interaction and its manifestations, Problems of conversion, Community tensions Secularism, Minority status and religious fundamentalism. 8. Population Dynamics Socio-cultrual aspects of sex, Age, Marital status, Feritility and mortality. Sociopsychological, cultural and economic problems of population explosion, Population policy and family welfare programme; Determinants of population growth. 9. Women and Society: Demographic profile of women, Changes in their status; Special problemsdowry, atrocities, discrimination; welfare programmes for women & children, Domestic Violence Act-2005, Sexual Harassment at Workplace-2013. 10. Dimensions of Change and Development: Social change and Indices of modernisation, Sources of socia change: Endogenous and Exogenous, Processes of Social Change: Sanskritisation Westernisation, Secularisation and Modernisation, Agents of change: Mass Media Education and communication, problems of modernization and planned change, Strategy and ideology of planning. Five year plans. Poverty alleviation programme; Environment Unemployment and programme for Urban Development; social movement with specia reference to Social reform, peasant, Backward Classes, Women and Dalit Movements.

9. PHILOSOPHY: PAPER-I (History and Problems of Philosophy)

(SECTION-A)

1. Plato: Theory of ideas 2. Aristotle : Form, matter and Causation. 3. Descartes: Method soul, God, Mind-Body dualism. 4. Spinoza : Substance, Attributes and Modes, Pantheism 5. Leibnitz: Monads, God. 6. Locke : Theory of knowledge, Rejection of Innate ideas Substance and Qualities. 7. Berkeley : Refutation of Abstract Idea, Refutation of Matter Refutation of the distinction between Primary and Secondary Qualities, Idealism. 8 Hume: Theory of knowledge, Scepticism, Self, Causality. 9. Kant: Apriori and Aposterior Knowledge, Analytic and Synthetic Judgements, possibility of Synthetic Aprior Judgement, Space, Time, Categories, Ideas of Reason, Criticism of the proofs for the existence of God 10. Hegel: Dialectical Method, Absolute Idealism. 11 (a) Moore: Defence of Common sense, Refutation of Idealism. 11 (b) Russell : Theory of Descriptions Incomplete Symbols, Logical Atomism : Atomic Facts. 12. Wittgenstein: Elementary Propositions, Picture Theory of Meaning, Distinction of Saying and Showing. 13. Logical Positivism : Verification Theory, Rejection of Metaphysics, Linguistic Theory of Necessary Propositions. 14. Phenomenology : Husserl Phenomological Method, Intentionality of Consciousness. 15. Existentialism: (Kiecrkegaard and Sartre)- Existence and Essence Freedom and Choice, Responsibility and Authenitc Existence. 16. Quine : Radica Translation. 17. Strawson: Theory of Person.

(SECTION-B)

1. Carvaka: Theory of knowledge, Materialism. 2. Jainism : Theory of Reality. Syadvada and Saptabhanginaya Bondage and Liberation. 3. Buddhism : Pratityasamutpada Ksanikavada, Nairatmyavada, Schools of Budhism. 4. Sankhya-Yoga : Prakriti, Purusa Theory of Causation, Liberation, Ashtanga-yoga, Cittabhumi, Ishvara. 5. Nyaya- Vaisesika : Pramanas, Self, Liberation, Nature of God and proofs for existence of God, Categories. Theory of causation, Atomism. 6. Mimamsa : Theory of Knowledge, Prama, Pramanas Svatahpramanyavada, 7. Vedanta : Sankara, Ramauja and Madhva (Brahma, Isvara Atma, Jiva, Jagata, Maya, Avidya, Adhyasa, Moksha).

Pholisophy : PAPER-II (Socio Political Pholisophy and Philosophy of Religion) (SECTION-A)

1. Social and Political Ideals: Equality, Justice, Liberty 2. Sovereignty 3. Individual and State 4. Democracy: Concept and forms 5. Socialism and Marxism 6. Humanism 7. Secularism 8. Multiculturalism 9. Theories of Punishment 10. Violence, Non-violence Sarvodaya 11. Gender-Equality 12. Scientific Temper and Progress 13. Philosophy of Ecology.

SECTION-B

1. Religion : Theology and Philosophy of Religion. 2. Religion and Morality 3. Notions of God; Personalistic, Impersonalistic, Natuaralistic. 4. Proofs for the existence of God. 5. Immoratility of Soul 6. Liberation 7. Religious Knowledge; Reason, Revelation and Mysticism 8. Religion without God 9. Problem of Evil 10. Religious Tolerance. 10. GEOLOGY: PAPER-I

General Geology, Geomorphology, Structural Geology, Palaeontology and Stratigraphy.

(i) General Geology: Origin of the Universe Planets of the Solar System. Interior of the Earth. Dating of rocks by various methods and Age of the Earth, Volcanoes: their types, causes and products, volcanic belts. Earthquakes: causes, effects and distribution. Island Arcs, Deep Sea trenches and Mid- Oceanic Ridges. Continental drift, Sea-floor spreading 2. Individual Differences and Measurement: Nature and sources of individual

GEOLOGY: PAPER-II

Crystallography, Mineralogy, Petrology, Economic Geology and Applied Geology (i) Crystallography: Crystalline and Non-Crystalline Solids, Space Groups, Space Lattice, Classification of Crystais in 32 classes of symmetry, Miller, Weiss Notations and Harman Mauguin symbols, Axial character, Symmetry elements and forms present in the Normal class of Cubic, Tetragonal, Hexagonal, Orthorhombic, Monoclinic and Triclinic Systems, Twinning and Twin laws, Crystal defects, Applications of X-ray diffraction techniques in crystallography.

(ii) Optical Mineralogy: General principles of optics, Isotropism and anisotropism, Properties of Minerals in Plane polarized light and between crossed polars, Concepts of optical indicatrix. Dispersion in minerals.

(iii) Mineralogy: Elements of Crystal chemistry, Types of bondings, ionic radii, coordination number, isomorphism, polymorphism and pseudomorphism, Structural classification of silicates, Physical, chemical, and optical properties of rock- forming minerals (Olivien Pyroxene, Amphiboles, Feldspars, Feldspathoids, Silica, Garnets, Mica and Alumino-silicate group).

(iv) Petrology : Magma its generation and physical properties one, two and three component phase diagrams (Silica, Albite-Anorthilte, Periclase- Silica, Diopside- Albite-Anorthite systems) and their significance. Bowen's Reaction Principle, magmatic differentiation and assimilation. Texture, structure and classification of igneous rocks. Petrology of some igneous rocks (Granite, Basalts, Alkaline rocks, Ultramafic rocks, Anorthote and Chamockites) with Indian examples. Process of formation of sedimentary rocks, Diagenesis and lithification. Textures and structures of sedimentary rocks and their significance. Classification of sedimentary rocks (clastic and non-clastic). Heavy minarals and their significance, Elementary concepts of depositional environments, Sedimentry facies and provenance. Petrography of important sedimentary rocks (Conglomerate, Breccia, Sandstone Greywacke, shale, Limestone and B.H.Q.). Wentworht's Scale. Metamorphic processes and types of metamorphism. Metamorphic grades, zones and facies, ACF, AKF and AFM diagrams. Texture, structures and nomenclature of metamorphic rocks, Anatexis. Petrography and petrogenesis of important metamorphic rocks. Description of Zeolite, Greenschist, Amphibolite Granulite and Eclogite Facies Rocks.

(v) Economic Geology: Ore Mineral, Gangue and Tenor. Processes of formation of mineral deposits. Common forms and structures of ore bodies, Classification of ore deposits. Control of ore localization. Metallogeny. Study of important metallic and nonmetallic mineral deposits. Oil and natural gas deposits, and Coal fields of India, Mineral resources of Uttar Pradesh. Mineral economics. National Mineral Policy. Conservation and utilization of minerals.

(vi) Applied Geology: Essentials of prospecting and Exploration techniques. Principal methods of Mining. Sampling, Mineral beneficiation. Geological considerations in Engineering works, Dams, Tunnels, Bridges and Roads. Elements of Soil and Groundwater Geology. Use of Aerial Photographs and Satellite imageries in geological investigations.

11. PSYCHOLOGY: PAPER - I BASIC PSYCHOLOGICAL PROCESSES

1. Psychology: Introduction: Overview of the subject matter, Place of psychology in science, Theoretical approaches: S-R humanisitic, Cognitive, information processing, 2. Methods: methods of data collection Natural observation, Interview, Case study, Tests,

scales and Questionnaires.

3. Biological bases of behavior: Outline of central, peripheral and autonomic nervous systems, Localization of functions in the brain, hemispheric specificity, nerve impulse and its conduction, receptor system, Endocrine system and its role in physical growth and personality make up.

4. Origin and development of behavior: Genetic bases, Evironmental factors, child rearing, deprivation, cultural factors, Motor and skill development, language development. 5. Attention and Perceptual Processes: Classical psychophysics and signal detection theory. Attentional processes, selective Attention and sustained attention, Perceptual organization, Perception of form, colour and depth. Perceptual- constancy, the stabilityinstability paradox, Perceptual sensitivity and perceptual defence.

6. Learning Processes: Conditioning: Classical instrumental and observational, Verbal learning, Methods and Processes, extinction, discrimination and generalization.

7. Memory: Encoding; structural, phonological and semantic dual encoding, Sensory memory, STM, LTM including episodic, semantic and procedural, Constructive Memory, Theories of forgetting.

8. Problem Solving, Reasoning and Thinking: Process and determinants of problem solving, Inductive, and deductive reasoning, hypothesis testing, Language and thought; Whorfian view-point and its critique, Information processing in thinking.

9. Emotions : Nature and development, Theories of emotion; physiological, cognitive and opponent-process, Indicators of emotion, recognition of emotion.

10. Motivation: Criteria of motivated Behaviour, Motivation: Processes and Types, Measurement of motivation, Extrinsic versus intrinsic motivation.

11. Individual differences in psychological functions: General mental ability, theoretical approaches: Spearman, Thurstone, Guilford, Jensen, Vernon, Sternberg, J.P. Das and Piaget, Creativity and creative thinking.

PSYCHOLOGY- PAPER-II

Psychology In the Applied Settings

1. Psychology as an Applied Science: Applied versus basic science, Nature and fields of psychology, social community, industry, school, health and environment.

Thes, beep bed iterations and this became ridges. Continental anti, bed noor spreading	2. Individual Differences and measurement. Nature and sources of individual
and Plate Tectonics. Origin of Continents and Oceans.	differences, Psychological scaling, test construction and standardization, Reliability and
(ii) Geomorphology: Weathering and Erosion Geomorphic processes, Geomorphic	validity, Norms, Cross-Validation.
cycles. Topography and its relation to structures and Lithology. Drainage patterns and their	3. Assessment of Personality: Issues in personality assessment, self-report measures
significance. Geomorphic features of India. Aeolian, Fluvial, Glacial, Coastal and Karst	projective techniques, response styles; familiarity with important personality measures
processes and landforms.	like TAT. Rorschach and MMPI.
(iii) Structural Geology: Concept of Stress and strain, strain markers, Strain in 2- and 3-	4. Psychological Disorders and Mental Health: Classification of Psychological
dimensions and their significance. Geometry and classification of Folds, Faults, joints.	disorders (DSM-IV), symptoms and etiology of psychoneurotic, psychotic and
Types and significance of Unconformities, Linear and Planar structures, and their	psychosomatic disorders; coping with stress and mental health.
significance. Major Tectonic features of India.	5. Social Problems and Psychology: Attitude and Prejudice, Cognitive and Motivational
(iv) Palaeontology: Micro- and mega-fossils, Index fossils, Derived fossils and their	
	6. Social Influence: Influence, control and power, Basis of influence; Social facilitation,
Geological distribution of Bivalves, Gastropods, Ammonoids, Brachiopods, Trilobites,	Ledership in group, Group factors in performance.
Echinoids and Corals. Vertebrate life through ages. Evolution of Horse and Elephant,	7. Psychology in Industry and Organisation: personnel selection, Training and
Gondwana flora and their palaeontogical significance.	Performance Appraisal, job attitudes and job behavior, Motivational patterns in
(v) Stratigraphy: Principles of Stratigraphy, stratigraphic classification, Nomenclature,	organizations, Organisational communication, organisational effectiveness.
Geological Time scale. Study of geological systems of India in terms of Lithology,	
distribution, fossil contents and economic importance (Dharvar Supergroup, Cuddapah	
Supergroup, Vindhyan Supergroup, Gondwana Supergroup, Deccan Traps, Siwalik	achievement; interventions for improving school performance, Education of specific
Supergroup).	categories of children.
Supergroup).	Contri

9. Psychology In the Clinical setting: Nature and goals of Psychotherapy,	Constitution for promotion of International peace and Security and Legislation for giving
Psychoanalytic persens- centered therapy, group and behavior therapies, community	
mental health, Illness prevention and Health promotion.	4. State Recognition and State Succession
10. Environmental Psychology: Role of environment in behavior, personal space,	5. Territory of States: modes of acquisition and loss of territory
effects of noise pollution, crowd and atmoshpheric pollution , Interventions for reducing	
adverse impacts.	Economic Zone and Ocean beyond national jurisdiction
12. BOTANY: PAPER-I	7. Air space and aerial navigation
Microbiology, Pathology, Plant Diversity, Morphogenesis	8. Outer space: Exploration and use of outer space
Microbiology: Microbial diversity elementary idea of Microbiology of Air, Water and Soil, a	
	humanterian Law- International conventions and contemprorary development, Human
reference to Agriculture, Industry Medicine and Environment.	Rights and its enforcement in Municipal Law: National Human Rights Commission.
Plant Pathology: Mode of infection, defence mechanism, control of plant diseases,	10. Jurisdiction of States: basis of jurisdiction and immunity from jurisdiction
Important plant diseases caused by viruses, bacteria, fungi and nematodes with special relerence to tobacco mosaic, leaf curl of papaya, cirtrus canker, rust of wheat, smut of	11. Extradition and Asylum
barley, late blight of potato, red rot of sugarcane, ear cockle of wheat, ergot of bajara, stem	
gall of coriander and wilt of arhar.	13. Treaties: Formation, application and termination14. State Responsibility
	15. United Nations: Purposes and principles; principal organs and their powers and
importance of viruses, bacteria, algae, fungi, bryophytes, pteridophytes and	
gymnosperms including fossils.	16. Peaceful means for settlement of International disputes
Morphology: Morphology of root, stem, leaf, flower and fruits, secondary growth.	17. Lawful recourse to force: aggression, self-defence and interventions
Embryology: Microsporogenesis and male gametophyte, megasporogenesis and	
female gametophyte, fertilization, embryo and endosperm development.	Weapons; Nuclear Non-proliferation Treaty, CTST.
Taxonomy: Principles of taxonomy, systems of classification of angiosperms (Bentham	19. International Terrorism, State sponsored terrorism, International criminal Court
and Hooker, Takhtajan), rules of botanical nomenclature, chemotaxonomy distinguishing	20. New International Economic order and Monetary Law: WTO, TRIPS, GATT, IMF and
features of families- Ranunculaceae, Magnoliaceae, Brassicaceae, Malvaceae,	World Bank.
Fabaceae, Rosaceae, Apiaceae, Cucurbitaceae, Asteraceae, Rubiaceae Apocyanaceae,	Law PAPER-II
Solanaceae, Acanthaceae, Varbenaceae, Lamiaceae Euphorbiaceae, Arecaceae,	1-A- LAW OF CRIMES: (a) Concept of Crimes, Elements, Preparations, and attempt to
Orchidaceae, Poasceae.	commit crime. (b) (1) Indian Penal Code, 1860
Morphogenesis: Correlation, Polarity, Symmetry, totipotency, differentation and	i. General exceptions
regeneration of tissues and organs; methods and applications of cell tissue, organ and	ii. Joint and Constructive liability
protoplast cultures, somaclonal variations, somatic hybrid and cybrids.	iii. Abetment
BOTANY: PAPER-II	iv. Criminal conspiracy.
Cell Biology, Genetics, Physiology, Biochemistry, Ecology and Economic Botony	v. Offences against the state
Cell Biology: Cell as structural and functional unit of life, Ultra structure of eucaryotic and	vi. Offences against Public Tranquility
prokaryotic cells, structure and functions of plasma membrane, endoplasmic reticulum,	vii. Offences against Human Body
chloroplasts, mitochondria, ribosomes, golgibodies, and nucleolus: Cell cycle, mitosis and meiosis, Chromosomal morphology and chemistry, numerical and structural changes in	viii. Offences against Property
chromosomes and their cytological and genetical effects.	ix. Offences against Women
Genetics: Mendel's Law of inheritance, interaction of genes, linkage and crossing over, genetic	x. Defamation
recombination in fungi, cyanobacteria, bacteria and viruses, gene mapping, sex linkage,	
determination of sex, cytoplasmic inheritance of plastid; gene concept, genetic code.	xii. Prevention of Corruption Act, 1988
Moleculr Genetics: Moleculr genetics-DNA as genetic material. Structure and replication	B. LAW OF TORTS: i. Nature of tortious liability
of DNA, role of nucleic acids in protein synthesis (transcription and translation) and	ii. Liability based upon fault and strict liability
regulation of gene expression, mutation and evolution, DNA damage and repair, gene	iii. Statutory liability
amplification, gene rearrangement, oncogene, genetic engineering- restriction enzyme,	iv. Vicarious liability including State liability
cloning vectors (pBR 322, PTi lambda phage), gene transfer, recombinant DNA,	v. General Defences
application of genetic engineering in human welfare,	vi. Joint tort feasors
Physiology and Biochemistry: Water relations of plants, absorption, conduction of	vii. Negligence
water and transpiration; mineral nutrition and ion transport, translocation of	viii. Remedies.
phyotosynthates, essential micro- and macroelements and their function, chemistry and	ix. Defamation
classification of carbohydrates; photosynthesis-mechanism, factors affecting	x. Nuisance
photosynthesis, C3 and C4 carbon fixation cycle, photorespiration; plant respiration and	xi. Conspiracy
fermentation, enzymes and coenzymes, mechanism of enzyme action: secondary	xii. False imprisonment and malicious prosecution.
metabolites (alkaloids, steroids, terpenes, lipids), nitrogen fixation and nitrogen	C. Law of Contracts and Mercantile Law:
metabolism, structure of protein and its synthesis: Plant Growth: Plant growth-growth, Movements and senescence, growth hormones and	i. Nature and formation of contract / E- contract
growth regulators their structure, role and importance in agriculture and horticulture;	ii. Standard form of Contract
physiology of flowering, sexual incompatibility, seed germination and dormancy.	iii. Factors vitiating consent
Ecology: Scope of ecology, ecological factors, plant communities and plant succession,	iv. Void, Voidable, illegal and unenforceable contracts
concept of biosphere, ecosystem-structure and functions, abiotic and biotic components,	v. Performance of contracts.
flow of energy in the ecosystem, applied aspects of ecology, natural resources and their	vi. Dissolution of contractual obligations
conservation, endangered, threatened and endemic taxa, pollution and its control.	vii. Frustration of contracts
Economic Botany: Plants as sources of food, fibre, timber, drugs, rubber, beverage,	viii. Quasi contracts
spices, resin and gums, dyes, essential oils, pesticides and biofertilizers, ornamental	ix. Remedies for breach of contract
plants, energy plantation and petrocrops.	x. Contract Indemnity, Guarantee and Insurance xi. Contract of Agency,
13. LAW: PAPER-I	xi. Contract of Agency, xii. Sale of Goods and hire purchase
Part-A (Constitutional Law and Administrative Law)	xiii. Formation, Liability and Dissolution of Partnership
1. Constitution: Constitutional Law, Constitutional Conventions; Constitutionalism	xiv. Negotiable Instruments Act 1881
2. Salient features of Indian Constitution and its Nature.	D. Contemporary Legal Developments:
3. Federalism: Presidential and Parliamentary form of Government; Separation of	i. Concept of Public Interest Litigation and Environmental Law
Powers; Rule of Law.	ii. Right to Information Act-2005
4. Fundamental Rights: Nature and its relationship with Directive Principles of State	iii. Alternative Disputes Resolution- Concept, Types and Prospect
Policy and Fundamental Duties, Fundamental Rights and Human Rights with special	iv. Aims, objectives and Salient features of the competition Law 2002
reference to Right to equality, Right to Speech and expression, Right to life and personal liberty, Religious, Cultural and Educational Right, Right to Constitutional remedies, Right	v. Doctrine of Plea bargaining
to information, Right to Free and Compulsory Education and Right of women and children.	vi. Offences under the Information and Technology Act, 2000 specially Civil Liability
5. Constitutional Position of the President and relations with the Council of Ministers.	(Sections 43 to 64) and Criminal Liability (Section 65 to 75).
Consitutional position of Governor and their powers.	14. ANIMAL HUSBANDARY AND VETERINARY SCIENCE
	PAPER-I

Consitutional position of Governor and their powers.	14. ANIMAL HUSBANDARY AND VETERINARY SCIENCE
6. The Supreme Court and High Courts: their powers and jurisdiction; Public Interest	PAPER-I
Litigation.	<u>SECTION-A</u>
7. Distribution of Legislative powers between the Union and States, Administrative and	A. Animal Nutrition: Digestion of feed in ruminants and nonruminants Nutrient
financial relations between Union, States and Local Bodies	requirements for milk production. Nutrient and their functions in Animal body.
8. Principles of Natural Justice: Emerging trends and judicial approach	Classification of feed stuffs, feeding standards, Principles of rationing and computation of
9. Delegated legislation: Its Consitutionality and judicial and legislative controls	balance ration, Conservation of fooder as silage and hay, treatment of poor quality
10. Services under the Union and States: Recruitment, conditions of service and	roughages, Role of enzymes in digestion, minerals in feeds, sources, deficiency symptom,
Constitutional safe guard; Union Public Service Commission and State Public Service	function, Vitamins: sources, function and deficiency syndrome. Role of Harmones in
Commission; Powers and Functions	production and reproduction, Metabolism of carbohydrates, proteins and lipids, Feed
11. Emergency Provisions	supplements and feed additive- function and deficiency syndrome. Use of Probiotics and
12. Election Commission: Power and Functions	Prebiotics in dairy animals and poultry nutritions; Digestion trials, feeding of animals under
13. Parliamentary Privileges and Immunities	stress conditions, feeding of calves, heifers, Bulf and cows/buffaloes before and after
14. Amendment of the Constitution	parturition. Interrelationship of vitamins with mineral, Evaluation of energy and protein-
15. Ombudsman: Lok Pal, Lok Ayukt etc.	proximate analysis of feeds. Requirement and formulation of feeds for layers and broilers.
Part- B (International Law)	B. Animal Physiology and Environmental Physiology: Adoption, Mechanism of
1. Nature of International Law	acclemetization, growth, measures of growth, methods of controlling, stress due to
2. Source: Treaty, Custom, General principles of law recognized by civilized nations,	temperature during winter and summer. Animal digestions and absorption of
subsidiary means for the determination of law	carbohydrates, protein and fats in ruminents and nonruminents. Male and female reproductive organ and function, physiology of milk secretion, ejection, holdup of milk.
3. Relationship between International Law and Municipal Law, Provisions in Indian	

Spermatogenisms and oogenesis, collection of semen. Evalutation, dilution and preservative. Deep frozen semen, semen dilutors. A.I. methods, hormonal control of memory glance, effect of heat stress on production, reproduction, meat quality, Parturition, distokia, retention of placenta.

SECTION-B

A. LIVESTOCK PRODUCTION AND MANAGEMENT: Comparison of Dairy Farming in India with developed countries. Dairying, commercial Dairy farming, under mixed and specialized system, starting an organization of dairy farming, procurement of goods in dairy farming. Factors determing the efficiency of dairy animals, herd recording, budgeting, Pricing policy, Personnel Management. Houseing of dairy animal and poultry, Management of livestock- dairy calves, heifers, milks, stud, bulf, Maintenance of records. Milking system- method and principles, clean milk production, economics of dairy and poultry farming. General problems of cattle, sheep, goat, pigs and poultry management. Gokul Mission, N.D.P. Package of common management practices for dairy, cost of milk production and posture management.

B. Milk and Milk products Technology: procurement and transportation of milk. Reception and Quality testing of milk, Definition, composition and food value of milk. Physico-Chemical properties of milk. Chilling, filteration, clarification, separation and standardization of milk. Homogenization, pasteurization and sterilization of milk. Packaging and distribution of milk. Defects in milk, their causes and prevention, Toned milk, standardized milk, Toned milk, double toned milk, reconstituted milk, recombined milk, flavoured milk and filled milk. Cleaning and sanitization of dairy equipments. Culture and its propogation. Preparation, packaging, yield and composition of Khoa, Chhena, Paneer, Dahi, Lassi, Srikhand and Kulfi. Manufacturing and grading of Ghee. Production and quality testing of Icecream, Butter, Cheese, Condensed, Evaporated and Dry Milk. BIS and FSSAI, Standards of Milk and Milk Products. Utilization of Dairy by-products-whey, buttermilk, skim milk.

ANIMAL HUSBANDARY AND VETERINARY SCIENCE PAPER-II

SECTION-A

a. General Genetics and Animal Breeding: Role of livestock in National Economy, relationship of plant with Animal. Livestock and milk production statistics, heredity and variation, Mendal's Law of inheritance, sex linked, sex influenced and sex limited heredity. Mutation. Cytoplasmic inheritance, conservation of germ plasm, breeds of cattle, buffaloes, goats, sheep, pig and poultry. Coefficient of relationship, Inbreeding Coefficient, methods of selection, selection index. Method and system of breeding, collection, evaluation, dilution and preservation of semen. Methods of A.I. Gene and Genolipic frequency. Hardy weinberg law; population versus individual gene and Genotipic frequency, Qualitative and quantitative traits.

b. ANIMAL HEALTH AND HYGIENE: Anatomy of ox and fowl, Histological techniques, freezing, paraffining embedding of tissues, storing and preparation of blood film, Histological stain ed embryology of cow. Physiology of blood and its; circulation, digestion, respiration, excretion: endocrine gland in health and diseases. General Veterinary hygiene with respect of water, air and habitate.

SECTION-B

c. ANIMAL DISEASES: Immunity and vaccination, Principles and methods of Immunization, classification of diseases, diseases of cattle, buffalo, sheep and goat. Etiology, symptoms and diagnosis, treatment, prevention, and control of various disease, like Anthrax, H.S., B.Q., Mastits. T.B., Johnes disease, food and mouth disease, Rinder pest, cow pox, Faciolopsis, Actinobacilosis, Actinomycosis, Trypanosomiasis, Pyroplasmosis, Trichomoniasis, Anaplasmosis, Milk fever. Tympanitis, Naval ill, Diseases of poultry- Etiology, symptoms, diagnosis, treatment prevention and control of various disease, Ranikhet, Fowlpox, Fowltyphyd Pullorum disease, Coxidiosis, Aviam Leusocis complex. Disease of Swine: Swine fever Hogeholera, Manz.

d. VETERINARY PUBLIC HEALTH: Zoonosis, Classification definition, role of animals and birds in transmission of zoonotic disease, Veterinary Jurisprudence – Rules and regulations for improvement of animals and animals product and prevention of animal diseases, Materials and methods for collection of samples for veterolegal, investigation. Duties and role of veterinarian in slaughter houses to provide meat under hygienic condition. By-products of Slaughter Houses and their economic utilization.

e. EXTENSION: Basic philosophy, objectives, concept and principles of extension, methods adopted to educate farmers under rural conditions, Transfer of technology and its feed back Problems and constraints in transfer of technology in animal husbandry programmes for rural development.

<u>15. Statistics: Paper-I</u> <u>Probability theory and statistical Application</u>

Group – A- PROBABILITY THEORY: Sample space and events, Classical and Axiomatic Definitions of probability, Laws of total probability, Conditional Probability, Independence of Events, Theorem of Compound Probability Bayes. Theorem and its Applications. Random Variable Discrete and Continuous. Distribution Function; Elementary Properties of Distribution Function, Bivariate Distribution and associated Marginal and Conditional Distributions. Mathematical Expectation and Conditional Expectation, Moments, Moment Generating and Characteristic Functions. Markov and Chebyshev Inequalities, Convergence in probability, Weak Law of Large Numbers and Central Limit Theorem for independently and Identically Distributed Random Variables, Some Standard Discrete and Continuous Distributions, Viz, Bionomial, Poisson, Hypergeometric, Geometric Negative Bionomial, Multinomial, Uniform, Normal, Exponential, Gamma, Beta and Cauchy Bivariate Normal Distribution.

and Method of Maximum Likelihood, Interval Estimation Simple and Composite Hypotheses, Two Kinds of Errors, Critical Region, Level of Significance size and Power Function, Unbiased Tests, Most- Powerful and Uniformly Most Powerful Tests, Neyman-Pearson Lemma and its Application, Likelihood Ratio Test. Tests based on t, Chi-Squiare, z and F-distributions. Large Sample Tests. Distributions of order Statistics and Range, Non-Parametric Tests, Viz... Sign Test, Median Test, Run Test, Wilcoxon-Mann-Whitney Test.

GROUP-B-STATISTICAL MANAGEMENT: Nature of Operations Research Problems, Linear Programming Problem and the Graphical Solution in simple Cases, Simplex method, Dual of Linear Programming Problem Assignment and Transportation Problems, Zero sum two-person game, Pure and Mixed Strategies, Value of a Game. Fundamental Theorem, Solution of 2x2 Games, Nature and Scope of Sample Survey, Sampling Vs. Complete Enumeration, Simple Random Sampling from Finite Populations with and without Replacement, Stratified Sampling and Allocation Principles, Cluster Sampling with Equal Cluster Size. Ratio, Product and Regression Methods of Estimation and Double Sampling, Two Stage Sampling with Equal First Stage Units, Systematic Sampling. Statistical-Quality Control, Charts for variables and Attributes.

Acceptance-Sampling, OC, ASN and ATI Curves, Producers risk and Consumer's risk. Concept of AQL, AOQL and LTPD, Single and Double Sampling Plans Scaling Procedures, Scaling of Test items Test Scores, Theory of Tests, Parallel Tests, True Score, Reliability and Validity of Tests.

16. MANAGEMENT PAPER-I

The candidates are expected to be acquainted with various aspects of Management. They should be able to apply theory to practice in the context of world business, in general and business function in India, in particular. For this, they are expected to be well conversant with the environment, in which business functions in India. They should also be able to display knowledge and application of managerial tools of analysis and decision-making in various functional areas.

1. Management Concepts and Evolution, Concept and significance of Management; Management as science or art; distinction between management and administration; Role and Responsibilities of management; Principle of management; Evolution of management thought- classical school, Neo-classical School, modern management school.

2. Planning and Decision Making; Planning-nature, type, significance and limitations; Plans objectives; policies; procedures; planning premises; Forecasting, Techniques of forecasting and limitation. Decision making – types, process; Rational decision making and its limitations. Concept of bounded rationality.

3. Organization and Organizational Behaviour; Organisation-concept, Types, divisions and levels, Span of management; Authority and responsibility; Authority types, sources, Delegation of authority, principles and obstacles to delegation; Centralisation and decentralization of authority; Organisational behaviour- concept and significance, individual and group behaviour. Organisational Change, resistance to change; conflict management

4. Directing-principles and techniques, Motivation-Maslow, Hezberg, McLelland, McGregor, Contingency theories; MBO. Leadership, types, Traits of successful leader, Various theories of leadership; Communication-Process, Levels and types, barriers to communication, Measures for effective communication, Role of technology in communication.

5. Controlling-Process; Pre-requisites for effectives controlling, Methods of controlling, budgetary and non budgetary methods, Coordination, Concept, Techniques and barriers to Co-ordination.

6. Business Environment, Interplay between business unit and environment, ethics and corporate governance; Monetary Policy, Fiscal Policy, Foreign Capital and Foreign Collaboration; Strategy, concept levels, SWOT analysis core competency and synergy, Porter's Five Forces Model and Value Chain Analysis, BCG Matrix.

MANAGEMENT PAPER-II SECTION-I MARKETING MANAGEMENT

Concept of Marketing, Marketing Mix; Marketing Research; Marketing Environment; Marketing Plan; Market Segmentation; Market Target and Positioning; Product Strategies, Product Life-Cycle; Consumer Behaviour; Brand Management; Sales Promotion, Advertising, Management of Sales Force, Pricing Decision, Marketing Channel-Retail Management, Internet Marketing, Customer Relationship Management, Rural Marketing in India; International Marketing; Marketing Audit and Control; Ethics in Marketing.

SECTION-II PRODUCTION MANAGEMENT

Meaning and Nature of Production Management; Type of Production Systems; Production Planning and Control, Lean Manufacturing and Flexible Systems; Ranking, Loading and Scheduling for different production system; Site Selection and Plant Location, Plant Layout and Material Handling; Production Design, Inventory Management; Supply Chain Management; Enterprise Resource Planning; Total Quality Management, Six Sigma, PERT and CPM, Waste Management.

SECTION-III- FINANCIAL MANAGEMENT

Meaning and Scope, Estimating the firm's financial requirements; Capital Structure determination; Cost of Capital; Working Capital Management; Capital Market, Regulatory Role of SEBI, Venture Capital, Mutual Fund; Divident Policy; Net Banking and NPA Management; Corporate Restructuring, Merger and Acquisition; Investment Decision, Risk Analysis; Lease Financing; Foreign Exchange Market.

SECTION-IV- HUMAN RESOURCE MANAGEMENT

Cauchy Bivariate Normal Distribution.	
GROUP-B, STATISTICAL APPLICATIONS: Method of least Squares Correlation and	Nature of Human Resource Management, Scope of Human Resource Management; Job
Linear Regression, Product Moment correlation, Rank Correlation, Intra-Class Correlation	Analysis and Job Design; Recruitment and Selection; Training and Development; Career
and Correlation Ratio, Partial and Multiple correlation and Regression for Three Variables.	Planning; 360 degree Performance Apprisal; Worker's Participation in Management;
One- Way and Two-Way Analysis of Variance with equal number of Observations per Cell	ESOPs; Trade Union in India; Safety, Welfare, Strike, Lay-Off, Lock-out and
Design of Experiments-Basic Principles of Design of Experiment, Completely	Reconciliation; HR Audit; Flexible Working Condition; Work from Home; Valuntary
Randomized Design, Randomized Block Design, Latin Square Design, 2 ² and 2 ³ Factorial	Retirement Scheme (VRS); Outsourcing.
Experiments, Missing Plot Technique Sources of Demographic Data, Stable and	17. POLITICAL SCIENCE AND INTERNATIONAL RELATIONS: PAPER-I
Stationary Populations, Measures of Fertility and Mortality, Life Tables, Simple Population	SECTION-A
Growth Models. Index Numbers and Their Uses, Index Numbers due to laspeyre,	Political Theory- Definition, Nature and Scope of Political Science,
	Approches to the study of Political Science-Traditional, Behavioural, Systems and Marxist
Index Number and Cost of Living Index Number. Time- Series and its Components,	State- Definition, Theories of origin and theories related to the functions-Liberal,
Determination of Trend and Seasonal Indices, Periodogram and Correlogram Analysis,	Individualistic, Socialistic.
Variate Difference Method.	Sovereignty-Meaning, Types and theories.
STATISTICS: PAPER-II	Rights-Meaning, Kinds and theories
STATISTICAL INFERENCE AND MANAGEMENT	Liberty- Meaning, Kinds, and theories.
GROUP-A-STATISTICAL INFERENCE: Properties of Estimators, Consistency,	Justice-Meaning, Kinds, and Theories; relation between equality and liberty.
Unbiasedness, Efficiency, Sufficiency, Cramer-Rao Inequality for Minimum Variance	Democracy-Meaning, types, Theories-Liberal, Socialist and Marxist.
Unbased Estimator, Rao-Blackwell Theorem. Estimation Procedures, Method of Moments	Forms of Government: Democrative & Authoritatrian-Unitary and Federal, Parliamentary
	Contd.

and Presidential	5. Economic policies 1858-1914. Railways Commercialization of Indian Agriculture;
Political Institutions- Legislature, Executive, and Judiciary.	Growth of landless labourers and rural indebtedness; Famines; India as market for British
Political parties and Pressure groups, Electoral Systems.	Industry and drain theory 6. Early Indian nationalism; Social background; Formation of
Political Philosophy –	political associations; Peasant and tribal uprisings during the early nationalist era;
(A) Indian Political Thinkers- Manu, Kautilya, Gandhi, M.N. Roy, Ambedkar	Foundation of the Indian National Congress; The moderate phase of the Congress;
(B) Western Political Thought- Plato, Aristotle, Machiavelli, Hobbes, Locke,	Growth of Extremism, Anti-partitions; and Swadeshi Movement, Birth of Muslim League.
Rousseau, Mill, Hegel, Green, Marx, Laski, Gramci, Hanna Arendt	The Indian Councils Act of 1909; the Government of India Act of 1919. 7. Inter-war
SECTION-B	economy of India: Industries and problem of protection; Agricultural distress; The Great
Indian Government and Politics	Depression; Ottawa agreements and discriminatory Protection. The growth of Trade
Indian Nationalism-Causes for the Rise of Nationalism, Bang Bhang Movement, Non-	
Cooperation Movement and Civil disobedience movement	leadership: Gandhi's thoughts, and methods of mass mobilization, and different
	movements; States people's Movement and other strands of the National Movement: (a)
constitution, Fundamental Rights, Fundamental duties, Directive principles of state policy.	Revolutionary movements in India and Abroad; (b) Swarajists, Liberals, Responsive
Amendment of the Constitution,	cooperation; (c) Emergence of Leftism in India (d) Subhash Chandra Bose and the Indian
Union Government- President, Prime Minister and Council of Ministers, Parvument of the Supreme Court.	
State Government- Governor, Chief Minister and Council of Ministers, State Legislature,	Hindu Mahasabha etc.; Women and National Movement. 10. Literary and cultural developments: Tagore, Premchand, Subramanayam Bharti, Iqbal as examples only, 11.
High Court.	Towards freedom: The Act of 1935; Congress Ministries, 1937-1939, The Pakistan
Centre-State Relations.	movement, 12. Post-1945 upsurge (RIN Mutiny, Telangana uprising etc.): Constitutional
Local Self Government – Municipality, Municipal Corporation, and 74 th Amendment.	
Panchayati Raj and 73 rd Amendment.	SECTION-B
Political Process- Caste, Regionalism, Linguism, Communalism in Politics,	13. Renaissance, Reformation and Counter Reformation, Age of Enlightenment; Major
Political Parties, Pressure groups and their Role, National Integration	ideas of Enlightenment, Kant, Rousseau etc.; Spread of Enlightenment outside Europe,
Union Public Service Commission, State Public Service Commission, Election	
commission, Niti Ayog, Human Rights Commission.	14. Origins of Modern Politics-European States System; American Revolution; French
POLITICAL SCIENCE AND INTERNATIONAL RELATIONS: PAPER-II	Revolution and its aftermath, (1789-1815).
SECTION-A	15. Industrialization: Industrial Revolution: Causes and Impact on Society:
International Relations – Meaning, Nature and Scope	Industrialization in other countries.
Theories of International and Relations – Idealists, Realist, Systems and Decision making	
theories	Italy: Disintegration of Empires through the emergence of nationalities.
Factors determining foreign Policy-National Interest and Ideology	17. Imperialism and Colonialism: Trans-Atlantic slave Trade, Asian Conquest; Types of
Means of National Interest- Nationalism, Imperialism, Colonialism. Principles of Balance of Power, and Collective Security.	Empire: Settlement and non-settlement; Latin America, South Africa, Indonesia, Australia.
Role of International Law and Diplomacy in Internatinal Relations.	18. Revolutions and Counter-Revolutions- 19 th Century European revolutions; The Russian Revolution of 1917-1921; Fascist Counter-Revolution, Italy and Germany; the
U.N.: Organization and Role	Chinese Revolution of 1949.
Changing International Political order in the post- Cold war Period Arms race and Arms	
Control	developments.
Role and Relevance of Non-Aligned Movement.	20. Cold War- Emergence of two Blocs and other related developments. Emergence of
Regional Organizations-E.U., A.S.E.A.N., A.P.E.C., S.A.A.R.C.	Third World and Non-Alignment; UNO and Dispute Resolution.
New International Economic Order-W.T.O., Liberalization, Privatization and Globalization	21. Colonies and Liberation- Latin America- Bolivia; Arab World- Egypt; South Africa-
Contemporary issues in International Politics- Human Rights, Environment, Terrorism,	Apartheid Policy and Democracy; South-East Asia-Vietnam.
Nuclear Proliferation.	22. Decolonization and underdevelopment -Break up of Colonial Empires; British,
<u>SECTON-B</u>	French, Dutch; Factors Constraining Development: Latin America, Africa, Asia.
1- Foreign Policies of America, Russia and China	23. Soviet Disintegration and the Unipolar World- Causes, Consequences and other
2- India's Foreign Policy and relations with America, Russia and China	developments; Globalization.
3- India's Relations with Neighbouring Countries	40 Authornalisme BARED I
4- Palestine Problem and Arab- Israel Conflict5- Role of Third World in International Relations	<u>19. Anthropology – PAPER-I</u>
6- North- South dialogue, South- South Cooperation.	1.1 Anthropology: Its meaning, scope and development.1.2 Relationship with other disciplines: History, Economics, Sociology, Psychology,
7- Indian Ocean- Problems and prospects.	Political Science, Life Sciences, Medical Sciences.
18. HISTORY:	1.3 Main branches of Anthropology: their scope and relevance.
PAPER-I (SECTION-A)	2.1 Human Evolution and emergence of Man: Organic Evolution; Theories of evolution-
1. Sources and approaches to study of early Indian History. 2. Early pastoral and	
agricultural communities. The Archaeological evidence. (Neolithic and Chalcaolithic	
Cluture) 3. The Indus civilization: its origin, nature and decline. 4. Patterns of settlement,	
economy, social organization and religion in India (c. 2000 to 500 B.C.): archaeological	Hominoidea and Hominidae; Comparative Anatomy of man and Apes; Skeletal changes
perspectives. 5. Evolutions of North Indian society and culture: evidence of Vedic Texts	due to erect posture and its implications.
(Samhitas of Sutras). 6. Teachings of Mahavira and Buddha, Contemporary Society. Early	2.3 Origin and Evolution of Man: Phylogenetic status, characteristics and distribution of
phase of state formation and urbanization. 7. Rise of Magadha: the Mauryan Empire.	the following: Prepleistocence fossil primate-Oreopithecus, South and East African
Ashoka's inscriptions, his dharma and nature of the Mauryan State. 8-9 Post- Mauryan	······································
Period in Northern and Peninsular India. Political and Administrative History. Society,	
Economy, Culture and Religion. Tamilakam and its society and Sangam Texts. 10-11 Changes in the Gupta and post-Gupta period (upto c. 750) political history of northern and	55
peninsular India. Samanta System and changes in political structure; economy; Social	
Structure; culture; religion. 12. Themes in early Indian cultural history, languages and	(
texts; major stages in the evolution of art and architecture; major philosophical thinkers	
and schools; ideas in science and mathematics.	Grimaldi.
SECTION-B	4.1 Human Genetics: Meaning, scope and branches, its relationship with other sciences.
13. Major dynasties and Political structures in North India from 750A.D. to 1200 A.D. Rise	4.2 Methods for the study of genetic principles in man-family study (Pedigree analysis,
of Rajput Dynasties and the imperial Cholas.	Twin study, Foster child, co-twin method, cytogenetic method, Immunological method,
14. Arab Conquest of Sindh and the Ghaznavide Empire; Advent of Islam and Sufism	
Alberuni and his study of India Science and Civilisation.	4.3 Mendelian Genetics in man-family study, single factor, multi factor, polygenic
15. India 750 A.D. – 1200 A.D.: Economy, Society, Literature, Major Historical works,	inheritance in man, concept of genetic polymorphism and selection. Mendelian
Styles of Architecture, Religious thought and Institutions, Growth of Bhakti Movement.	populations- Hardy-Weinberg Law, Inbreeding, Genetic Load, Genetic implications of
16. The Ghorain invasions, Economic, Social and Cultural consequences and the	
foundation of the Sultanat.	4.4 Chromosomes and Chromosomal aberrations in man; Genetic counseling.

foundation of the Sultanat. **17.** The Sultanat period and Political Dynasties: Slaves, Khaliis, Tughlags, Syeds and B

4.4 Chromosomes and Chromosomal aberrations in man; Genetic counseling.

5. Concept of Race: Race and racism, racial classification; Ethnic groups of mankind:-
characteristics and distribution.
6. Ecological Anthropology: Concept and methods; Bio-cultural adaptation.
7.1 Human Growth and Development: Concept and factors affecting growth and
development, methods of growth studies.
7.2 Biological and Socio-ecological factors influencing fecundity, fertility, natality and
mortality.
8. Applications of Physical Anthropology and Human Genetics.
9.1 Principles of Prehistoric Archaeology: Broad outlines of prehistoric cultures- i.
Palaeolithic, ii. Mesolithic, iii. Neolithic, iv. Chalcolithic, v. Copper-Bronze age.
9.2 Dating Methods: Relative and Absolute.
10.1 The Nature of Culture: Concept and characteristics of culture and civilization;
ethnocentrism and cultural relativism.
10.2 The nature of society: Concept of Society; Society and Culture; Social Institutions;
Social Groups; and Social Stratification.
10.3 Marriage: Definition and Universality; Laws of marriage (endogamy, exogamy,
hypergamy, hypogamy, incest taboo); Types of marriage (monogamy, polygamy);
Functions of marriage; Marriage regulations (Preferential); Marriage payments (bride
wealth and dowry).
10.4 Family, Household and Domestic Group: Definition and universality; functions Cont.

and Types (from the perspectives of structure, blood relation, marriage, residence and	
succession); Impact of urbanization.	Introduction to computer aided design of structure
10.5 Kinship: Consanguinity and Affinity; Principles and types of descent (Unilineal,	
Double, Bilaterial, Ambilineal); Forms of descent groups (Lineage, clan, phratry, moiety	
and kindred); Kinship terminology (descriptive and classificatory).	riveted and welded plate girders, gantry girders, stancheons with battens and lacings.
11. Economic Organization: Meaning, Scope and relevance of economic anthropology;	PART-B
Formalist and Substantivist debate; Principles governing Production, Distribution and	(a) Fluid Mechanics: Fluid properties, types of fluids and their role in fluid motion. Kinematics and dynamics of fluids flow: velocity and acceleration, stream lines
Exchange (reciprocity, redistribution and market) in communities subsisting on hunting and gathering fishing, swiddening, pastoralism, Horticulture and Agriculture.	equation of continuity, irrotational and rotational flow, velocity potential and stream
12. Political Organization: Band, tribe, chiefdom, kingdom and state; concepts of power,	functions.
Authority, Legitimacy; Social Control, Law and justice in simple societies.	Continuity, momentum, energy equations Navier Stokes equation, Euler's equation
13. Religion: Anthropological approaches to the study of religion (evolutionary,	of motion Bernoulli's equation. Applications to fluid flow problems e.g. pipe flow, sluid
psychological and functional) monotheism and polytheism; myths and rituals; forms of	gates, weirs, etc.
magico-religious beliefs in tribal and peasant societies (animism, animatism, fetishism,	Laminar Flow: Laminar and turbulent boundary layer on a flat plate, laminar sub-layer
naturalism and totemism); religion, magic and science distinguished, magico religious	smooth and rough boundaries, submerged flow, drag and lift forces.
functionaries (priest, shaman, medicine man, sorcerer and witch).	Turbulent flow through pipes: Characteristics of turbulent flow, velocity distribution and
14. Anthropological theories:	variation of pipe friction factor, Hydraulic grade line and total energy line.
i. Classical evolutionism-Tylor, Morgan and Frazer.	(b) Hydraulics: Uniform and non-uniform flows, momentum and energy correction factors
ii. Diffusionism-British, German and American.	specific energy and specific force, critical depth, gradually varied flow, classification o
iii. Functionalism-Malinowski, Structural functionalism-Radcliffe-Brown.	surface profiles, control section, step method of integration of varied flow equations, rapidly
iv. Structuralism- Levi-Strauss.	varied flow, hydraulic jump. Surges.
v. Culture and Personality- Benedict, Mead, Linton, Kardiner and Cora-du-Bois.	Hydraulic Machines and Hydropower: Hydraulic turbines and their classification, choice
vi. Neo-evolutionism- Childe, White, Steward.	of turbines, performance parameters, controls, Characteristics, specific speed, Principles of hydropower development.
vii. Cultural Materialism (Harris). 15 1 Pessarah Mathada in Cultural Anthropology: Field work tradition in anthropology:	(c) Geotechnical Engineering: Soil types and structure, gradation and particle size
15.1 Research Methods in Cultural Anthropology: Field work tradition in anthropology; Distinction between technique, method and methodology; Tools of Data collection-	distribution, Atterberg's limits.
Observation, Interview, Schedule, Questionnaire, Case history, Case study and	Flow through porous media: Effective stress and pore water Pressure, permeability
Genealogy; Secondary sources of information.	concept, field and laboratory determination of permeability, Seepage pressure, quick
15.2 Controlled comparison and cross cultural study.	sand condition.
Anthropology – Paper-II	Compaction of soil: Laboratory and field tests. Compressibility and consolidation theory
1. Emergence and Development of the Indian Culture and Civilization: Prehistoric	
(Paleolithic, Mesolithic and Neolithic-Chalcolithic); Protohistoric (Indus Civilization).	Stress distribution in soils Boussinesque and Westergaard's analysis, Earth pressure
2. Demographic profile of India: Ethnic and linguistic elements in the Indian population	theory and analysis for retaining walls, application for sheet piles and Braced excavation.
and their distribution.	Bearing capacity of soil: Approaches for analysis, fields tests, settlement analysis, stability
3. The structure and function of traditional social system: Vernasharam, Purushartha,	of slopes.
Karma, Rina and Rebirth.	Foundation: Type and selection criteria for foundation of structures, Design criteria fo
4. Caste system in India: Structure and characteristics; Varna and Caste, Dominant	foundation, Analysis of distribution of stress for footings and pile, pile group action, pile
Caste, Caste mobility, Jajmani system, Tribe-caste continuum.	load tests.
5. Sacred Complex and Nature-Man-Spirit Complex.	Subsuface exploration of soils, Ground improvement and soil stablisation techniques.
5. Sacred Complex and Nature-Man-Spirit Complex.6. Impact of Buddhism, Jainism, Islam and Christianity on Indian society including tribals.	Subsuface exploration of soils, Ground improvement and soil stablisation techniques. <u>CIVIL ENGINEERING:</u>
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Principle of planning of buildings for residents and specific use, Building code provision and use. Basic principles of detailed and Approximate estimating, specifications, rate analysis principles of valuation of real property. Machinery for earthwork, concreting and the specific uses, Factors affecting selection of construction equipments, operating cost of equipments. Construction activity, schedules, organizations, Quality assurance principles. Basis principle of network, CPM and PERT uses in construction monitoring, Cost optimizatio and resource allocation. Basic principles of Economic analysis and methods. Project Profitability: Basic principles of financial planning, simple toll fixation criterions. (b) Surveying: Common methods and instruments for distance and angle measuremer for Civil Engg.works, their use in plane table, traverse survey, leveling, triangulatior contouring and topographical maps. Basic principles of photogrammetry and remot sensing. 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Rolling loads and influences lines: Influence lines for shear Force and Bending moment at a section of a beam. Criteria for maximum shear force and bending moment in beams channelized, intersection rotary etc., signal designs, standard traffic signs and markings.

traversed by a system of moving loads. Influences lines for simply supported plane pin	(d) Rail
jointed trusses.	crossing
Jointou (100000).	trook of

effects.

Matrix mehods of analysis: Force method and displacement method of analysis of indeterminate beams and rigid frames.

Plastic-analysis of beams and frames: Theory of plastic bending, Plastic analysis s method, Mechanism method.

Unsymmetrical bending: Moment of inertia, position of Neutral axis and Principal Calculation of bending stresses.

(b) Design of Concrete structures: Concept of mix design. Reinforced con Working stress and limit state method of design. Recommendation of B.I.S. Codes. I of one- way and two-way slabs, stair-case, slabs, simple and continuous bea rectangular, T and L sections. Compression members under direct load with or w eccentricity.

Cantilever and Counter-fort type retaining walls.

Water Tanks: Design requirements for rectangular and circular tanks resting on ground. Prestressed Concrete: Methods and systems of prestressing, anchorages, Analysis and

design of sections for flexure based on working stress, loss of prestress. Earthquake

ilway Engineering: Permanent way, ballast, sleeper, chair and fastenings, points ngs, different types of turn outs, cross-over, setting out of points, Maintenances of Arches: Three hinged, two hinged and fixed arches, rib shortening and temperature track, super elevation, creep of rails, ruling gradients, track resistance, tractive effort, curve resistance, Station yards and station, station buildings, platform sidings turn outs, Signals and interlocking, Level Crossings.

PART- B

statical	(a) Water Resources Engineering:	
	Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration, infiltration, overland	
	flow, hydrograph, flood frequency analysis, flood routing through a reservoir, channel flow routing- Muskingam method.	
r anes,	routing-Muskingam method.	
	Ground Water flow: Specific yield storage coefficient coefficient of permeability	
Decian	contined and uncontined aquiters, radial flow into a well under contined and uncontined	
	Ground and surface water resources, single and multipurpose projects, storage capacity of	
Millioul	reservoirs, reservoir losses, reservoir sedimentation.	
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Water requirements of crops, consumptive use, duty and delta, irrigation methods and their efficiencies.

Canals: Distribution systems for canal irrigation, canal capacity, canal losses, alignment of main and distributory canals, most efficient section, lined canals and their design, regime

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theory, critical shear stress, bed load.	Maxwell's equation. Electromagnetic wave equations. Poynting's Theorem. Waves of
Water logging: causes and control, salinity.	transmission lines. Wave-guides. Microwave resonators.
Canal structures: Design of head regulators, canal falls, aqueducts, metering flumes and	
canal outlets.	applications. Transient and steady-state analysis of systems. Transform techniques ar
Diversion head work: Principles and design of weirs on permeable and impermeable	
foundation, Khosla's theory.	Network functions. Two-port network. Network parameters. Elements of network
Storage works: Types of dams, design, principle of gravity and earth dams, stability	
analysis.	(iii) Electrical & Electronic Measurement & Instrumentation: Basic methods
Spillways: Spillway types, energy dissipation.	
River training: Objectives of river training, methods of river training and bank protection.	Measurement. Error analysis, Electrical Standards. Measurement of voltage, curren power, energy, power-factor, resistance, inductance, capacitance, frequency and loss
(b) Environmental Engineering:	angles. Indicating instruments. DC and AC Bridges, Electronic measuring instrument
Water Supply: predicting demand for water, impurities of water and their significance,	
physical, chemical and bacteriological analysis, waterborne diseases, standards for	Multi-meter, digital voltmeter, frequency counter, Q-meter, oscilloscope, technique
potable water.	special purpose CRO's. Transducers and their classifications. Thermo-couple, thermistic
Intake of Water: Water treatments: principles of coagulation, flocculation and	RTD, LVDT, strain-gauges. Piezo-electric transducers etc., Application of tranducers
sedimentation, slow, rapid and pressure filters, chlorination, softening, removal of tests,	
odour and salinity.	
Sewerage Systems: Domestic and industrial wastes, storm sewage, separate and	(iv) Analog & Digital Electronics: semiconductors, semiconductor diodes & zene
combined systems, flow through sewers, design of sewers.	
Sewage Characterisation: BOD,COD, solids, dissolved oxygen, nitrogen and TOC.	types of amplifiers including feedback and D.C. amplifiers; Operational amplifiers an
Standards of disposal in normal water course and on land.	their application; Feedback oscillators: Colpitts and Hartley types, waveform generator
Sewage Treatment: Working principle, units, chambers, sedimentation tank, trickling	Multi-vibrators; Boolean algebra. Logic gates Combinational and sequential digit
filters, oxidation ponds, activated sludge process, septic tank, disposal of sludge, recycling	
of waste water.	of the second se
Solid waste management: Collection and disposal in rural and urban contexts,	(v) Electrical Machines: D.C. Machines: commutation and armature reaction
management of solid waste.	characteristics and performance of motors and generators; Applications, starting an
Environmental pollution: Sustainable development, Radioactive wastes and disposal.	speed control. Synchronous generators: Armature reaction, voltage regulation, parall
Environmental impact assessment for thermal power plants, mines, river valley projects.	operation. Single- and Three-phase Induction motors: Principle of operation, performance
Air and water pollution control acts.	characteristics, starting, speed control. Synchronous Motors: Principle of operation
21. MECHANICAL ENGINEERING: PAPER-I	performance analysis, Hunting, Synchronous condenser. Transformers: Construction
(PART-A)	phasor diagram, equivalent circuit, voltage regulation, Performance, Auto-transformer
1. Theory of Mechines: Kinematic and dynamic anyalysis of planer mechanisms, belt and	instrument transformers. Three-phase transformers.
chain drives, gears and gear train, cams, flywheel and governors. Balancing of rotating and	(vi) Material Science: Theory of Semiconductors, Conductors and insulator
reciprocating masses, single and multi cylinder Engines.	Superconductivity. Various insulators used for Electrical and Electronic application
2. Mechanical Vibrations: Vibrating systems, single degree freedom systems, natural	Different magnetic materials, properties and applications. Hall Effect.
frequency, damped and forced vibrations, resonance, force transmissibility, two degree of	
freedom systems, vibration absorbers, whirling of shafts and critical speeds.	1. Control Engineering: Mathematical Modeling of physical dynamic systems. Bloc
3. Mechanics of Solids: Stress and strain, elastic constants, uniaxial loading, thermal	diagram and signal flowgraph. Transfer function. Time-response and frequency-response
stress, two dimensional stress analysis, principal stresses, generalised Hook's law, total	of linear systems. Error evaluation, Bode Plot, Polar Plot and Nichol's chart, Gain Marg
and distorsion strain energy, theories of failures, bending and shear stresses in beams,	and Phase Margin, Stability of linear feedback control systems. Routh-Hurwitz ar
Torsion of shafts, Close coiled Helical springs, Thin and thick pressure versels, rotating	Nyquist criteria. Root locus technique. Design of compensators. State variable methods
discs, Buckling of columns.	system modeling, analysis and design. Controllability and Observability and their testin
4. Engineering Materials: Basic concept of structure of solids, crystalline materials,	methods. Pole placement, design using state variables feedback. Control system
crystal defects, alloys and binary phase diagrams, structures and properties of common	components (Potentiometers, Tachometers, Synchros & Servomotors).
engineering materials. Basics of polymers, ceramics and composite materials; Iron-	2. Industrial Electronics: Various power semiconductor devices. Thyristor & i
Carbon equilibrium diagram, heat treatment of steels.	protection and series-parallel operation. Single-phase and poly-phase uncontrolle
<u>(PART-B)</u>	rectifiers. Smoothing filters, D.C. regulated power supplies. Controlled converters an
5. Manufacturing Science: Machine tool Engineering, Merchant's force analysis, Taylor's	inverters, choppers. Cyclo-converters, A.C. voltage regulators. Application to variab
tool life equation, conventional machining, NC and CNC machining Processes, jigs and	speed drives. Induction and Dielectric heating.
fixtures, standard forming and welding processes.	SECTION B: (HEAVY CURPENT)
6. Non Convensional Machining Processes: EDM, ECM, Ultrasonic machining, water	(3) Electrical Machines: (IFundamentals of Electro-Mechanical energy conversion
jet machining etc, application of lasers and plasmas, energy rate calculations. Metrology:	Analysis of Electro-Magnetic torque and induced voltages. The general torque equation
concept of fits and tolerances, tools and gauges, comparators, inspection of length,	(ii). Three- Phase Induction motors: Concept of revolving field. Induction motor a
position, profile and surface finish.	transformer. Phasor diagram and equivalent circuit. Performance evaluation. Correlation
7. Manufacturing Management: Product development, value analysis, Break-even	of induction motor operation with basic torque relations. Torque-speed characteristic
analysis, forecasting techniques, Operation Scheduling, Capacity Planning, Assembly line	Circle diagram, starting and speed-control methods. (iii). Synchronous Machine
balancing, CPM and PERT, Inventory control, ABC Analysis, EOQ model, material	Generation of e.m.f.; Equivalent circuit, Experimental determination of leakage an
requirement planning, job design, job standards, method study and work measurements.	synchronous reactances. Theory of salient-pole machines. Power equation. Parall
8. Quality Management: Quality analysis, control charts, acceptance, sampling, total	operation. Transient and sub-transient reactances and time constants. Synchronol
quality management, Operations research, linear programming, graphical and simplex	
	motor Phasor diagram and equivalent circuit Performance V-curves Power factor
methods, Transportation and assignment models, single Serve queueing model, Value	
methods, Transportation and assignment models, single Serve queueing model, Value Engineering.	control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circu
methods, Transportation and assignment models, single Serve queueing model, Value Engineering. MECHANICAL ENGINEERING: PAPER-II	control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circulard performance; Stepper motors. Methods of operation, Drive amplifiers. Half stepping
methods, Transportation and assignment models, single Serve queueing model, Value Engineering. <u>MECHANICAL ENGINEERING: PAPER-II</u> (PART-A)	and performance; Stepper motors. Methods of operation, Drive amplifiers. Half stepping Reluctance type steppor motor, Principles and working of universal motor. Single-phase
methods, Transportation and assignment models, single Serve queueing model, Value Engineering. <u>MECHANICAL ENGINEERING: PAPER-II</u> (PART-A) 1. <u>Thermodynamics:</u> Laws of thermodynamics and their applications; T-ds equations,	control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circu and performance; Stepper motors. Methods of operation, Drive amplifiers. Half stepping Reluctance type steppor motor, Principles and working of universal motor. Single-phase A.C. compersated series motor.
methods, Transportation and assignment models, single Serve queueing model, Value Engineering. <u>MECHANICAL ENGINEERING: PAPER-II</u> <u>(PART-A)</u> 1. <u>Thermodynamics:</u> Laws of thermodynamics and their applications; T-ds equations, Maxwell and Clapeyron equation and their uses; Availability and irreversibility.	 control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circuland performance; Stepper motors. Methods of operation, Drive amplifiers. Half stepping Reluctance type steppor motor, Principles and working of universal motor. Single-phase A.C. compersated series motor. (4) Electric Drives: Fundamentals of electric drive, Rating estimation. Electric braking
 methods, Transportation and assignment models, single Serve queueing model, Value Engineering. <u>MECHANICAL ENGINEERING: PAPER-II</u> (PART-A) <u>Thermodynamics:</u> Laws of thermodynamics and their applications; T-ds equations, Maxwell and Clapeyron equation and their uses; Availability and irreversibility. <u>Fluid Mechanics:</u> Properties and classification of fluids, Manometry, forces on 	control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circuland performance; Stepper motors. Methods of operation, Drive amplifiers. Half stepping Reluctance type steppor motor, Principles and working of universal motor. Single-phase A.C. compersated series motor. (4) Electric Drives: Fundamentals of electric drive, Rating estimation. Electric braking Electro-mechanical transients during starting and braking, time and energy calculation.
 methods, Transportation and assignment models, single Serve queueing model, Value Engineering. <u>MECHANICAL ENGINEERING: PAPER-II</u> (PART-A) <u>Thermodynamics:</u> Laws of thermodynamics and their applications; T-ds equations, Maxwell and Clapeyron equation and their uses; Availability and irreversibility. <u>Fluid Mechanics:</u> Properties and classification of fluids, Manometry, forces on immersed sunfaces, stability of floating bodies, Kinematics and dynamics of 	 control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circular and performance; Stepper motors. Methods of operation, Drive amplifiers. Half steppin Reluctance type steppor motor, Principles and working of universal motor. Single-phase A.C. compersated series motor. (4) Electric Drives: Fundamentals of electric drive, Rating estimation. Electric brakin Electro-mechanical transients during starting and braking, time and energy calculation Load equalization. Solid-State control of D.C., Three-phase Induction and Synchronol.
 methods, Transportation and assignment models, single Serve queueing model, Value Engineering. <u>MECHANICAL ENGINEERING: PAPER-II</u> (PART-A) <u>Thermodynamics:</u> Laws of thermodynamics and their applications; T-ds equations, Maxwell and Clapeyron equation and their uses; Availability and irreversibility. <u>Fluid Mechanics:</u> Properties and classification of fluids, Manometry, forces on 	 control, hunting. (iv). Special Machines: Two-phase A.C. servomotorsEquivalent circuland performance; Stepper motors. Methods of operation, Drive amplifiers. Half stepping Reluctance type steppor motor, Principles and working of universal motor. Single-phase A.C. compersated series motor. (4) Electric Drives: Fundamentals of electric drive, Rating estimation. Electric braking

(5) Electric Traction: Various Systems of track electrification and their comparison. Mechanics of train movement. Estimation of tractive effort and energy requirement. Electrification and their comparison, Traction motors and their characteristics.

(6) Power System and Protection: (a). Types of Power Station. Selection of site. General layout of Thermal, Hydro and Nuclear Stations. Economics of different types. Base load and peak load of stations. Pumped-storage Plants. (b). Transmission and Distribution: A.C. and D.C. Transmission systems. Transmission line parameters and calculations. Performance of Short, Medium and Long transmission lines, A-, B-, C-, D-parameters. Insulators. Mechanical design of overehead transmission lines and Sag calculation, Corona and its effects, Radio interference. EHVAC and HVDC transmission lines, underground cables. Per unit representation of power system. Symmetrical and unsymmetrical fault analysis. Symmetrical components and their application to fault analysis. Load flow analysis using Gauss-Seidel and Newtor-Raphson methods. Fast de-coupled load flow. Steady-state and transient stability. Equal area criterion, Economic operation of power system, incremental fuel costs and fuel rate. Penalty factors. ALFC and AVR control for real-time operation of inter-connected power system. (c). Protection: Principle of arc extinction, Classification of circuit breakers. Restriking phenomenon. Calculation of restriking and recovery voltages. Interruption of small inductive and capacitive currents Testing of Circuit Breakers. (d). Relaving Principles: Primary and back-Up relaving, overcurrent, differential, impedance, and direction relaying principles. Constructional details. Protection schemes for transmission line, transformer, generator, and bus protection. Current and potential transformer and their applications in relaying. Traveling waves. Protection against surges, Surge impedance.

heat transfer laws, shape factor, heat exchange between black and gray surfaces. 4. <u>Refrigeration and Air Conditioning:</u> Vapour compression, vapour absorption, steam jet and air refrigeration systems, Desirable properties of refrigerants, eco- friendly refrigerants, Analysis of compressors, condensers, expansion valves and evaporaters.

3. Heat Transfer: Modes of heat transfer, One dimensional steady and unsteady

conduction. Heat transfer through extended surfaces. Free and forced convective heat

transfer, Empirical correlations in laminar and turbulent flows, Heat Exchangers, Radiation

fully developed flow through pipes.

(PART- B)

5. <u>I.C Engines:</u> Classification, Thermodynamic cycles of operation, Performance Calculations, Heat balance sheet, Combustion in S.I and C.I Engines, normal and abnormal combustion, knocking and detonation. Effect of variables on knocking and detonation, Fuels used in S.I and C.I Engines, Fuel injection, carburetion and multi point fuels injection (MPFI) Supercharging, Engine cooling, Emission and Control, Turboprop and Rocket Engines.

6. <u>Steam Engineering</u>: Modern steam Generators, Rankine cycle, Modified Rankine cycle and analysis, Natural and artificial draught, flow of steam in convergent and divergent nozzles, pressure at throat for maximum discharge, super saturated flow in nozzles, Wilson line.

7. <u>Turbomachines:</u> Classification, Continuity, momentum and energy equations, Flow analysis in axial and centrifugal compressors and turbines, Dimensional analysis and modelling. Performance of Pumps, Compressors and turbines.

8. **Power Plant Engineering:** Site selection for Steam, Hydro Nuclear and Gas Power Plants, dust removal equipments, fuel handling and cooling water system. Thermodynamic analysis of steam and gas turbine power plants, governing of turbines. Solar, Wind and Nuclear Power Plants, Economic power generation.

22. ELECTRICAL ENGINEERING:

(I) E.M. Theory: Analysis of Electrostatic and magetostatic Fields, Laplace, Poisson &

(OR)

SECTION-C (Light Current)

(7) Communication System: Amplitude, Frequency and Phase modulation and their comparison, Generation and detection of amplitude, frequency, phase and pulse modulated signals. Modulators and demodulators, Noise problems, Channel efficiency.

Sampling theorem. Sound and vision broadcost, transmitting and receiving systems.	PART-B (POETRY)
Antennas and feeders. Transmission lines at Audio, Radio and ultra-high frequencies.	
Fiber-optics and optical communication systems. Digital communications, pulse code	
	Alif and noon) (12) Iqbal: Kulliyat-e-Iqbal (Bal-E-Gibrail only) (13) Josh Malihabadi: Saf-o-
system- LAN, ISDN etc. Electronic Exchanges. (a) Microwaves: Electromagetic waves,	Subu (14), Firaq Gorakhpuri: Gul-e-Naghma. (15) Faiz: Dste-Saba, (16) Akhatar-ul-Iman:
unguided media, wave guides. Cavity resonators and Microwave tubes, Magnetrons,	Treek Saiyyara, Bint-E-Lamhat.
Klystrons and TVVT. Solid-State microwave devices. Microwave amplifiers. Microwave	<u>25. हिन्दी साहित्य प्रथम प्रश्न पत्र</u>
receivers. Microwave filters and measurements. Microwave antennas.	भाग—1 हिन्दी भाषा तथा नागरी लिपि का इतिहास— 1. पालि, प्राकृत एवं अपभ्रंश तथा पुरानी हिन्दी का
23. English Literature	संक्षिप्त परिचय 2. मध्यकाल में ब्रज और अवधी का काव्य भाषा के रूप में विकास 3. खडी बोली साहित्यिक
Paper-I	भाषा के रूप में विकास 4. राजभाषा, सम्पर्क भाषा, राष्ट्रभाषा एवं मानक भाषा के रूप मे हिन्दी 5. वैज्ञानिक
Answers must be written in English.	और तकनीकी क्षेत्र में हिन्दी भाषा की स्थिति। 6. हिन्दी भाषा का क्षेत्र और अवधी, ब्रज, खड़ी बोली, भोजपुरी,
Section-A	बुन्देली का क्षेत्र एवं भाषिक विशेषताएं 7. मानक हिन्दी का व्याकरणिक स्वरूप 8. नागरी लिपि का उद्भव
Candidates will be required to show adequate knowledge of the following topics and	और विकास, देवनागरी लिपि की वैज्ञानिकता, समस्यायें और समाधान । 9. हिन्दी शब्द – सम्पदा।
movements:	(भाग–2 हिन्दी साहित्य का इतिहास)
The Renaissance: Elizabethan and Jacobean Drama; Metaphysical Poetry; The Epic and	1. हिन्दी साहित्य के इतिहास लेखन की परम्परा। 2. हिन्दी साहित्य के इतिहास में काल– विभाजन तथा
the Mock-epic; Neo-classicism; Satire; The Romantic Movement; The Rise of the Novel;	नामकरण । 3. आदिकाल, भक्तिकाल, रीतिकाल, आधुनिक काल की प्रमुख प्रवृतियां। 4. आधुनिक कालः
The Victorian Age.	पुनर्जागरण और भारतेन्द्र युग, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद, नयी कविता एवं परवर्ती
Section-B	काव्यधारायें।
Texts for detailed study are listed below:	(क) हिन्दी उपन्यास, हिन्दी कहानी, हिन्दी नाटक एवं रंगमंचः उदभव –विकास एवं इनकी अधुनातन प्रवृत्तियां
1. William Shakespeare: Twelfth Night, King Henry IV, Pt I, Macbeth and the Tempest.	(ख) हिन्दी निबन्ध तथा अन्य गद्य विधायें: जीवनी, आत्मकथा, रेखाचित्र, संस्मरण यात्रा वृतान्त । (ग) हिन्दी
2. John Donne. The following poems: "Canonization", "Death be not proud", "The Good	आलोचना का प्रांरम्भ और विकास। प्रमुख आलोचक : रामचंद्र शुक्ल, नन्ददुलारे बाजपेयी, हजारी प्रसाद
Morrow" and "The Relic".	द्विवेदी, नगेन्द्र, रामविलास शर्मा, नामवर सिंह, रामस्वरूप चतुर्वेदी।
3. John Milton: Paradise Lost, Book-I	हिन्दी साहित्यः द्वितीय प्रश्न पत्र,
4. John Dryden: All for Love	(भाग- प्रथम)
5. Alexander Pope: The Rape of the Lock	इस प्रश्न–पत्र में निर्धारित रचनाओं में से व्याख्या एवं उन पर आलोचनात्मक प्रश्न पूछे जायेंगे। कबीर
6. William Wordsworth. The following poems: "Tintern Abbey", "Three Years She Grew",	ग्रन्थावली, सम्पादक — श्याम सुन्दर दास, साखी संख्या 1 से 100 तक और पद संख्या 1 से 20 तक।
"Michael" and "Milton, Thou Shouldst be Living at This Hour"	सूरदास (भ्रमरगीत सार) सम्पादक -रामचन्द्र शुक्ल, पद संख्या 51 से 100 (कुल 50 पद)
7. P B Shelley: "To a Skylark" and "Ode to the West Wind"	तुलसीदास— रामचरितमानस उत्तरकाण्ड— (दोहा संख्या— 75 से अन्त तक) । जायसी (पदमावत),
8. Alfred Tennyson: "Ulysses" and "Lotos Eaters"	सम्पादक – रामचन्द्र शुक्ल (सिंहलदीप खण्ड और नागमती वियोग खण्ड), बिहारी संग्रह (प्रारम्भ से 100
9. Robert Browning: "My Last Duchess" and "The Lost Leader"	दोहे तक) हिन्दी परिषद प्रकाशन, इलाहाबाद ।
10. Francis Bacon: "Of Studies" and "Of Truth"	जयशंकर प्रसाद – कामायनी – (श्रद्धा और इड़ा सर्ग) सुमित्रानन्दन पन्त– नौका बिहार, परिवर्तन, निराला –
11. Charles Lamb: "Dream Children" and "Poor Relations"	राम की शक्ति पूजा, अज्ञेय – असाध्यवीणा, मुक्ति बोध– अन्धेरे में, नागार्जुन–बादल को घिरते देखा है,
Section-C	अकाल के बाद।
Text for non-detailed study are listed below:	(भाग द्वितीय)
1. Jane Austen. Pride and Prejudice.	नाटक – भारतेन्दु हरिश्चन्द्र – अन्धेर नगरी, जयशंकर प्रसाद– स्कन्द गुप्त,
2. Charles Dickens. Great Expectations.	निबन्ध— रामचन्द्र शुक्ल, चिन्तामणि भाग–एक (कविता क्या है, श्रद्धा और भक्ति)। हजारी प्रसाद द्विवेदी
3. Thomas Hardy: Far from the Madding Crowd	–कुटुज (निबन्ध)
1. Mark Twain: The Adventures of Huckleherry Finn	
4. Mark Twain: The Adventures of Huckleberry Finn.	उपन्यास— प्रेमचन्द्र—गोदान, फणीश्वरनाथ रेणू— मैला आंचल ।
English Literature	उपन्यास— प्रेमचन्द्र—गोदान, फणीश्वरनाथ रेणु— मैला आंचल । हिन्दी की कहानियां— 1— प्रेमचन्द्र— मॉ, 2— जयशंकर प्रसाद— आकाशदीप, 3—अज्ञेय—रोज,
English Literature Paper-II	
English Literature Paper-II Answers must be written in English.	हिन्दी की कहानियां— 1— प्रेमचन्द्र— मॉ, 2— जॅयशंकर प्रसाद— आकाशदीप, 3—अज्ञेय—रोज, 4— राजेन्द्र यादव— जहां लक्ष्मी कैद है, 5— उषा प्रियम्बदा—वापसी ।
English Literature Paper-II Answers must be written in English. Section-A	हिन्दी की कहानियां— 1— प्रेमचन्द्र— मॉ, 2— ज्यशंकर प्रसाद— आकाशदीप, 3—अज्ञेय—रोज, 4— राजेन्द्र यादव— जहां लक्ष्मी कैद है, 5— उषा प्रियम्बदा—वापसी । <u>26. SANSKRIT LITERATURE: PAPER-1</u>
English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and	हिन्दी की कहानियां— 1— प्रेमचन्द्र— मॉ, 2— जॅयशंकर प्रसाद— आकाशदीप, 3—अज्ञेय—रोज, 4— राजेन्द्र यादव— जहां लक्ष्मी कैद है, 5— उषा प्रियम्बदा—वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u>
English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements:	हिन्दी की कहानियां — 1— प्रेमचन्द्र— मॉ, 2— जयशंकर प्रसाद— आकाशदीप, 3—अज्ञेय—रोज, 4— राजेन्द्र यादव— जहां लक्ष्मी कैद है, 5— उषा प्रियम्बदा—वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and
English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of-	हिन्दी की कहानियां– 1– प्रेमचन्द्र– मॉ, 2– जयशंकर प्रसाद– आकाशदीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी कैद है, 5– उषा प्रियम्बदा–वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic
English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in	हिन्दी की कहानियां– 1– प्रेमचन्द्र– मॉ, 2– जयशंकर प्रसाद– आकाशदीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी कैद है, 5– उषा प्रियम्बदा–वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of
English Literature Paper-II Answers must be written in English. Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Feminist approaches to Literature.	हिन्दी की कहानियां– 1– प्रेमचन्द्र– मॉ, 2– जयशंकर प्रसाद– आकाशदीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी कैद है, 5– उषा प्रियम्बदा–वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Pronunciation and prayatnas of Sanskrit sounds, Comparision of Vedic and Classical
English Literature Paper-II Answers must be written in English. Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Feminist approaches to Literature. Section-B	हिन्दी की कहानियां– 1– प्रेमचन्द्र– मॉ, 2– जयशंकर प्रसाद– आकाशदीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी कैद है, 5– उषा प्रियम्बदा–वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Pronunciation and prayatnas of Sanskrit sounds, Comparision of Vedic and Classical Sanskrit languages.
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English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Feminist approaches to Literature. Section-B Texts for detailed study are listed below: 1. William Butler Yeats. The following poems: "The Second Coming", "Sailing to Byzantium", "A Prayer for my Daughter", "Meru" and "Lapis Lazuli" 2. T.S. Eliot, The following poems: "The Love Song of J. Alfred Prufrock" and "Journey of the Magi" 3. W.H. Auden. The following Poems: "The Unknown Citizen" and "In Memory of W.B. Yeats" 4. Philip Larkin. The Following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The following poems: "Afternoons" and "Deceptions" 6. Derek Walcott. The Following poems: "AFar Cry from Africa" and "Sea Grapes" 7. Nissim Ezekiel. The following poems: "Looking for a Cousin on a Swing", "On The Death of a Poem" 9. John Osborne: Look Back in Anger. 10. Eugene O'Neill: Desire Under the Elms 11. Girish Karnad: Hayavadana	हिन्दी की कहानियां– 1– प्रेमचन्द्र– मॉ, 2– जयशंकर प्रसाद– आकाशदीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी कैद है, 5– उषा प्रियम्बदा–वापसी । <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION-A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Pronunciation and prayatnas of Sanskrit sounds, Comparision of Vedic and Classical Sanskrit languages. <u>SECTION-B Sanskrit Grammar</u> सन्धि, समास, कृदन्त, तद्धित, स्त्रीप्रत्यय एवं कारक from the Laghusiddhanta- Kaumudi. <u>SECTION-C Indian Philosophy</u> General study of Indian Philosophy based on the following texts:- तर्कमाषा – केशव मिश्र (अनुमानपर्यन्त), सांख्यकारिका– ईश्वरकृष्ण, वेदान्तसार– सदानन्द, कठोपनिषद्–प्रथम अध्याय– द्वितीया वल्ली, श्रीमद्भगवद्गीता – द्वितीय अध्याय । <u>SECTION-D Sanskrit Poetics</u> (I) General Study of the Dhvani Theory and its kinds according to ध्वन्यालोक– प्रथम उद्योत of Anandavardhana. (II) The following topics from the काव्यप्रकाश of Mammata: काव्यप्रयोजन, काव्यल्क्षण, काव्यहेतु, काव्यभेद, शब्दशक्तियॉ, रससिद्धान्त, गुण तथा अनुप्रास, श्र्वेष, यमक, उपमा, रूपक, उत्प्रेक्षा, अपह्नत्ति, अतिशयोक्त, व्यतिरेक, अर्थान्तरन्यास, विभावना, विशेषोक्ति, स्वभावोक्ति, समासोक्ति, अप्रस्तुतप्रसंसा, दृष्टान्त, दीपक एवं परिसंख्या अलंकार। <u>SECTION-E Essay in Sanskrit</u> The Essay in Sanskrit should not be less than 250 words. <u>SANSKRIT LITERATURE PAPER-II</u>
English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Feminist approaches to Literature. Section-B Texts for detailed study are listed below: 1. William Butler Yeats. The following poems: "The Second Coming", "Sailing to Byzantium", "A Prayer for my Daughter", "Meru" and "Lapis Lazuli" 2. T.S. Eliot, The following poems: "The Love Song of J. Alfred Prufrock" and "Journey of the Magi" 3. W.H. Auden. The following Poems: "The Unknown Citizen" and "In Memory of W.B. Yeats" 4. Philip Larkin. The Following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The Following poems: "AFar Cry from Africa" and "Sea Grapes" 7. Nissim Ezekiel. The following poems: "Looking for a Cousin on a Swing", "On The Death of a Poem" 9. John Osborne: Look Back in Anger. 10. Eugene O'Neill: Desire Under the Elms 11. Girish Karnad: Hayavadana 12. Thomas Carlyle: "Hero as a Poet"	हिन्दी की कहानियां– 1– प्रेमचन्द्र– मॉ, 2– जयशंकर प्रसाद– आकाशदीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी कैद है, 5– उषा प्रियम्बदा–वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Pronunciation and prayatnas of Sanskrit sounds, Comparision of Vedic and Classical Sanskrit languages. <u>SECTION-B Sanskrit Grammar</u> सन्धि, समास, कृवन्त, तद्धित, स्त्रीप्रत्यय एवं कारक from the Laghusiddhanta- Kaumudi. <u>SECTION-C Indian Philosophy</u> General study of Indian Philosophy based on the following texts:- तर्कमाषा – केशव मिश्र (अनुमानपर्यन्त), सांख्यकारिका– ईश्वरकृष्ण, वेदान्तसार– सदानन्द, कठोपनिषद्–प्रथम अध्याय– द्वितीया वल्ली, श्रीमद्भगवद्गीता – द्वितीय अध्याय । <u>SECTION-D Sanskrit Poetics</u> (I) General Study of the Dhvani Theory and its kinds according to ध्वन्यालोक– प्रथम उद्योत of Anandavardhana. (II) The following topics from the काव्यप्रकाश of Mammata: काव्यप्रयोजन, काव्यलक्षण, काव्यहेतु, काव्यभेद, शब्दशक्तियॉ, रससिद्धान्त, गुण तथा अनुप्रास, श्लेष, यमक, उपमा, रूपक, उत्प्रेक्षा, अपहनति, अतिशयोक्ति, व्यतिरेक, अर्थान्तरन्यास, विभावना, विशेषोक्ति, स्वभावोक्ति, समासोक्ति, अप्रस्तुतप्रसंसा, दृष्टान्त, दीपक एवं परिसंख्या अलंकार । <u>SECTION-E Essay in Sanskrit</u> The Essay in Sanskrit should not be less than 250 words. <u>SANSKRIT LITERATURE PAPER- II SECTION-A (Prose & Poetry)</u>
English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Feminist approaches to Literature. Section-B Texts for detailed study are listed below: 1. William Butler Yeats. The following poems: "The Second Coming", "Sailing to Byzantium", "A Prayer for my Daughter", "Meru" and "Lapis Lazuli" 2. T.S. Eliot, The following poems: "The Love Song of J. Alfred Prufrock" and "Journey of the Magi" 3. W.H. Auden. The following Poems: "The Unknown Citizen" and "In Memory of W.B. Yeats" 4. Philip Larkin. The Following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The following poems: "Afternoons" and "Deceptions" 6. Derek Walcott. The Following poems: "AFar Cry from Africa" and "Sea Grapes" 7. Nissim Ezekiel. The following poems: "Looking for a Cousin on a Swing", "On The Death of a Poem" 9. John Osborne: Look Back in Anger. 10. Eugene O'Neill: Desire Under the Elms 11. Girish Karnad: Hayavadana	हिन्दी की कहानियां- 1- प्रेमचन्द्र- मॉ, 2- जयशंकर प्रसाद- आकाशदीप, 3-अझेय-रोज, 4- राजेन्द्र यादव- जहां लक्ष्मी कैद है, 5- उषा प्रियम्बदा-वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION-A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Pronunciation and prayatnas of Sanskrit sounds, Comparision of Vedic and Classical Sanskrit languages. <u>SECTION-B Sanskrit Grammar</u> सचि, समास, कृदन्त, तद्धित, स्त्रीप्रत्यय एवं कारक from the Laghusiddhanta- Kaumudi. <u>SECTION-C Indian Philosophy</u> General study of Indian Philosophy based on the following texts:- तर्कमाषा – केशव मिश्र (अनुमानपर्यन्त), सांख्यकारिका– ईश्वरकृष्ण, वेदान्तसार– सदानन्द, कठोपनिषद्–प्रथम अध्याय– द्वितीया वल्ली, श्रीमद्भगवदगीता – द्वितीय अध्याय । <u>SECTION-D Sanskrit Poetics</u> (I) General Study of the Dhvani Theory and its kinds according to ध्वन्यालोक– प्रथम उद्योत of Anandavardhana. (II) The following topics from the काव्यप्रकाश of Mammata: काव्यप्रयोजन, काव्यलक्षण, काव्यहेतु, काव्यभेद, शब्दशक्तियॉ, रससिद्धान्त, गुण तथा अनुप्रास, श्लेष, यमक, उपमा, रूपक, उत्प्रेक्षा, अपस्तुतप्रसंसा, दृष्टान, दीपक एवं परिसंख्या अतंकार । <u>SECTION-E Essay in Sanskrit</u> The Essay in Sanskrit should not be less than 250 words. <u>SANSKRIT LITERATURE PAPER-II SECTION-A (Prose & Poetry)</u> First hand reading of the following texts: 1- कादम्बरी (शुकनासोपदेश), 2. शिवराजविजयम् (प्रथम
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English Literature Paper-II Answers must be written in English. Section-A Candidates will be required to show adequate knowledge of the following topics and movements: Pre-Raphaelite Movement, Modernism; Poets of the Thirties; The stream-of- consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Feminist approaches to Literature. Section-B Texts for detailed study are listed below: 1. William Butler Yeats. The following poems: "The Second Coming", "Sailing to Byzantium", "APrayer for my Daughter", "Meru" and "Lapis Lazuli" 2. T.S. Eliot, The following poems: "The Love Song of J. Alfred Prufrock" and "Journey of the Magi" 3. W.H. Auden. The following poems: "The Unknown Citizen" and "In Memory of W.B. Yeats" 4. Philip Larkin. The Following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The Following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The Following poems: "Afternoons" and "Deceptions" 5. Sylvia Plath. The following poems: "Afternoons," and "Sea Grapes" 7. Nissim Ezekiel. The following poems: "Looking for a Cousin on a Swing", "On The Death of a Poem" 9. John Osborne: Look Back in Anger. 10. Eugene O'Neill: Desire Under the Elms 11. Girish Karnad: Hayavadana 12. Thomas Carlyle: "Hero as a Poet" 13. John Ruskin: "The Veins of Wealth" (Essay II from Unto This Last) Section-C Texts for non-detailed study are listed below: 1. Graham Greene: The Power and the Glory 2. William Golding: Lord of the Flies 3. Raja Rao: Kanthapura. 4. Nathaniel Hawthorne: The Scarlet Letter 24. URDU LITERATURE PAPER - FIRST: PART-A	हिन्दी की कहानियां– 1– प्रेमवन्द्र– मॉ, 2– जॅयशंकर प्रसाद– आकाशादीप, 3–अज्ञेय–रोज, 4– राजेन्द्र यादव– जहां लक्ष्मी केद है, 5– उषा प्रियम्बदा–वापसी। <u>26. SANSKRIT LITERATURE: PAPER-1</u> <u>SECTION- A Linguistics</u> Origin and development of language, Classification of languages, Indo-European and Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Pronunciation and prayatnas of Sanskrit sounds, Comparision of Vedic and Classical Sanskrit languages. <u>SECTION-B Sanskrit Grammar</u> सस्थि, समास, कृदन्त, तद्वित, स्त्रीप्रत्यय एवं कारक from the Laghusiddhanta- Kaumudi. <u>SECTION-C Indian Philosophy</u> General study of Indian Philosophy based on the following texts:- तर्कभाषा – केशव मिश्र (अनुमानपर्यन्त), सांख्यकारिका– इंश्वरकृष्ण, वेदान्तसार– सदानन्द, कठोपनिषद–प्रथम अध्याय– द्वितीया वल्लो, श्रीमद्भगवद्गीता – द्वितीय अध्याय । <u>SECTION-D Sanskrit Poetics</u> (I) General Study of the Dhvani Theory and its kinds according to ध्वन्यालोक– प्रथम उद्योत of Anandavardhana. (II) The following topics from the काव्यप्रकाश of Mammata: काव्यप्रयोजन, काव्यलक्षण, काव्यहेतु, काव्यमेद, शब्दशक्तियॉ, रससिद्धान्त, गुण तथा अनुप्रास, श्लेष, यमक, उपमा, रूपक, उत्प्रेसा, अपहुतप्रसंसा, दृष्टान्त, दीपक एवं परिसंख्या अलंकार । <u>SECTION-E Essay in Sanskrit</u> The Essay in Sanskrit should not be less than 250 words. <u>SANSKRIT LITERATURE PAPER-II SECTION-A (Prose & Poetry)</u> First hand reading of the following texts: 1- कादमबरी (युकनासोपदेश), 2. शिवराजविजयम् (प्रथम निःखवास), 3. नलचम्पू (प्रथम उच्छवास), 4. मेघदूतम् (पूर्वर्मघ), किरतार्जुनीयम् (प्रथम सर्ग), 6. नीतिशतकम् । (One Question on above carrying 25 marks will be answered in Sanskrit) <u>SECTION-B (Sanskrit Drama)</u> Textual study of the following works: 1. अभिज्ञानाकुन्तलम् (यतुर्थ अंक), 2. उत्तरारमचरितम् (तृतीय अंक), 3. प्रतिमानाटकम् (प्रथम ए द्वितीय अंक), 4. मुचछक्तिकम् (प्रथम अंक) । <u>SECTION-C (</u>
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Boli, Braj Bhasha and Haryanvi. (b) Persio- Arabic elements in Urdu. (c) Urdu Language from 1600 AD to 1900 AD (d) Different theories of the origin of Urdu language. (2) (a)

Development of Urdu Literature in Deccan (b) Two classical Schools of Urdu Poetry-Delhi & Lucknow. (c) Development of Urdu prose upto Ghalib (3) (a) Aligarh movement. Progressive movement and their impact on Urdu Literature. (b) Urdu Literature after independence.

Part-B

Important genesis of poetry- Ghazal, Qasida, Marsiya, Masnavi Rubai, Qata (1) Nazm. Blank Verse. Free Verse (2) Different Kinds of prose -Destan, Novel short Story Drama. Literary Criticism. Biography, Essay. Khaka and Inshaiya (3) Role of Urdu literature in freedom movement.

URDU LITERATURE

PAPER-SECOND

This paper will require first hand reading of the texts prescribed and will be designed to test the candidates critical ability.

PART-A (PROSE)

Meer Amman: Bagh- O- Bahar. (2) Ghalib: Intekhab-E-Ghalib. Pub: Urdu vendor and purchaser. Hire purchase Vs installment payment system. (1) Academy, Lucknow. (3) Hali: Mugaddam-E-Sher-O-Shairi. (4) Ruswa: Umrao Jan Ada (5) 4. Branch Accounting- dependent, independent and foreign branches; Accounting Prem Chand: Prem Chand ke Numainda Afsaney, Ed. Prof. Qamer Rais. (6) Abul Kalam treatment branch account, final account, stock and debtor systems, wholesale price basis. 5. Problems of amalgamation and reconstruction (AS-14), Accounting of holding Azad: Ghubar-e-Khatir. (7) Imtiaz AliTaj: Anarkali. (8) Qurratul Ain Hyder: Akhir-e-Shab ke Hamsafar, Mohammad Hasan; Zahak, companies, Cash flow statement (AS-3)

Page No. - 17

<u>SECTION-D (History of Sanskrit Literature)</u>

General Study of Veda and Vedangas. Origin, development and characteristics of the following Literary genesis: आर्ष महाकाव्य, महाकाव्य, गद्यकाव्य, गीतिकाव्य, नाटक एवं कथा साहित्य-Note: In this section one question carrying 25 marks will be answered in the form of short note on particular work/author.

SECTION-E - Translation from Hindi to Sanskrit. 27. Commerce and Accountancy Paper-1 Accounting and Financial Management

Part-I: Accounting

1. Nature, concepts and branches of accounting, relationship between financial, cost and management accounting, advantages and limitations of accounting. Disclosure of Accounting Practices (AS-I)

2. Royalty-types, Accounting treatment for different royalties.

3. Hire Purchase System-Concept and features, Accounting process in the books of hire

Contd

	VIII. Public Sector Undertakings: Forms, Top-level Managements, control and Problems.
cost sheet; marginal costing- concept, significance, marginal Vs absorption costing, contribution, profit volume ratio and margin of safety.	IX. Control over Public Expenditure: Parliamentary Control; Role of the Finance
Part-II: Financial Management	Ministry, Comptroller and Auditor General.
1. Nature, scope and objectives of Financial Management; Capital Budgeting decisions	
importance, process, limitations, methods-payback period, net present value, internal rate	
of return and average rate of return. 2. Sources of short, medium and long term funds, preference and equity shares, debenture	XI. State Administration: Governor, Chief Minister, Council of Ministers, Chief Secretary, Secretariat: Directorates.
and bond financing.	XII. District Administration: Role and importance, District Magistate / Collector, Land
3. Working capital management-classification, dangers of inadequate working capital,	Revenue, Law and Order and Developmental functions, District Rural Development
approaches to estimation of working capital requirement, tools of cash, inventory and	Angency, Special Programmes of Rural Areas.
receivables management. 4. Cost of capital- Classification and determination, computation of weighted average cost	XIII. Local Administration: Panchayti Raj and Urban Local Government, Features, forms and problems. Autonomy of Local Bodies
of capital, leverage and its types.	XIV. Administration for Welfare: Administration for the welfare of weaker sections with
5. Dividend policy- determinants, Walter, Gordan, Modigliani & Miller approaches,	particular reference to Scheduled Castes, Scheduled Tribes; Programme for the welfare of
advantages and disadvantages of stable dividend policy.	Women.
6. Indian capital market- main attributes, distinction between capital and money markets, defects of capital market, working of Indian stock Exchanges, SEBI as a regulator.	XV. Issue Areas in Indian Administration: Relationship between political and permanent Executives, Generalists and Specialists in Administration, Integrity in Administration,
Commerce and Accountancy	People's Participation in Administration, Redressal of Citizen's Grievances; Lok Pal and
Paper-II	Lok Ayuktas; Administration Reforms in India.
Organizational Behaviour and Human Resource Management	29. MEDICAL SCIENCE
Part-I: Organizational Behaviour 1. Nature and concept of organization, Organizational theories- classical, neo-classical,	PAPER-I
bureaucratic and system approaches, merits and demerits of centralization and	1. Human Anatomy: Gross anatomy, applied anatomy, blood supply and lymphatic drainage of tongue, thyroid,
decentralization.	mammary gland, stomach, liver, prostate, gonads, uterus, Heart and lungs.
2. Basis and Sources of power, power structure, barriers and politics.	Applied anatomy including blood and nerve supply of upper and lower limbs and joints of
3. Organizational Goals-Primary, Secondary, Single and multiple goals; displacement, succession, expansion and multiplication of goals.	shoulder, hip and knee.
4. Organization-Types, Structure, line and staff, functional, committee, matrix, and project,	Applied anatomy of diaphragm, perineum and inguinal region. Applied anatomy of kidney, urinary bladder, uterine tubes and vas deferens.
formal and informal organization, organizational conflict- causes, cures.	Embryology: Placenta and placental barrier. Development of heart, gut, kidney, uterus,
5. Organizational Change-Nature, Significance, causes, cures, Resistance to change and	ovary, testis and their common congenital abnormalities.
adaptation. Part-II Human Resource Management	Central and peripheral autonomic nervous system: Gross and clinical anatomy of
1. HRM- Concept, objectives, significance, functions and challenges to HR Managers.	ventricles of brain, circulation of cerebrospinal fluid; Neural pathways and lesions of cutaneous sensations, hearing and vision; Cranial nerves, distribution and clinical
2. Recruitment and selection, methods of training, executive development programmes.	significance; Components of autonomic nervous system, Internal capsule and cerebral
3. Motivation- Concept, theories- Maslow's Need Hierarchy, Herzberg's health & hygiene	cortex.
and Alderman's Z theory. Determinants of morale, morale and productivity. 4. Leadership- types and styles, Wages- methods of wage payment, wage differential and	2- HUMAN PHYSIOLOGY
wage policy in India.	
5. Industrial Relations-Nature, objectives, Scope and significance.	IMMUNITY, THROMBOCYTOPENIA CVS_CARDIC CYCLE
5. Industrial Relations-Nature, objectives, Scope and significance.6. Collective Bargaining- Concept, features and requirements for successful bargaining;	CVS_CARDIC CYCLE, RESPIRATION-OBSTRUCTIVE DISEASES, ACID BASE BALANCE
 5. Industrial Relations-Nature, objectives, Scope and significance. 6. Collective Bargaining- Concept, features and requirements for successful bargaining; Worker's participation in management- levels and forms of participation, worker's 	CVS_CARDIC CYCLE, RESPIRATION-OBSTRUCTIVE DISEASES, ACID BASE BALANCE KIDNEY- MICTURATION REFLEX,
 5. Industrial Relations-Nature, objectives, Scope and significance. 6. Collective Bargaining- Concept, features and requirements for successful bargaining; Worker's participation in management- levels and forms of participation, worker's participation in India. 	CVS_CARDIC CYCLE, RESPIRATION-OBSTRUCTIVE DISEASES, ACID BASE BALANCE KIDNEY-MICTURATION REFLEX, GIT- PEPTIC ULCER, LIVER FAILURE, JAUNDICE (OBSTRUCTIVE, HEPATIC,
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Scope and significance of development Administration, Political, Economic and socio-	Candida Cryptococcus Aspergillus
	6. Pharmacology:
XII. Public Policy: Concepts and significance, Theories of public, public policy	Drug Nomenclature
formulation, execution and evaluation.	Adverse Drug Reactions
PUBLIC ADMINISTRATION: PAPER-II	Drug Act & Drug Schedules
INDIAN ADMINISTRATION	Drug Clinical trial
I. Evolution of Indian Administration: Major Characteristics of Mauryan, Mughal and	• Drug Life,
British Periods.	Drug Advertisement
II. Constitutional Setting: Parliamentary Democracy; Federalism; Secularism,	Drug Addiction
Socialism.	Pharmaco Vegilance Programme
III. Poitical Executive at the Union Level: President, Prime Minister, Council of Ministers:	Prescription Writing
Cabinet Committees.	Side effects of the following drugs:
IV. Structure of control Administration: Central Secretariat; Cabinet secretariat	Antipyretics and analgesics, Antibiotics,
Ministries and Departments, Boards and Commissions, Field Organizations.	Antimalaria, Antikala-azar, Antidiabetics,
V. Central-State Relations: Legislative, Administrative and Financial.	Antihypertensive Antiviral Antiparasitic Antifungal
VI. Public Services: All India, Central and State Services. Union and State Public Service	Immunosuppressants
Commissions: Training of Civil Servants.	Anticancer. Anti-diarrheal, Antitubercular, Diuretics.
VII. Machinary for Planning: Plan formulation at the national level; NITI Aayog, National	7. Forensic Medicine and Toxicology:
Development Council, Planning Machinery at the State and District levels.	Contd

Medical Ethics and Law, Medico legal aspect of pregnancy, delivery and abortion; Sexual	
offences, Forensic examination of injuries and wounds; Examination of blood and seminal	
stains; poisoning, sedative overdose, hanging, drowning, burns, DNA and finger print	Question Paper) (Conventional Type) Paper-VII Optional Subject-II (Second 3 hours 200
study. Medical Science- Paper –II	Question Paper) (Conventional Type)
1. General Medicine:	Total Marks of all the question papers 1400
A) Aetiology, Clinical features, diagnosis and principals of management (including	
prevention) of: Tetanus, Rabies, HIV / AIDS, Dengue, Japanese Encephalitis, Typhoid,	
Leprosy, Tuberculosis, Malaria, Indian Kala-azar, Rheumatic Heart disease.	Any two subjects to be selected from the following list of the optional subjects-
B) Aetiology, Clinical features, diagnosis and principals of management of: Ischemic Heart	
Disease, Hypertension, Diabetes Mellitus, Hypothyroidism, Hyper thyroidism, Epilepsy,	
Bronchial Asthma, Chronic Obstructive Lung Disease (COPD), Pleural Effusion, Viral Hepatitis	3. Botany 4. Chemistry
and Cirrhosis of Liver, Peptic Ulcer Disease, Pneumonia, Occupational Lung disease. C) Aetiology, Clinical features, diagnosis and principals of management of:	5. Chemical Engineering
Glomurulonephritis, Nephrotic / Nephritic Syndrome, Renal Failure, Hyponatremia,	
Anemia, Thalassemia, Haemophillia, Leukaemia, Lymphoma, Rheumatoid Arthritis,	
Osteoporosis, Urinary Tract Infections, Meningitis, Encephalitis.	8. Geology
D) Medical Emergencies: Heat stroke, Drowning, Carbon monoxide poisoning, Organo-	
phosphorus poisoning, Aluminium phosphoid poisoning.	10. Mechanical Engineering 11. Physics
E) Anxiety, Psychosis, Schizophrenia, Dementia F) Medico-legal aspect of Hanging, Alcoholism,	12. Statistics
G) Investigative Procedures in Medicine: Ultrasonography, CT Scan, MRI,	
Echocardiography, Endoscopy, Bone Marrow aspiration, CSF examination, Complete	
Blood Count.	15. Horticulture
2. Pediatrics:	16. Environmental Science.
Immunization, Baby friendly hospital, Breast feeding, congenital cyanotic heart disease,	Provided that the candidates will not be allowed to offer the following combination o subjects-
respiratory distress syndrome, broncho-pneumonias, Neonatal hyperbilirubinemia, Kernicterus. IMNCI classification and management, PEM grading and management, ARI	
and Diarrhea of under five years children and their management.	(b) Mathematics and Statistics
3. Dermatology:	(c) Chemistry and Chemical Engineering
Psoriasi, scabies, eczema, vitiligo, Stevan Johnson's syndrome and TEN, Lichen Planus,	(d) of the Engineering Subjects viz. Agriculture Engineering, Chemical Engineering, Civil
Leprosy, Bacterial viral and fungal infections of skin.	Engineering and mechanical Engineering not more than one subject.
4. General Surgery:	Note- The standard and syllabus of the subjects mentioned above are given in this advertisement under schedule to the appendix-8 .
Clinical features, causes, diagnosis and principles of management of cleft palate, harelip. Laryngeal tumor, oral and esophageal tumors.	APPENDIX -8
Peripheral arterial diseases, varicose veins,	General Instructions and Syllabus for Main (Written) Examination of Assistant
Tumours of Thyroid, Adrenal Glands, Breast Abscess, cancer, fibroadenoma and adenosis	
Bleeding peptic ulcer, tuberculosis of bowel, ulcerative colitis, cancer stomach.	1. All the question papers for the examination will be of conventional (essay) type but
Renal mass, Cancer Prostate, Benign Prostatic Hyperplasia (BPH).	general studies will be objective type. 2. All question papers must be answered in Hindi or English. Question papers will be se
Haemothorax, stones of Gall bladder, Kidney, Ureter and Urinary Bladder.	
Management of surgical conditions of Rectum, Anus and Anal canal, Gall bladder and Bile ducts.	3. The duration of each of the papers referred to above will be three hours but genera
Portal hypertension, liver abscess, peritonitis, Peri Ampullary Carcinoma Fractures of	
spine, Colles' fracture and bone tumors.	Personality Test
Endoscopy.	The candidate will be interviewed by a board of competent and unbased observers Personality test will be 150 Marks.
Laparoscopic Surgery. Advance Trauma Life Support System (ATLS)	Schedule
Surgical Ethics.	The standard of papers in General Hindi and General Studies will be such as may
5. Obstetrics and Gynaecology including Family Planning:	expected of a Science or Engineering Graduate of an Indian University.
Fertilization and Implantation, Development, Function and Abnormalities of placenta.	The Scope of the Syllabus for optional subject papers for the examination is
Diagnosis of pregnancy, Antenatal care.	broadily of the Honour's Degree level i.e. available higher than the Bachelor's Degree and lower than the Master's Degree. In the case of Engineering subject, the leve
Labour management, complications of 3 rd stage, Antepartum and postpartum hemorrhage, resuscitation of the newborn, Management of abnormal lie and difficult labour,	corresponds to the Bachelor's Degree. There shall be no practical exam. in any subject.
Management of small for date, Fetal growth restriction or premature newborn.	OPTIONAL SUBJECTS
Diagnosis and management of anemia, Preeclampsia and Eeclampsia of pregnancy,	Total number of questions in the question papers of optional subjects will be
Management of Rh-Negative, Diabetes with pregnancy, multiple pregnancy. Birth injuries.	eight. All questions will carry equal marks. Each paper will be divided into two parts, viz
Management of Abortion, Ectopic pregnancy.	Part A and Part B, each part containing four questions. Out of eight questions, five questions are to be attempted. One question in each part will be compulsory. Candidates
Intra-uterine devices, pills, tubectomy and vasectomy, Medical termination of pregnancy including legal aspects.	will be required to answer three more questions out of the remaining six questions, taking
Development of genital organs, Congenital anomalies of uterus and their treatment.	at least one question from each part. In this way, at least two questions will be attempted
Vaginal discharge, pelvic pain, infertility, Abnormal uterine bleeding (AUB), Fibroid and	from each part i.e. one compulsory question plus one more.
prolapsed of uterus.	सामान्य हिन्दी एवं निबन्ध
Management of Post- menopausal Syndrom.	प्रथम खण्ड सामान्य हिन्दी निर्धारित अंक 100 1. अपठित गद्यांश का संक्षेपण, उससे सम्बन्धित प्रश्न, रेखांकित अंशों की व्याख्या एवं उसका उपयुक्त शीर्षक ।
Cancer cervix, Carcinoma body of uterus and ovary. <u>6. Community Medicine (Preventive & Social Medicine)</u>	1. अपाठत गंधाश का संक्षपण, उससे सम्बान्धत प्रश्न, रखाकित अशा का व्याख्या एवं उसका उपयुक्त शावक 2. शासकीय, अर्द्धशासकीय, वैयक्तिक तथा व्यवसायिक समस्याओं के निराकरण हेतु सम्बन्धित को सम्बोधित
1. Concepts of health and disease	पत्र, कार्यालय आदेश, अधिसूचना और परिपत्र सम्बन्धी पत्रलेखन / आलेखन ।
2. Principles, methods, approach and measurement of Epidemiology	3. अनेकार्थी शब्द, विलोम शब्द, पर्यायवाची शब्द, तत्सम एवं तद्भव, क्षेत्रीय, विदेशी (शब्द भण्डार), वर्तनी
3. Food and nutrition security, Nutritional Diseases / disorders & National Nutritional	अर्थबोध, शब्द-रूप, संधि, समास, क्रियायें, हिन्दी वर्णमाला, विरोम चिन्ह, शब्द रचना, वाक्य रचना, अर्थ
Programmes.	मुहावरे एवं लोकोक्तियाँ, उ.प्र. की मुख्य बोलियाँ तथा हिन्दी भाषा के प्रयोग में होने वाली अशुद्धियाँ । द्वितीय खण्ड हिन्दी निबन्ध निर्धारित अंक 100
4. Components of environment, pollution related disesses, and Total Sanitary Campaign, Management of Hospital and Industrial waste, Nosocomial Infections.	द्वितीय खण्ड
5. Health Information System, Basics of Medical Statistics, Demography and Information,	इसक अन्तर्गत दा उपखण्ड होग प्रत्यक उपखण्ड से एक—एक निबन्ध (कुल निलाकर दो निबन्ध) लिखन होंगे प्रत्येक निबन्ध की विस्तार सीमा 700 शब्द होगी निबन्ध हेतु निम्नवत् क्षेत्र होंगे:–
education & communication	(अ) (i) साहित्य, संस्कृति (ii) राष्ट्रीय विकास योजनायें / क्रियान्वयन (iii) कृषि, उद्योग एवं व्यापार ।
6. Health management and administration: Techniques, Tools, Programme	(ब) (İ) विज्ञान, पर्यावरण (II) प्राकृतिक आपदायें एवं उनके निवारण (III) राष्ट्रीय, अन्तर्राष्ट्रीय, सामयिक
implementation and Evaluation.	सामाजिक समस्यायें / निदान।
 Critical appraisal of Health Care Delivery System Objectives, Components, Goals and Status of Reproductive and child Health, National 	General Studies, Paper-I
health Mission Millennium and Sustainable Developments Goals.	1. History of India - Ancient, Mediaeval, Modern
	,

health Mission Millennium and Sustainable Developments Goals	S.		1. History of India - Ancient, Mediaeval, Modern	
9. Objectives, components and critical appraisal of National He	ealth Program	mmes: i) For	2. Indian National Movement and Indian Culture.	
Communicable Diseases (RNTCP, NVBDCP, AIDS), ii) Non-	-communicat	ole Diseases	3. Population, Environment and Urbanization in Indian Context.	
(National Programme for Control of Non-communicable Disease	es, National M	lental Health	4. World Geography, Geography of India and its natural resources.	
programmes, Geriatric Mental Health)			5. Current events of national and International Importance.	
10. Occupational Health			6. Indian Agriculture, Trade and Commerce.	
11. Disaster Management and Health Management in fairs and fe	estivals		7. Specific Knowledge of U.P. regarding education, Cultural, Agricultural, Trade,	
12. Policies, acts and legislations related to health			Commerce, the methods of living and Social Customs.	
13. National and International Health Organizations.			History of India and Indian culture will cover the broad history of the country from about the	
APPENDIX-7			middle of the nineteenth century and would also include questions on Gandhi, Tagore and	
PLAN OF EXAMINATION AND SYLLABUS for Main (Write	tten) Examiı	nation of	Nehru. The part on current events of national and international Importance will include	
Assistant Conservator of Forest / Range Forest Officer S	Services Exa	mination.	questions also on sports and games.	
Plan of Main (Written) Examination			General Studies, Paper-II	
	ime Period	Marks	1. Indian Polity	
01 Paper-I General Hindi and Essay (Conventional Type)	3 hours	200	2. Indian Economy	
02 Paper-II General Studies-Ist Paper (Objective Type)	2 hours	200	3. General Science (Role of Science and technology in the development of India including	
03 Paper-III General Studies-IInd Paper (Objective Type)	2 hours	200	science in every day life)	
04 Paper-IV Optional Subject-I (First	3 hours	200	4. General Mental ability.	
Question Paper) (Conventional Type)			5. Statistical Analysis, Graphs and Diagrams.	
Paper-V Optional Subject-I (Second	3 hours	200	The part relating to Indian polity will include questions on the political system in India	

in India. The part relating to role and impact of science and technology in the development of India, questions will be asked to test the candidates awareness in this field. Emphasis will be on the applied aspects. The part relating to statistical analysis, graphs and diagrams will include exercise to test the candidates ability to draw common sense conclusions from information presented in statistical graphical or diagrammatical form and to point out deficiencies limitation or inconsistencies there in.

OPTIONAL SUBJECTS

Total number of questions in the question papers of optional subjects will be eight. All questions will carry equal marks. Each paper will be divided into two parts, viz. Part A and Part B, each part containing four questions. Out of eight questions, five questions are to be attempted. One question in each part will be compulsory. Candidates will be required to answer three more questions out of the remaining six questions, taking at least one question from each part. In this way, at least two questions will be attempted from each Part .e. one compulsory question plus one more.

AGRICULTURE **PAPER-I**

Ecology and its relevance to man, natural resources, their sustainable management and conservation, Physical and Social environment as factors of crop distribution and production Climatic elements as factors of crop growth, Impact of changing environment on cropping pattern as indicators of environments. Environmental pollution and associated hazards to crops, animals, and humans.

Cropping pattern in different agro-climatic zones of the country, Impact of high-yielding and short-duration varieties on shifts in cropping pattern. Concepts of multiple cropping, multi-storey, relay and inter-cropping, and their importance in relation to food production. Package of practices for production of important cereals, pulses, oil seeds, fibres, sugar, commercial and fodder crops grown during Kharif and Rabi seasons in different regions of the country.

Important features, scops and propagation of various types of forestry plantations such as extension, social forestry, agro-forestry and natural forests.

Weeds, their characteristics, dissemination and association with various crops; their multiplications; cultural, biological and chemical control of weeds. Soil-physical, chemical and biological properties, Processes and factors of soil formation. Modern classification of Indian soils, Mineral and organic constituents of soils and their role in maintaining soil productivity. Essential plant nutrients and other beneficial elements in soils and plants. Principles of soil fertility and its evaluation for judicious fertiliser use, integrated nutrient management. Losses of nitrogen in soil, nitrogen-use efficiency in submerged rice soils, nitrogen fixation in soils. Fixation of phosphorus and potassium in soils and the scope for their efficient use. Problem soils and their reclamation methods.

Soil conservation planning on watershed basis, Erosion and run-off management in hilly, foot hills and valley lands; processes and factors affecting them. Dry land agriculture and its problems. Technology of stabilising agriculture production in rain fed agriculture area. Water-use efficiency in relation to crop production, criteria for scheduling irregations, ways and means of reducing run-off losses of irrigation water. Drip and sprinkler irrigation. Drainage of water-logged soils, quality of irrigation water, effect of industrial effluents on soils and water pollution.

Farm management, scope, important and characteristics, farm planning. Optimum resources use and budgeting. Economics of different types of farming systems.

Marketing and pricing of agricultural inputs and outputs, price fluctuations and their cost; role of co-operatives in agricultural economy; types and systems of farming and factors affecting them.

Agricultural extension, its importance and role, methods of evaluation of extension, programmes, socio-economic survey and status of big, small and marginal farmers and landless agricultural laborers; farm mechanization and its role in agricultural production and rural employment. Training programmes for extension workers; lab-to-land programmes.

AGRICULTURE

PAPER-II

Cell Theory, cell structure, cell organelles and their function, cell division, nucleic acidsstructure and function, gene structure and function. Laws of heredity, their significance in plant breeding, Chromosome structure, chromosomal aberrations, linkage and cross-over and their significance in recombination breeding. Polyploidy, euploids and aneuploids, Mutation-micro and macro-and their role in crop improvement, variation components of variation. Heritability, sterility and incompatibility, classification and their application in crop improvement, Cytoplasmic inheritance, sex-linked, sex-influenced and sex-limited characters.

History of plant breeding, Modes of reproduction, selfing and crossing techniques, Origin and evolution of crop plants, centre of origin, law of homologous series, crop genetic resources-conservation and utilization, Application of principles of plant breeding to the Improvement of major field crops. Pure-line selection, pedigree, mass and recurrent selections, combining ability, its significance in plant breeding. Hybrid vigour and its exploitation, backcross method of breeding, breeding for disease and pest resistance, role of interspecific and intergeneric hybridization. Role of biotechnology in plant breeding. Improved varieties, hybrids, composites of various crop plants.

and marketing in India.

and Indian constitution. The Indian economy will cover broad features of economic policy | Food production and consumption trends in India. National and International food policies. Production, procurement, distribution and processing constraints. Relation of food production to national dietary pattern, major deficiencies of calorie and protein.

AGRICULTURAL ENGINEERING

PAPER-I SECTION A

1. Soil and Water Conservation: Scope of - Soil and water conservation. Mechanics and types of erosion, their causes. Mechanics and types of erosion, their causes. Rainfall, runoff and sedimentation relationships and their measurement. Soil erosion control measures-biological and engineering including stream bank protection-vegetative, barriers, contour bunds, contour trenches, contour stone walls, contour ditches, terraces, outlets and grassed waterways. Gully control structures-temporary and permanent-design of permanent soil conservation structures such as chute, drop and drop inlet spiliways. Design of farm, ponds and percolation ponds. Principles-of flood control-flood routing. Watershed Management-investigation, planning and implementation-selection of priority areas and water shed work plan, water harvesting and moisture conservation. Land development-levelling, estimation of earth volumes and costing. Wind Erosion processdesign of shelter belts and wind brakes and their management. Forest (Conservation) Act. 2. Aerial Photography and Remote Sensing: Basic characteristics of photographic images, interpretation keys, equipment for interpretation, imagery interpretation for land use, geology soil and forestry.

Remote sensing-merits and demerits of conventional and remote sensing approaches. Types of satellite images, fundamentals of satellite image interpretation, techniques of visual and digital interpretations for soil, water and land use management. Use of GIS in planning and development of watersheds, forests including forest cover, water resources etc.

SECTION B

3. Irrigation and Drainage: Sources of water for irrigation. Planning and design of minor irrigation projects. Techniques of measuring soil moisture-laboratory and in situ, soil-water plant relationships. Water requirement of crops. Planning conjunctive use of surface and ground water. Measurement of irrigation water, measuring devices-orifices, weirs and flumes. Methods of irrigation-surface, sprinkler and drip, fertigation. Irrigation efficiencies and their estimation. Design and construction of canals, field channels, underground pipelines, head-gates, diversion boxes and structures for road crossing.

Occurence of ground water, hydraulics of wells, types of wells (tube wells and open wells) and their construction. Well development and testing. Pumps-types, selection and installation. Rehabilitation of sick and failed wells.

Drainage causes of water logging and salt problems. Methods of drainage-drainage of irrigated and unirrigated lands, design of surface, sub-surface and vertical drainage systems. Improvement and utilization of poor quality water. Reclamation of saline and alkali soils. Economics of irrigation and drainage systems. Use of waste water for irrigationstandards of waste water for sustained irrigation, feasibility and economics.

4. Agricultural Structures: Site selection, design and construction of farmstead-farm house, cattle shed, dairy barn, poultry shed, hog housing, machinery and implement shed, storage structures for food grains, feed and forage. Design and construction of fences and farm roads. Structures for plant environment-green houses, poly houses and shade houses. Commonbuilding materials used in construction-timber, brick, stone, tiles, concrete etc. and their properties. Water supply, drainage and sanitation systems.

AGRICULTURAL ENGINEERING

PAPER-II SECTION 'A'

1. Farm power and machinery: Agricultural mechanization and its scope. Sources of farm power-animate and electromechanical, Thermodynamics, construction and working of internal combustion engines. Fuel, ignition, lubrication, cooling and governing system of IC engines. Different types of tractors and power tillers. Power transmission, ground drive, power take off (p.t.o.) and control system. Operation and maintenance of farm machinery for primary and secondary tillage. Traction theory, Sowing transplanting and interculture implements and tools. Plant protection equipment-spraying and dusting. Harvesting, threshing and combining equipment. Machinery for earth moving and land developmentmethods and cost estimation. Ergonomics of man-machine system. Machinery for horticulture and agro-forestry, feeds and forages. Haulage of agricultural and forest produce.

Agro-energy: Energy requirements of agricultural operations and agroprocessing. Selection, Installation, safety and maintenance of electric motors for agricultural applications. Solar (thermal and photovoltic), wind and biogas energy and their utilization in agriculture, gasification of biomass for running IC engines and for electric power generation. Energy efficient cooking stoves and alternate cooking fuels. Distribution of electricity for agricultural and agro-industrial applications.

Section 'B'

3. Agricultural Process Engineering: Post harvest technology of crops and its scope. Engineering properties of agricultural produces and by products. Unit operations cleaning grading, size reduction, densification, concentration, drying/dehydration, evaporation, filtration, freezing and packaging of agricultural produces and by-products. Material handling equipmentbelt and screw conveyors, bucket elevators, their capacity and power requirement.

Seed technology, its importance. Different kinds of seeds and their seed production and Processing of milk and dairy products- homogenisation, cream separation, pasteurization, processing techniques. Role of public and private sectors in seed production, processing sterilization, spray and roller drying, butter making, Ice cream, cheese and shrikhand manufacture. Waste and by product utilization rice husk, rice bran, sugarcane bagasse, Physiology and its significance in agriculture, imbibition, surface tension, diffusion and Plant residues and coir pith. osmosis. Absorption and translocation of water, transpiration and water economy. 4. Instrumentation and computer applications in Agricultural Engineering: Enzymes and plant pigments; photosynthesis-modern concepts and factors affecting the Electronic devices and other characteristics rectifiers, amplifiers, oscillators, process, aerobic and nonaerobic respiration; c, c and CAM mechanisms, Carbohydrate, multivibrators, Digital circuits-sequential and combinational system. Application of protein and fat metabolism. microprocessors in data acquisition and control of agricultural engineering processes-Growth and development; photoperiodism and vernalization. Auxins, hormones and other measurement systems for level, flow, strain, force, torque, power, pressure, vacuum and plant regulators and their mechanism of action and importance in agriculture. Physiology temperature. Computer-intruduction, input/outputdevies, central processing unit, memory of seed development and germination; dormancy. Climatic requirements and cultivation of devices, operating systems, processors, keyboards and printers. Algorithms, flowchart major fruits, plants, vegetables crops and flower plants; the package of practices and their specification, programme translation and problem analysis in Agricultural Engineering. scientific basis. Handling and marketing problems of fruit and vegetables. Principal Multimedia and Audio-Visual aids. BOTANY methods of preservation of Important fruits and vegetable products, processing **PAPER-I** techniques and equipment. Role of fruits and vegetables in human nutrition. Raising of 1. Microbiology and Plant Pathology: Viruses; bacteria and plasmids-structure and ornamental plants and design and layout of lawns and gardens. reproduction, General account of infection, Phytoimmunology. Applications of Diseases and pests of field vegetables, orchard and plantation crops of India. Causes and microbiology in agriculture, industry, medicine and pollution control in air, soil and water. classification of plant pests and diseases. Principles of control of plant pests and diseases. Biological control of pests and diseases. Integrated pest and disease management. Important plant diseases caused by viruses, bacteria, mycoplasma, fungi nematodes. Epidemiology and forecasting. Pesticides, their formulations and modes of action. Mode of infection and dissemination. Molecular basis of infection and disease Compatibility with rhizobial Inoculants. Microbial Toxins, Storage pests and diseases of resistance/defence. Physiology of parasitism and control measures, Fungal toxins. 2. Cryptogams: Algae, Fungi, Bryophytes Pteridophytes-structure and reproduction from cereals and pulses and their control.

evolutionary view point. Distribution of Cryptogams in India and their economic potential. 3. Phanerogams Gymnosperms: Concept of Progymnosperms, Classfication and distribution of Gymnosperms. Salient features of Cycadales, Conferrals and Gnetales, their structures and reproduction, General account of Cycadofilicales, Bennettitales and Cordaitales

Angiosperms: Systmatics, anatomy, embryology, palynology and phylogeny. Comparative account of various systems of Angiosperm Classification. Study of angiospermic families-Magnoliaceae, Ranunculaceae, Brassicaceae (Cruciferae), Rosacea Leguminosae, Euphorbiaceae, Malvaceae, Dipterocarpaceae Apiaceae (Umbelliferae), Asclepiadaceae Verbenaceae, Solanaceae, Rubiaceae Cucurbitaceae, Asteraceae (Composite) Poaceae (Gramineae), Arecaceae (Palmae), Liliaceae, Musaceae, Orchidaceae.

Stomata and their types. Anomalous secondary growth, Anatomy of C3 and C4 plants.

Development of male and female gametophytes, pollination, fertilization, Endosperm-its development and function. Patterns of embryo development, Polymbryony, apoxmis, Applications of palynology.

4. Plant Utility and Exploitation: Origin of cultivated plants, Vavilovs centres of origin Plants as sources for food, fooder, fibres, spices, beverages, drugs, narcotics, insecticides, timber, gums, resins and dyes. Latex, cellulose Strach and their products. Perfumery, importance of Ethnobotany in Indian context. Energy plantation, Botanical Gardens and Herbaria.

5. Morphogenesis: Totipotency, polarity, symmetry and differentiation, Cell, tissue, organ and protoplast culture, Somatic hybrids and Cybrids.

BOTANY **PAPER-II**

1. Cell Biology: Techniques of Cell Biology, Prokaryotic and eukaryotic cells- structural and Ultrastructural details. Structure and function of extracellular matrix of ECM (cell wall) and membranes-cell adhesion, membrane transport and vesicular transport-structure and function of cell organelles (chloroplasts, mitochondria, ER, ribosome's, endosomes, lysosomes, peroxisomes, hydrogenosome). Nucleus, nucleolus, nuclear pore complex, Chromatin and nucleosome. Cell signalling and cell receptors. Signal transduction (Gproteins, etc.), Mitosis and meiosis; molecular basis of cell cycle. Numerical and structural variations in chromosomes and their significance. Study of polytene, lampbrush and Bchromosomes-structure, behaviour and significance.

2. Genetics, Molecular Biology and Evolution : Development of genetics, and geneversus allele concepts (Pseudoalleles). Quantitative genetics and multiple factors Linkage and crossing over- methods of gene mapping including molecular maps (idea of mapping function). Sex chromosomes and sexlinked inheritance, sex determination and molecular basis of sex differentiation. -Mutation (biochemical and molecular basis) Cytoplasmic inheritance and cytoplasmic genes (including genetics of male sterility) Prions and prion hypothesis. Structure and synthesis of nucleic acids and protines. Genetic code and regulation of gene expression. Multigene families.

Organic evolution-evidences, mechanism and theories. Role of RNA in origin and evolution.

3. Plant Breeding, Biotechnology an Bio-statistics: Methods of plant breeding introduction, selection and hybridisation' (pedigree, backcross, mass selection, bulk method). Male sterility and heterosis breeding. Use of apomixes in plant breeding. Micropropagation and genetic and genetic engineering methods of transfer of genes and transgenic crops; development and use of molecular markers in plant breeding, Standard deviation and coefficient of variation (CV). Tests of significance (Z-test, t-test and chisquare tests). Probability and distributions (normal, binomial and Poisson distributions) Correlation and regression.

4. Physiology and Biochemistry: Water relations, Mineral nutrition and ion transport miniral deficiencies. Photosynthesis-photochemical reactions, photophosphory-lation and corbon pathways including C pathway (photorespiration), C, C and CAM pathways Respiration (anaerobic and aerobic, including fermentation)-electron transport chain and oxidative phosporylation, Chemiosmotic theory and ATP synthesis. Nitrogen fixation and nitrogen metabolism. Enzymes, coenzymes, energy transfer and energy conservation Importance of secondary metabolites. Pigments as photoreceptors (plastidial pigments and phytochrome). Photoperiodism and flowering, vernalization, senescence. Growth substances-their chemical nature, role and applications in agri-horticulture, growth indices, growth movements. Stress physiology (heat, water, salinity, metal). Fruit and seed physiology. Dormancy, storage and germination of seed. Fruit ripening-its molecular basis and manipulation.

5. Ecology and Plant Geography: Ecological factors, Concepts and dynamics of community. Plant succession. Concepts of biosphere, Ecosystems and their conservation Pollution and its control (including phytoremediation).

Forest types of India-afforestation, deforestation and social, forestry. Endangered plants endemism and Red Data Books. Biodiversity, Convention of Biological Diversity, Sovereign Rights and Intellectual Property Rights. Biogeochemical cells, Global warming.

CHEMISTRY PAPER-I

1. Atomic Structure

Quantum theory, Heisenberg's uncertainity principle, Schordinger wave equation (time independent). Interpretation of wave function, particle in one-dimensional box, quantum numbers, hydrogen atom wave functions. Shapes of s, p and d orbitals.

2. Chemical Bonding

Thermodynamic systems, states and processes, work, heat and internal energy; first law of thermodynamics, work done on the systems and heat absorbed in different types of processes; calorimetry, energy and enthalpy changes in various processes and their temperature dependence.

Second law of thermodynamics; entropy as a state function, entropy changes in various process, entropy-reversibility and Irreversibility, Free energy functions; criteria for equilibrium, relation between equilibrium constant and thermodynamic quantities; Nernst heat theorem and third law of thermodynamics.

Micro and macro states; canonical esnemble and canonical partition function; electronic, rotational and vibrational partition functions and thermodynamic quantities; chemical equilibrium in ideal gas reactions.

6. Phase equilibria and solutions

Phase equilibria in pure substances; Clauslus-Clapeyron equation; phase diagram for a pure substance; phase equilibria in binary systems, partially miscible liquids- upper and lower critical solution temperatures; partial molar quantities, their significance and determination; excess thermodynamic functions and their determination.

7. Electrochemisty- Debye-Huckel theory of strong electrolytes and Debye-Huckel limiting Law for various equilibrium and transport properties.

Galvanic cells, concentration cells; electro-chemical series, measurement of e.m.f. of cells and its applications fuel cells and batteries.

Processes at electrodes; double layer at the interface; rate of charge transfer, current density; over-potential; electra-analytical techniques-voltameter, polarography, amperometry, cyclic-votametry, ion selective electrodes and their use.

8. Chemical Kinetics

Concentration dependence of rate of reaction; defferential and integral rate equations for zeroth, first, second and fractional order reactions. Rate equations involving reverse, parallel, consecutive and chain reactions; effect of temperature and pressure on rate constant. Study of fast reactions by stop-flow and relaxation methods, Collisions and transition state theories.

9. Photochemistry

Absorption of light; decay of excited state by different routes; photochemical reactions between hydrogen and halogens and their quantum yields.

10. Surface phenomena and catalysis

Adsorption from gases and, solutions on solid absorbents, adsorption isotherms-Langmuir and B.E.T. isotherms; determination of surface area, characteristics and mechanism of reaction on heterogeneous catalysts.

11. Bio-inorganic chemistry

Metal ions in biological systems and their role in ion-transport across the membranes (molecular-mechanism), lonophores, photosynthesis-PSI, PSII; nitrogen fixation, oxygenuptake proteins cytochromes and ferredoxins.

12. Coordination chemistry

(a) Electronic configurations; introduction of theories of bonding in transition metal complexes, Valence bond theory, crystal field theory and its modifications; applications of theories in the explanation of magnetism and electronic spactra of metal complexes.

(b) Isomerism in coordination compounds. IUPAC nomenclature of coordination compounds; stereochemistry of complexes with 4 and 6 coordination numbers; chelate effect and polynuclear complexes; trans effect and its theories; kinetics of substitution reaction in square-planer complexes; thermodynamic and kinetic stability of complexes.

(c) Synthesis and structures of metal carbonyls; carobxylate anions, cabonyl hydrides and metal nitrosyl compounds.

(d) Complexes with aromatic systems, synthesis, structure and bonding in metal olefin complexs, alkyne complexes and cyclopentadienyl complexes; coordi-native unsaturation, oxidative addition reactions, insertion reactions, fluxional molecules and their characterization. Compounds with metal-metal bonds and metal atom clusters.

13. General chemistry of 'f' block elements

Lanthanides and actinides; separation oxidation states, magnetic and spectral properties; lanthanide contraction.

14. Non-Aqueous Solvents

Reaction in liquid NH₃, HF, SO₂ and H₂SO₄ Failure of solvent system concept, Coordination model of non-aqueous solvents, Some highly acidic media, fluorosulphuric acid and super acids.

CHEMISTRY PAPER-II

1. Delocalised covalent bonding: Aromaticity, anti-aromaticity; annulenes, azulenes, tropolones, kekulene, fulvenes, sydones.

2. (a) Reaction mechanisms: General methods (both kinetic and non-kinetic) of study of mechanism or organic reactions illustrated by examples-use of isotope cross-over experiment, Intermediate trapping stereochemistry; energy diagrams of simple organic reactions-transition states and intermediates; energy of activation; thermodynamic control and kinetic control of reactions.

(b) Reactive Intermediates: Generation, geometry, stability and reactions of carbonium and carbonium ions, carbanions, free radicals, carbenes, benzynes and niternes.

(c) Substitution reactions: SN1, SN2, SNi, Sn1', SN2', SNi' and SRN1 mechanisms; neighbouring group participation; electrophilic and nucleophilic reactions of aromatic compound including simple heterocyclic compounds-pyrrole, furan thiophene, indole.

(d) Elimination reactions: E1, E2 and E1cb mechanism; orientation in E2 reactions-Saytzeff and Hotfmann; pyrolytic syn elimination-acetate pyrolysis, Chugaev and Cope

 Ionic bond, characteristics of Ionic compounds, factors affecting stability of Ionic compounds, lattice energy, Born-haber cycle; covalent bond and its general characteristics, polarities of bonds in molecules and their dipole moments. Valence bond theory, concept of resonance and resonance energy. Molecular orbital theory (LCAO method); bonding in homonuclear molecules: H2+, H2 to Ne2 NO, CO, HF, CN, CN, BeH2 and CO2. Comparison of valence bond and molecular orbital theories, bond order, bond strength and bond length. 3. Solid State Forms of solids, law of constancy of interfacil angles, crystal systems and crystal classes (crystallographic groups). Designation of crystal faces, lattice structures and unit cell. Laws of rational indices. Bragg's law. X-ray diffraction by crystals. Close packing, radious ratio rules, calculation of some limiting radius ration values. Structures of NaCI, ZnS, CsCI, CaF2, CdI2 and rutile. Imperfection in crystals, stoichiometric and nonstoichiometric defects. Impurity defects, semi-conductors, Elementary study of liquid crystals. 4. The gaseous state Education of state for real gases, Intermolecular Interactions, liquification of gases and critical phenomena, Maxwell's distribution of speeds, intermolecular collisions, collisions 	 (e) Addition reactions: Electrophilic addition to C-C and C=C; nucleophilic addition to C=O, C-N, conjugated olefins and carbonyls. (f) Rearrangements: Pinacol-pinacolune, Hoffmann, Beckmann, Baeyer-Villiger, Favorskii, Fries, Claisen, Cope, Stevens and Wagner Meerwein rearrangements. 3. Pericyclic reactions : Classification and examples; Woodward-Hoffmann, rules-electrocyclic reactions, cycloaddition reactions [2+2 and 4+2] and sigmatropic shifts [1, 3; 3,3 and 1,5] FMO approach. 4. Chemistry and mechanism of reactions: Aldol condensation (including directed aldol condensation), Claisen condensation, Dleckmann, Perkin, Knoevenagel, Witting, Clemmensen, Wolff-Kishner, Cannizzaro and von Richter reactions; Stobbe, benzoin and acyloin condensations; Fischer indole synthesis, Skraup synthesis, Bischler- Napieralski, Sandmeyer, Reimer-Tiemann and Reformatsky reactions. 5. Polymeric Systems (a) Physical chemistry of polymers: Polymer solution and their thermodynamic 	
	(a) Physical chemistry of polymers: Polymer solution and their thermodynamic properties; number and weight average molecular weights of polymers, Determination of molecular weights by sedimentation, light scattering, osmotic pressure, viscosity and group analysis methods.	
	Contd	

(b) Preparation and properties of polymers:

Organic polymers-polyethylene, polystyrene, polvinyl chloride, Teflon, nylon, terylene synthetic and natural rubber, Inorganic polymers-phosphonitrilic halides, borazines silicones and silicates.

(c) Biopolymers: Basic bonding in proteins, DNA and RNA.

6. Synthetic uses of reagents: OsO₄, HIO₄, Cro₃, Pb(OAc)₄, SeO2, NBS, B₂H₆, Na-Liquid NH₃, LiA1H4NaBH₄n-BuLi, MCPBA.

7. Photochemist: Photochemical reactions of simple organic compounds, excited and ground stales, singlet and triplet states, Norrish-Type I and Type II reactions.

8. Principles of spectroscopy and applications in structure elucidation

a) Rotational spectra: Diatomic molecules; isotopic substitution' and rotationa constants.

b) Vibrational spectra: Diatomic molecules, linear triatomic molecules, specific frequencies of functional groups in polyatomic molecules.

c) Electronic spectra: Singlet and triplet states. N->p* and p->p* transitions; application to conjugated double bonds and conjugated carbonyls-Woodward Fieser rules.

d) Nuclear magnetic resonance: Isochronous and anisochronous protons; chemica shift and coupling constant; Application of H'NMR to simple organic molecules.

e) Mass spectra: Parent peak, base peak, daughter peak, matastable peak fragmentation of simple organic molecule a cleavage, Mc-Latterly rearrangement. f) Electron spin resonance: Inorganic complexes and free radicals.

CHEMICAL ENGINEERING PAPER-I Section A

a) Fluid and Particle Dynamics

Viscosity of fluids, Laminar and turbulent flows, Equation of continuity and Navier-Strokes equation- Bernoulli's theorem. Flow meters. Fluid drag and pressure drop due to friction Reynold's Number and friction factor-effect of pipe roughness. Economic pipe diameter Pumps, water, air/stream jet ejectors, compressors, blowers and fans, agitation and mixing of liquids, Mixing of solids and pastes. Crushing and Grinding Principles and equipment Rittinger's and Bond's laws. Filtration and filtration equipment. Fluid- particle mechanics free and hindered setting. Fluidisation and minimum fluidisation velocity, concepts of compressible and incompressible flow. Transport of solids.

b) Mass Transfer

Molecular diffusion coefficient, First and second law and diffusion, mass transfer coefflecients, film and penetration theories of mass transfer, Distillation, simple distillation relative volatility, fractional distillation, plate and packed columns of distillation. Calculatior of packed columns for distillation. Calculation of theoretical number of plates. Liquid-liquid equilibria. Extraction-theory and practice;' design of gas-absorption columns, Drying, Humidification, dehumidi-fication, Crystallisation, Design of equipment.

c) Heat Transfer

Conduction, thermal conductivity, extended surface heat transfer.

Convection-free and forced. Heat transfer coefficients-Nusselt Number. LMTD and effectiveness. NTU methods for the design of Double Pipe and Shell & Tube Hea Exchangers, Analogy between heat and momentum transfer, Boiling and condensation heat transfer, single and multiple-effect evaporators. Radiation-. Stefan-Boltzman Law emissivity and absorptivity. Calculation of heat load of a furnace, Solar heaters.

d) Novel Separation Processes:

Equilibrium separation processesion exchange, osmosis, electro-dialysis, reverse osmosis, ultra-filtration and other membrane processes, Molecular distillation. Supe critical fluid extraction.

SECTION-B

e) Process Equipment design: Factors affecting vessel design criteria Cost considerations, Design of storage vessels-vertical, horizontal spherical, under-ground tanks for atmospheric and higher pressure. Design of closures flat and eliptical head Design of supports. Materials of construction-characteristics and selection.

f) Process Dynamics and Control: Measuring instruments of process variable like level pressure, flow, temperature pH and concentration with indication in visual pneumatic/analog/ digital signal forms. Control variable, manipulative variable and load variables. Linear control theory-Laplace, transforms. PID controllers. Block diagram representation, Transient and frequency response, stability of closed loop system Advanced control strategies. Computer based process control.

CHEMICAL ENGINEERING PAPER II **SECTION-A**

(a) Material and Energy Balances

Material and energy balance calculations in processes with recycle/bypass/purge Combustion of solid/liquid/gaseous fuels, stoichiometric relationships and excess ai requirements. Adiabatic flame temperature.

(b) Chemical Engineering Thermodynamics Laws of thermodynamics. PVT relationship for pure components and mixture, Energy functions and inter-relatioships-Maxwells relations, Fugacity, activity and chemical potential. Vapourliquid equilibria, for ideal/nonideal, single and multi component systems. Criteria for chemical reaction equilibrium equilibrium constant and equilibrium conversions, Thermodynamic cycles-refrigeration and power.

(c) Chemical Reaction Engineering

disposal techniques, Design and performance analysis of pollution control equipment. Fire and explosion hazards rating HAZOP and HAZAN, Emergency planning, disaster management, Environmental legislations-water, air environment protection Acts. Forest (Conservation) Act.

(f) Process Engineering Economics

Fixed and working capital requirement for a process industry and estimation methods. Cost estimation and comparison of alternatives. Net present value by discounted cash flow. Pay back analysis. IRR, Depreciation, taxes and insurance, Break-even point analysis. Project scheduling-PERT and CPM, Profit and loss account, balance sheet and financial statement. Plant location and plant layout including piping.

CIVIL ENGINEERING

PAPER-1 Part-A

ENGINEERING MECHANICS, STRENGTH OF MATERIALS AND STRUCTURAL ANALYSIS, ENGINEERING MECHANICS:

Units and Dimensions, SI Units, Vectors, Concept of Force, Concept of particle and rigid body. Concurrent, Non-Concurrent- and parallel forces in a plane, moment of force and Varignon's theorem, free body diagram, conditions of equilibrium Principle of virtual work, equivalent force system.

First and Second Moment of area, Mass moment of Inertia, Static Friction, Inclined Plane and bearings, Kinematics and Kinetics, Kinematics In Cartesian and Polar Coordinates, motion under uniform and nonuniform acceleration, motion under gravity, Kinetics of particle: Momentum and Energy principles, D'Alembert's Principle, Collision of elastic bodies, rotation of rigid bodies, simple harmonic motion, Flywheel.

STRENGTH OF MATERIALS:

Simple Stress and Strain, Elastic constants, axially loaded compression members, Shear force and bending moment, theory of simple bending, Shear Stress distribution across cross sections, Beams of uniform strength, Leaf Spring, Strain Energy in direct stress, bending & shear. Deflection of beams; Mecaulay's method, Mohr's Moment area method, Conjugate beam method, unit load method, Torsion of Shafts, Transmission of power, close coiled helical springs, Elastic stability of columns, Euler's Rankin's and Secant formulae. Principal Stresses and Strains in two dimensions, Mohr's Circle, Theories of Elastic Failure, Thin and Thick cylinder; Stresses due to internal and external pressure.-Lame's equations.

STRUCTURAL ANALYSIS:

Castiglianios theroems I and II, Unit load method of consistent deformation applied to beams and pin jointed trusses. Slope-deflection, moment distribution, Kani's method of analysis and column Analogy method applied to indeterminate beams and rigid frames. Rolling loads and influences lines: Influences lines for Shear Force and Bending moment at a section of beam. Criteria for maximum shear force and bending Moment In beams traversed by a system of moving loads. Influences lines for simply supported plane pin jointed trusses.

Arches: Three hinged, two hinged and fixed arches, rib shortening and temperature effects, influence lines in arches.

Matrix methods of analysis: Force method and displacement method of analysis of indeterminate beams and rigid frames.

Plastic Analysis of beams and frames: Theory of plastic bending, plastic analysis, statical method, Mechanism method. Unsymmetrical bending: Moment of inertia, product of inertia, position of Neutral Axis and Principle axis, calculation of bending stresses.

PART-B

DESIGN OF STRUCTURES: STEEL, CONCRETE AND MASONRY STRUCTURES. STRUCTURAL STEEL DESIGN:

Structural Steel: Factors of safety and load factors, Rivetted, bolted and welded joints and connections. Design of tension and compression member, beams of built up section, rivetted and welded plate girders, gantry girders, stancheons with battens and lacings, slab and gussetted column bases. Design of highway and railway bridges: Through and deck type plate girder, Warren girder, Pratt truss.

DESIGN OF CONCRETEAND MASONRY STRUCTURES:

Concept of mix design, Reinforces Concrete: Working Stress and Limit State method of design-recommendations of I.S codes, design of one way and two way slabs, stair-case slabs, simple and continuous beams of rectangular, T and L sections, Compression members under direct load with or without eccentricity, Isolated and combined footings. Cantilever and counterfort type retaining walls, Water tanks: Design requirements for rectangular and circular tanks resting on ground. Prestressed concrete; Methods and systems of prestressing, anchorages, analysis and design of sections for flexure beed on workingstress loss of prestress, Disign of brick masonry as per I.S. Codes Design of masonry retaining walls.

PART-C

FLUID MECHANICS. OPEN CHANNEL FLOW AND HYDRAULIC MACHINES

Fluid Mechanics: Fluid properties and their role in fluid motion, fluid statics including forces acting on plane and curve surfaces, Kinematics and Dynamics of Fluid flow: Velocity and accelerations, stream lines, equation of continuity, irrotational and rotational flow, velocity potential and stream functions, flownet, methods of drawing flownet, sources and sinks, flow separation, free and forced vortices.

Control volume equation, continuity, momentum, energy and moment of momentum equations from control volume equation, Navier-Strokes equation, Euler's equation of Batch reactors-kinetics of homogeneous reactions and interpretation of kinetic data. Ideal motion, application to fluid flow problems, pipe flow, plane, curved, stationary and moving

flow reactors-CSTR, plug flow reactors and their performance equations. Temperature	vanes, sluice gates, weirs, orffice meters and venturi meters.
effects and run-away reactions. Heterogeneous reactions-catalystic and non-catalystic	
and gas-solid and gas-liquid reactions. Interinsic kinetics and global rate concept	parameters, similitude theory, model laws, undistorted and distorted models.
Importance of interphase and intraparticle mass transfer on performance.	Laminar Flow: Laminar flow between parallel, stationary and moving plates, flow through
Effective-nessfactor. Isothermal and non isothermal reactors and reactor stability.	tube. Boundary Layer: Laminar and turbulent boundary layer on a flat plate, laminar sub-
SECTION-B	layer, smooth and rough boundaries, drag and lift.
(d) Chemical Technology	Turbulent flow through pipes: Characteristics of turbulent flow, velocity distribution and
Natural organic products-Wood and wood-based chemicals, pulp and paper, Agro-	variation of pipe friction factor, hydraulic grade line and total energy line, siphons, expansion
industries- sugar, Edible oils extraction (Including tree based seeds), Soaps and	
detergents, Essential oils- Biomass gasification (including biogas), Coal and coa	Open Channel Flow: Uniform and nonuniform flows, momentum and energy correction
chemical, Petroleum and Natural gas- Petroleum refining (Atmospheric	factors, Specific energy and specific force, critical depth, resistance equations and
distillation/cracking/reforming) Petrochemical industries- Polyethylene's	
(LDPE/HDPE/LLDPE), Polyvinyl Chloride, Polystyrene, Ammonia manufacture, Cemen	t drop, hydraulic jump and its applications surges and waves, gradually varied flow,
and lime industries, Paints and varnishes. Glass and ceramics Fermentation-alcohol and	classification of surface profiles, control section, step method of Integration of varied flow
antibiotics.	equation, moving surges and hydraulic bore.
(e) Environmental Engineering and Safety Ecology and Environment. Sources o	HYDRAULIC MACHINES AND HYDROPOWER:
pollutants in air and water, Green house effect, ozone layer depletion, acid rain	Centrifugal pumps-Types, characteristics, Net Positive Suction-height (NPSH), specific
Micrometeorology and dispersion of pollutants in environment, Measurement techniques	speed, Pumps in parallel.
of pollutant levels and their control strategies. Solid wastes, their hazards and their	Reciprocating pumps, Air vessels, Hydraulic ram, efficiency parameters, Rotary and
	Contd

positive displacement pumps, diaphragm and jet pumps, Hydraulic turbines, types	projects
classification, Choice of turbines, performance parameters, controls, characteristics,	IRRIGATION ENGINEERING: Water requirements of crops: consumptive use, quality of
specific speed. Principles of hydropower development. Type, layouts and Component	water for irrigation duty and delta, irrigation methods and their efficiencies.
works, surge tanks, types and choice, Flow duration curves and dependable flow. Storage	Canals: Distribution systems for canal irrigation, canal capacity, canal losses, alignment of
and pondage, Pumped storage plants, Special features of mini, micro-hydel plants.	main and distributory canals, most efficient section, lined canals, their design, regime
Part-D	theory, critical shear stress, bed load, local and suspended load transport, cost analysis of
GEO TECHNICAL ENGINEERING	lined and unlied canals, drain-age behind lining.
Types of soil, phase relationships, consistency limits particles size distribution,	Water logging: causes and control, drain-age system design, salinity.
classifications of soil, structure and clay mineralogy. Capillary water and structural water,	Canal structures: Design of cross regulators, head regulators, canal falls, aqueducts,
effectives trees and pore water pressure, Darcy's Law, factors affecting permeability,	metering flumes and canal outlets.
determination of permeability, permeability of stratified soil deposits.	Diversion head work: Principles and design of weirs of permeable and impermeable
Seepage pressure quick sand condition, compressibility and consoli-dation, Terzaghi's	
theory of one dimensional consolidation, consolidation test.	
	Storage Works: Types of dams, design, principles of rigid gravity and earth dams, stability analysis, foundation treatment, joints and galleries, control of seepage. Spillways: Spillway
parameters, pore pressure coefficients. Shear strength of soils, Mohr Coulomb failure	types, crest gates, energy dissipation. River training: Objectives of river training, methods
theory, Shear tests.	of river training.
Earth pressure at rest, active and passive pressure, Rankin's theory, Coulomb's wedge	Part-D
theory, earth pressure on retaining wall, sheetpile walls, Braced excavation, Bearing	
capacity, Terzaghi and other important theories, net and gross bearing pressure.	Water Supply: Estimation of surface and subsurface water resources, predicting demand
Immediate and consolidation settlement. Stability of slope, Total Stress and Effective	
Stress methods, Conventional methods of slices, stability number.	analysis, waterborne diseases, standards for potable water.
Subsurface exploration, methods of boring, sampling, penetration tests, pressure meter	Intake of water: Pumping and gravity schemes. Water treatment: Principles of
tests, Essential features of foundation, types of foundation, design criteria, choice of type	coagulation, flocculation and sedimentation; slow-, rapid-, pressure-, filters; chlorination,
of foundation, stress distribution in soils, Boussinessq's theory, Newmarks chart, pressure	
	Water storage and distribution: Storage and balancing reservoirs; types, location and
bearing capacity from field tests, allowable bearing capacity, Settlement analysis,	
allowable settlement. Proportioning of footing, Isolated and combined footings, rafts,	check and pressure reducing valves, meters, analysis of distribution systems, leak
Buoyancy rafts, Pile foundation, types of piles, plies capacity, static and dynamic analysis,	detection, maintenance of distribution systems, pumping stations and their operations.
design, of pile groups, pile load test, settlement of piles, lateral capacity, Foundation for	Sewerage systems: Domestic and Industrial wastes, storm sewage-separate and
Bridges. Ground improvement techniques-preloading sand drains, stone column,	combined systems, flow through sewers, design of sewers, sewer appurtenances,
grouting, soil stabilisation.	manholes, in lets, junctions, siphon, Plumbing in Public buildings.
	Sewage characterisation: BOD, COD, solids, dissolved oxygen, nitrogen and TOC,
PAPER-II	Standards of disposal in normal water course and on land.
	Sewage treatment: Working principles, units, chambers, sedimentation tanks, trickling filters, oxidation ponds, activated sludge process, septic tank; disposal of sludge, recycling
CONSTRUCTION TECHNOLOGY, EQUIPMENT, PLANNING AND MANAGEMENT 1. Construction Technology:	of waste water.
Engineering Materials: Physical properties of construction materials: Stones, Bricks and	Solid waste: Collection and disposal in rural and urban contexts, management of long-
Tiles; Lime, Cement and Surkhi Mortars; Lime concrete and Cement concrete, Properties	
•	Environmental pollution: Sustainable development. Radioactive wastes and disposal,
	Environmental impact assessment for thermal power plants, mines, river valley projects,
Properties and uses; defects in timber; seasoning and preservation of timber, Plastics,	Air pollution, Pollution control acts.
rubber and damp-proofing materials, termite proofing, Materials for Low cost housing.	FORESTRY
Construction: Building components and their functions; Brick masonry: Bonds, jointing,	PAPER-I
Stone masonry, Design of Brick masonry walls as per I.S. codes, factors of safety,	SECTION A
serviceability and strength requirements; plastering, pointing, Types of Floors & Roofs,	
Ventilators, Repairs in buildings, Functional planning of building; Building orientation,	i onviculture-General.
circulation, grouping of areas, privacy concept and design of energy efficient building;	
Transmoment function of allege individed concept and design of energy enicient officient.	General Silviculture Principles:
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provisions of National Building Code, Building estimates and specifications; Cost of works;	General Silviculture Principles: Ecological and physiological factors influencing vegetation, natural and artificial regeneration of forests; methods of propagation, grafting techniques; site factors; nursery
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Railway: Permanent way, sleepers, rail fastenings, ballast, points and crossings, design of turn outs, stations and yards, turn-tables, signals, and interlocking, level-crossing,

SECTION-B

1. Agroforestry, Social Forestry, Joint Forest Management and Tribology: Construction and maintenance of permanent ways: Supereleviation, creep of rail, ruling Agroforestry- Scope and necessity; role in the life of people and domestic animals and gradient, track resistance, tractive effort, relaying of track. **Highway Engineering:** Principles of highway planning, Highway alignments, Geometrical design:, Cross section, camber, superelevation, horizontal and vertical curves.

Classification of roads: low cost roads, flexible pavements, rigid pavements, Design of	opportunities for enhancing biodiversity, medicinal and other flora and fauna. Agro forestry
pavements and their construction, evaluation of pavement failure and strengthening.	systems under different agro ecological zones; selection of species and role of
Drainage of roads: Surface and subsurface drainage.	multipurpose trees and NTFPs, techniques, food, fodder and fuel security. Research and
Traffic Engineering: Forecasting techniques, origin and destination survey, highway	Extension needs.
capacity, Channelised and unchannelised Intersections, rotary design elements,	Social/Urban Forestry: Objectives, scope and necessity; people's participation.
markings, sign, signals, street lighting; Traffic surveys, Principle of highway financing.	JFM- Principles, objectives, methodology, scope, benefits and role of NGOs.
Part-C	Tribology: Tribal scene in India; tribes, concept of races, Principles of social grouping,
HYDROLOGY, WATER RESOURCES AND ENGINEERING	stages of tribal economy, education, cultural tradition, customs, ethos and participation in
Hydrology: Hydrologilcal cycle, precipitation, evaporation, transpiration, depression	forestry programmes.
storage, infiltration, overland flow, hydrograph, flood frequency analysis, flood estimation,	2. Forest Soils, Soil Conservation Watershed Management:
flood routing through a reservoir, channel flow routing-Muskingam method.	Forests Soils: Classification, factors affecting soil formation; physical, chemical and
Ground water flow: Specific yield, storage coefficient of permeability, confined and	biological properties.
unconfined aquifers, aquifers, aquitards, radial flow into a well under confined and	Soil Conservation: definition, causes for erosion; typeswind and water erosion;
unconfined conditions, tube wells, pumping and recuperation tests, ground water	conservation and management of eroded soils/areas, wind breaks, shelter belts; sand
potential.	dunes; reclamation of saline and alkaline soils, water logged and other waste lands. Role
WATER RESOURCES ENGINEERING:	of forests in conserving soils. Maintenance and build up of soil organic matter, provision of
Ground and surface water resource, single and multipurpose projects, storage capacity of	loppings for green leaf manuring; forest leaf litter and composting; Role of micro-
reservoirs, reservoir losses, reservoir sedimentation, economics of water resources	organisms in ameliorating soils; N and C cycles, VAM.
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Watershed Management: Concepts of watershed; role of mini-forests and forest trees in	Forestry, Scope and objectives of Forest Inventory.
overall resource management, forest hydrology, watershed development in respect of	GEOLOGY
torrent control, river channel stabilization, avalanche and landslide controls, rehabilitation	PAPER-I
of degraded areas; hilly and mountain areas; watershed management and environmental	
functions of forests; water-harvesting and conservation; ground water recharge and	
watershed management; role of integrating forest trees, horticultural crops, field crops,	The Solar System, meteorities, origin and interior of the earth, Radioactivity and age of
grass and fodders.	earth; Volcanoes-causes and products, volcanic belts, Earthquakes-causes, effects,
3. Environmental Conservation and biodiversity:	earthquake belts, seismicity of India, intensity and magnitude, seismongraphs, Island
Environment: Components and Importance, principles of conservation, impact of	arcs, deep sea trenches and mid-ocean ridges, Continental drift-evidences and
deforestation; forest fires and various human activities like mining, construction and	
developmental projects, population growth on environment.	Continents and oceans.
Pollution: Types, Global warming, green house effects, ozone layer depletion, acid rain,	(ii) Geomorphology and Remote Sensing:
impact and control measures, environmental monitoring; concept of sustainable	Basic concepts of geomorphology, Weathering and mass wasting, Landforms, slopes and
development, Role of trees and forests in environmental conservation; control and	drainage. Geomorphic cycles and their interpretation, Morphology and its relation to
prevention of air, water and noise pollution. Environmental policy and legislation in India,	structures and lithology. Applications of geomorphology in mineral prospecting, civil
Environmental impact Assessment, Economics assessment of water shed development	engineering, hydrology and environmental studies. Geomorphology of Indian sub-
vis-a-vis ecological and environmental protection.	continent. Aerial photographs and their interpretation-merits and limitations. The
4. Tree Improvement and Seed Technology: General concept of tree improvement,	Electromagnetic Spectrum. Orbiting satellites and sensor systems. Indian Remote
methods and techniques, variation and its use, provenance, seed source, exotics;	Sensing Satellites. Satellites data products, Applications of remote sensing in geology.
quantitative aspects of forest tree improvement, seed production and seed orchards,	The Geographic Information System and its applications. Global Positioning System.
progeny tests, use of tree improvement in natural forest and stand improvement, genetic	
testing programming, selection and breeding for resistance to diseases, insects, and	
adverse environment: the genetic base, forest genetic resources and gene conservation in	ellipsoid and stress-strain relationships of elastic, plastic and viscous materials, Strain
situ and ex-situ, Cost benefit ratio, economic evaluation.	markers in deformed rocks, Behaviour of minerals and rocks under deformation
FORESTRY	conditions, Folds and faults classification and mechanics. Structural analysis of folds,
PAPER- II	foliations, lineations, joints and faults, unconformities, Superposed deformation,
	Timerelationship between crystallization and deformation. Introduction to petrofabrics.
SECTION-A	SECTION- B
1. Forest Management and Management Systems:	
Objective and principles; techniques; stand structure and dynamics, sustained yield	(iv) Paleontology:
relation; rotation, normal forest, growing stock; regulation of yield; management of forest	Species definition and nomenclature. Megafossils and Microfossils. Modes of
plantations, commercial forests, forest cover monitoring. Approaches viz., (i) site-specific	
planning, (ii) strategic planning, (iii) Approval, sanction and expenditure, (iv) Monitoring (v)	correlation, petroleum exploration, paleo-climatic and pale oceanographic studies,
Reporting and governance. Details of steps involved such as formation of Village Forest	Morphology, geological history and evolutionary trend in Cephalopoda, Trilobita,
Committees, Joint Forest Participatory Management.	Brachiopoda, Echi-noidea and Anthozoa, Stratigraphic utility of Ammonoidea, Trilobita and
2. Forest Working Plan:	Graptoloidea, Evolutionary trend in Hominidae, Equidae and Probo-scidae. Siwalik fauna,
Forest planning, evaluation and monitoring tools and approaches for integrated planning;	Gondwana flora and its importance.
multipurpose development of forest resources and forest industries development; working	(v) Stratigraphy and Geology of India:
plans and working schemes, their role in nature conservation, bio-diversity and other	Classification of Stratigraphic sequences: Lithostratigraphic, biostratigraphic,
dimensions; preparation and control. Divisional Working Plans, Annual Plan of Operations.	chronostratigraphic and magnetostratigraphic and the interrelation-ships, Distribution and
3. Forest Mensuration and Remote Sensing: Methods of measuring- diameter, girth,	classification of Precambrian rocks of India, Study of stratigraphic distribution and lithology
height and volume of trees; form-factor; volume estimation of stand, current annual	of Phanerozoic rocks of India with reference to fauna, flora and economic importance,
increment; mean annual increment, Sampling methods and sample plots. Yield	Major boundary problems-Cambrian/Precambrian, Permian/Triassic, Cretaceous/Tertiary
calculation; yield and stand tables, forest cover monitoring through remote sensing;	and Pliocene/ Pleistocene, Study of climatic conditions, paleogeography and igneous
Geographic Information Systems for management and modelling.	activity in the Indian subcontinent in the geological past, Tectonic framework of India.
4. Surveying and Forest Engineering:	Evolution of the Himalayas.
Forest Surveying: different methods of surveying, maps and map reading, Basic	(vi) Hydrogeology and Engineering Geology:
principles of forest engineering. Building materials and construction. Roads and Bridges,	Hydrologic cycle and genetic classification of water. Movement of subsurface water,
General principles, objects, types, simple design and construction of timber bridges.	Springs, Porosity, permeability, hydraulic conductivity, transmissivity and storage
Section Billion Billio	coefficient, classification of aquifers. Water-bearing characteristics of rocks, Ground-water
	chemistry. Salt water intrusion, Types of wells. Drainage basin morphometry. Exploration
1. Forest Ecology and Ethnobotany:	for groundwater. Groundwater recharge, Problems and management of groundwater,
Forest Ecology: Biotic and abiotic components, forest eco-systems; forest community	Rainwater harvesting. Engineering properties of rocks. Geological Investigations for
concepts; vegetation concepts, ecological succession and climax, primary productivity,	dams, tunnels and bridges, Rock as construction material. Alkali-aggregate reaction,
nutrient cycling and water relations; physiology in stress environments (drought, water	Landslides causes, prevention and rehabilitation, Earthquake-resistant structures.
logging salinity and alkalinity). Forest types in India, identification of species, composition	GEOLOGY
and associations; dendrology, taxonomic classification, principles and establishment of	PAPER-II
herbaria and arboreta. Conservation of forest ecosystems. Clonal parks.	SECTION-A
Role of Ethnobotany in Indian Systems of Medicine; Ayurveda and Unani: Introduction,	
nomenclature, habitat, distribution and botanical features of medicinal and aromatic	
plants. Factors affecting action and toxicity of drug plants and their chemical constituents.	Classification of crystals into systems and classes of symmetry. International system of
2. Forest Resources and Utilization: Environmentally sound forest harvesting practices;	crystallographic notation, Use of projection diagrams to represent crystal symmetry.
logging and extraction techniques and principles transportation systems, storage and sale;	Crystal defects. Elements of x-ray crystallography. Petrological microscope and
Non-Timber Forest Products (NTFPs) -definition and scope; gums, resins, oleoresins,	accessories. Optical properties of common rock forming minerals, Pleochroism, extinction
fibres, oil seeds nuts, rubber, canes, bamboos, medicinal plants, charcoal, lac and shellac,	angle, double refraction birefringence, twinning and dispersion in minerals.
katha and Bidi leaves, collection; processing and disposal, need and importance of wood,	Physical and chemical characters of rock forming silicate mineral groups. Structural
seasoning and preservation; general principles of seasoning, air and kiln seasoning, solar	classification of silicates. Common minerals of igneous and metamorphic rocks. Minerals
dehumidification, steam heated and electrical kilns, Composite wood; adhesives-	of the caronate, phosphate, sulphide and halide groups.
	(ii) Igneous and Metamorphic Petrology Generation and crystallisation of magma

(ii) Igneous and Metamorphic Petrology Generation and crystallisation of magma. manufacture, properties, uses, plywood manufacture- properties, uses, fibre boards-Crystallisation of albite-anorthite, diopside-anorthite and diopsidewollastonite-silica manufacture properties, uses; particle boards-manufacture; properties, uses, Present systems, Reaction principle, Magmatic differentiation and assimilation, Petrogenetic status of composite wood industry in India and future expansion plans. Pulp-paper and significance of the textures and structures of igneous rocks. Petrography and petrogenesis rayon; present position of supply of raw material to industry, wood substitution, utilization of of granite, syenite, diorite, basic and ultrabasic groups, charnockite, anorthosite and alkaline rocks, Carbonatites. Deccan volcanic province, Types and agents of Anatomical structure of wood, defects and abnormalities of wood, timber identification metamorphism, Metamorphic grades and zones, Phase rule. Facies of regional and contact metamorphism, ACF and AKF diagrams Textures and structures of metamorphic rocks, Metamorphism of arenaceous, argillaceous and basic rocks, Minerals assemblages, Retrograde metamorphism, Metasomatism and granitisation, migmatities, granulite terrains of India

3. Forest Protection & wildlife Biology: Injuries to forest-abiotic and biotic, destructive agencies, insect-pests and disease, effects of air pollution on forests and forest die back, Susceptibility of forests to damage, nature of damage, cause, prevention, protective

measures and benefits due to chemical and biological control. General forest protection against fire, equipment and methods, controlled use of fire, economic and environmental costs; timber salvage operations after natural disasters, Role of afforestation and forest regeneration in absorption of CO2, Rotational and controlled grazing, different methods of control against grazing and browsing animals; effect of wild animals on forest regeneration, human impacts; encroachment, poaching, grazing, live fencing, theft, shifting cultivation and control.

4. Forest Economics and Legislation:

plantation wood; problems and possibilities.

general principles.

Forest economics: Fundamental principles, cost-benefit analysis; estimation of demand and supply; analysis of trends in the national and international market and changes in production and consumption patterns; assessment and projection of market structures; role of private sector and co-operatives; role of corporate financing. Socio-economic analysis of forest productivity and attitudes; valuation of forest goods and service.

Legislation-History of forest development; Indian Forest Policy of 1894, 1952 and 1990. National Forest Policy, 1988 of People's involvement, Joint Forest Management Involvement of women; Forestry policies and Issues related to land use, timber and nontimber products, sustainable forest manage-ment; industrialisation policies; institutional and structural changes. Decentralization and Forestry Public Administration, Forest laws, necessity; general principles, Indian Forest Act 1927; Forest Conservation Act, 1980; Wildlife Protection Act 1972 and their amendments; Application of Indian Penal Code to

(iii) Sedimentology:

Sedimentary rocks : Processes of formation, diagenesis and lithification, Properties of sediments, Clastic and nonclastic rocks-their classification petrography and depositional environment, Sedimentary facies and provenance. Sedimenetary structures and their significance. Heavy minerals and their significance, Sedimentary basins of India. **SECTION-B**

(iv) Economic Geology

Ore, ore minerals and gangue, tenor of ore, classification of ore deposits. Process of formation of minerals deposits. Controls of ore locallisation. Ore textures and structures. Metallogenic epochs and provinces, Geology of the important Indian deposits of aluminium, chromium, copper, gold, iron, lead, zinc, manganese, titanium, uranium and thorium and industrial minerals, Deposits of coal and petroleum in India, National Mineral Policy, Conservation and utilization of mineral resources, Marine mineral resources and Law of Sea.

(v) Mining Geology:

Methods of prospecting-Geological, geophysical, geo-chemical and geo-botanical, Techniques of sampling. Estimation of reserves of ore, Methods of exploration and mining metalic ores. Industrial minerals and marine mineral resources, Mineral beneficiation and ore dressing.

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(vi) Geochemistry and Environmental Geology:

Cosmic abundance of elements, Composition of the planets and meteorites, Structure and composition of earth and distribution of elements, Trace elements, Elements of crystal chemistry types of chemical bonds, coordination number, Isomorphism and polymorphism, Elementary thermodynamics.

Natural hazards-floods, landslides, coastal erosion, earthquakes and volcanic activity and mitigation, Environmental impact of urbanization, open cast mining, industrial and radioactive waste disposal, use of fertilizers, dumping of mine waste and fly-ash, Pollution of ground and surface water, marine pollution, environment protection legislative measures in India.

MATHEMATICS PAPER-I Section-A

Linear Algebra:

Vector, space, linear dependence and independence, subspaces, bases, dimensions Finite dimensional vector spaces. Matrices, Cayley-Hamilition theorem, eigen-values and eigenvectors, matrix of linear transformation, row and column reduction, Echelon form equivalences, congruences and similarity, reduction to cannonical form, rank, orthogonal, symmetrical, skew symmetrical, unitary, hermitian, skew-hermitian forms- their eigenvalues. Orthogonal and unitary reduction of quadratic and hermitian forms, positive definite quardratic forms.

Calculus

Real numbers, limits, continuity, differentiability, mean-value theorems, Taylor's theorem with remainders, indeterminate forms, maxima and minima, asymptotes. Functions of several variables: continuity, differentiability, partial derivatives, maxima and minima, Lagrange's method of multipliers, Jacobian, Riemann's definition of definite integrals, indefinite integrals, infinite and improper integrals, beta and gamma functions. Double and triple integrals (evaluation techniques only). Areas, surface and volumes, centre of gravity. **Analytical Geometry**

Cartesian and polar coordinates in two and three dimensions, second degree equations intwo and three dimensions; reduction to cannonical forms, straight lines, shortest distance between two skew lines, plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

Section-B

Ordinary Differential Equations:

Formulation of differential equations, order and degree, equations of first order and first degree, integrating factor, equations of first order but not of first degree, Clariaut's equation singular solution. Higher order linear equations with constant coefficients, complementary function and particular integral, general solution, Euler-Cauchy equation.

Second order linear equations with variable coefficients, determination of complete solution when one solution is known, method of variation of parameters.

Dynamics, Statics and Hydrostatics:

Degree of freedom and constraints, rectilinear motion, simple harmonic motion, motion in a plane, projectiles, constrained motion, work and energy, conservation of energy, motion under impulsive forces, Kepler's laws, orbits under central forces, motion of varying mass, motion under resistance.

Equilibrium of a system of particles, work and potential energy, friction, common catenary principle of virtual work, stability of equilibrium, equilibrium of forces in three dimensions.

Pressure of heavy fluids, equilibrium of fluids under given system of forces, Bernoulli's equation, centre of pressure, thrust on curved surfaces, equilibrium of floating bodies stability of equilibrium, meta-centre, pressure of gases.

Vector Analysis:

Scalar and vector fields, triple products, differentiation of vector function of a scalar variable, gradient, divergence and curl in Cartesian, cylindrical and spherical coordinates and their physical interpretations. Higher order derivatives, vector identities and vector equations. Application to Geometry; Curves in space curvature and torision. Serret-Frenet's formulae, Gauss and Stokes' theorems, Green's identities.

MATHEMATICS PAPER-II **SECTION-A**

Algebra:

Groups, sub-groups, normal subgroups, homomorphism of groups, quotient groups, basic isomorphism theorems, Sylovi's group, permutation groups, Cayley theorem, rings and ideals, principal ideal domains, unique factorization domains and Euclidean domains Field extensions, finite fields.

Real Analysis:

Real number system, ordered sets, bounds, ordered field, real number system as an ordered field with least upper bound property, Cauchy sequence, completeness, Continuity and uniform continuity of functions, properties of continuous functions on compact sets. Riemann integral, improper integrals, absolute and conditional convergence of series of real and complex terms, rearrangement of series, Uniform convergence, continuity, differentiability and integrability for sequences and series of functions. Differentiation of functions of several variables, change in the order of partial derivatives, implicit function theorem, maxima and minima, Multiple integrals.

Complex Analysis:

Analytic function Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula, power series, Taylor's series, Laurent's Series, Singularities, Cauchy's residue theorem, contour integration, Conformal mapping, bilinear transformations.

inear Programming:

ordinary differential equations: Euler and Runge Kuttamethods, Computer Programming: Storage of numbers in computers, bits, bytes and words, binary system, arithmetic and logical operations on numbers, Bitwise operations. AND, OR, SOR, NOT, and shift/ rotate operators, Octal and Hexadecimal Systems, Conversion to and form decimal Systems. Representation of unsigned integers, signed integers and reals, double precision reals and long integers.

Algorithms and flow charts for solving numerical analysis problems.

Developing simple programs in Basic for problems involving techniques covered in the numerical analysis.

Mechanics and Fluid Dynamics:

Generalised coordinates, constraints, holonomic and non-holonomic, systems, D' Alembert's principle and Lagrange's equations, Hamilton equations, moment of inertia, motion of rigid bodies in two dimensions. Equation of continuity, Euler's equation motion for inviscid flow, stream-lines, path of a particle, potential flow, two-dimensional and axisymetric motion, sources and sinks, vortex motion, flow past a cylinder and a sphere, method of images, Navier-Stokes equation for a viscous fluid.

MECHANICAL ENGINEERING PAPER-I

1. Theory of Machines

Kinematic and dynamic analysis of planar mechanisms, Cams, Gears and gear trains, Flywheels, Governors, Balancing of rigid rotors, Balancing of single and multi-cylinder engines, Linear vibration analysis of mechanical systems (single degree and two degrees of freedom), Critical speeds and whirling of shafts, Automatic Controls, Belts and chain drives. Hydrodynamic bearings.

2. Mechanics of Solids

Stress and strain in two dimensions, Principal stresses and strains, Mohr's construction, linear elastic materials, isotropy and anisotropy, Stress-strain relations, unilaxial loading, thermal stresses, Beams: Banding moment and shear force diagrams, bending stresses and deflection of beams, Shear stress distribution. Torsion of shafts, helical springs, Combined stresses, Thick and thin walled pressure vessels. Struts and columns. Strain energy concepts ad theories of failure. Rotating discs. Shrink fits.

3. Engineering Materials

Basic concepts on structure of solids, crystalline materials, Defects in crystalline materials, Allovs anc. binary phase diagrams, structure and properties of common engineering materials. Heat treatment of steels, plastics, Ceramics and camposite. Materials, common applications of various materials.

4. Manufacturing Science

Merchant's force analysis, Taylor's tool life equation, machinability and machining economics, Rigid, small and flexible automation, NC, CNC. Recent machining methods-EDM, ECM and ultrasonic. Application of lasers and plasmas, analysis of forming processes. High energy rate forming Jigs, fixtures, tools and gauges, Inspection of length, position, profile and surface finish.

5. MANUFACTURING MANAGEMENT

Production Planning and Control, Forecasting-moving average exponential smoothing. Operations scheduling assembly line balancing. Product development, Breakeven analysis, Capacity planning, PERT and CPM, Control Operations: Inventory control-ABC analysis, EOQ model, Materials requirement planning, Job design, Job standards, work Measurement, Quality management- Quality control Operations Research: Linear programming-Graphical and Simplex methods, Transportation and assignment models. Single server queuing model. Value Engineering; Value analysis, for cost/value, Total quality management and forecasting techniques. Project management.

6. ELEMENTS OF COMPUTATION

Computer Organisation, Flow charting, Features of Common Computer Languages FORTRAN, d Base-III, Lotus 1-2-3, C and elementary programmings.

MECHANICAL ENGINEERING PAPER-II

1. THERMODYNAMICS:

Basic concept, Open and closed systems, Applications of Thermo-dynamic Laws., Gas equations, Clapeyron equation, Availability, Irreversibility and T ds relations.

2. I.C. Engines:

Fuels and Combustion: Spark Ignition and compression ignition engines, four stroke engine and two stroke engines, mechanical, thermal and volumetric efficiency, Heat balance

Combustion process in S.I. and C.I. engines, pre-ignition detonation in S.I. engine Diesel knock in C.I. engine, Choice of engine fuels, Octane and Cetane ratings. Alternate fuels Carburration and Fuel injection, Engine emissions and control, Solid, liquid and gaseous fuels, stoichometric air requirements and excess air factor, fuel gas analysis, higher and lower. calorific values and their measurements.

3. HEAT TRANSFER, REFRIGERATION AND AIR CONDITIONING:

One and two dimensional heat conduction. Heat transfer from extended surfaces, heat transfer by forced and free convection, Heat exchangers, Fundamentals for diffusive and connective mass transfer, Radiation laws, heat exchange between black and non black surfaces, Network Analysis, Heat pump, refrigeration cycles and systems, Condensers, evaporators and expansion devices and controls, Properties and choice of refrigerant, Refrigeration Systems and components, psychometrics, comfort indices, cooling loading calculations, solar refrigeration.

4. TURBO-MACHINES AND POWER PLANTS:

Continuity, momentum and Energy Equations. Adiabatic and Isentropic flow, fanno lines, Raylegh lines, Theory and design of axial flow turbines and compressors, Flow through Linear programming problems, basic solution, basic feasible solution and optimal solution, turbo-machine balde, cascades, centrifugal compressor. Dimensional analysis and modelling. Selection of site for steam, hydro nuclear and stand-by power plants, Selection base and peak load power plants. Modern High Pressure, High duty boilers. Draft and dust removal equipment, Fuel and cooling water systems, heat balance, station and plant heat rates, operation and maintenance of various power plants, preventive maintenance, economics of power generation.

graphical method and Simplex method of solutions, Duality.

Transportation and assignment problems, Travelling salesman problems.

SECTION-B

Partial differential equations:

Curves and surfaces in three dimensions, formulation of partial differentiation equations solutions of equations of type dx/p=dy/q=dz/r; orthogonal trajectories, Pfaffian differential equations; partial differential equation of the first order, solution by Cauchy's method of characteristics; Charpit's method of solutions, linear partial differential equations of the second order with constant coefficients, equations of vibrating string, heat equation, Laplace equation.

Numerical analysis and Computer programming: Numerical methods solution of algebraic and transcendental equations of one variable by bisection, Regula-Falsi and Newton-Raphson methods, solution of system of linear equations by Gaussian elimination and Gauss-Jordan (direct) methods, Gauss-Seidel (iterative) method, Newton's (Forward and backward) and Lagrange's method of interpolation. Numerical integration; Simpson's one-third rule, tranpezodial rule, Gaussian quadrature formula. Numerical solution of

PHYSICS **PAPER-I SECTION-A**

1. Classical Mechanics (a) Particle dynamics

Centre of mass and laboratory coordinates, conservation of linear and angular momentum. The rocket equation, Rutherford scattering, Galilean transformation, inertial and non-inertial frames, rotating frames, centrifugal and Coriolls forces; Foucault pendulum.

(b) System of particles

Constraints, degrees of freedom, generalised coordinates and momenta, Lagranje's equation and applications to linear harmonic oscillator, simple pendulum and central force

problems Cyclic coordinates, Hamiltonian Lagrange's equation from Hamilton's principle.	Basic nuclear properties-size, binding energy, angular momentum, parity, magnetic
(c) Rigid body dynamics	moment, Semi-empirical mass formula and applications, Mass parabolas, Ground state of
Eulerian angles, inertia tensor, principal moments of inertia. Euler's equation of motion of a	
rigid body, force-free motion of a rigid body, Gyroscope.	Salient features of nuclear forces, Shell model of the nucleus-success and limitations,
2. Special Relativity, Waves & Geometrical Optics	Violation of parity in beta decay, Gamma decay and internal conversion, Elementary ideas
(a) Special Relativity	about Mossbauer spectroscopy, Q-value of nuclear reactions, Nuclear fission and fusion,
Michelson-Morley experiment and its implications, Lorentz transformations-length	energy production in stars, Nuclear reactors.
contraction, time dilation, addition of velocities, aberration and Doppler effect, mass	5. Particle Physics & Solid State Physics:
energy relation, simple application to a decay process Minkowski diagram, four	(a) Particle Physics
dimensional momentum vector. Covariance of equations of physics.	Classification of elementary particles and their interactions, Conservation laws, Quark
(b) Waves	structure of hadrons, Field quanta of electro-weak and strong Interactions, Elementary
Simple harmonic motion, damped oscillation forced oscillation and resonance, Beats.	ideas about Unification of Forces, Physics of neutrinos.
Stationary waves in a string. Pulses and wave packets. Phase and group velocities.	b) Solid State Physics
Reflection and Refraction from Huygen's principle.	Cubic crystal structure, Band theory of solids-conductors, insulators and semiconductors,
(c) Geometrical Optics	Elements of superconductivity, Meissner effect, Joseph-son junctions and applications,
Laws of reflection and refraction from Format's principle. Matrix method in paraxial optic-	Elementary ideas about high temperature superconductivity.
thin-lens formula, nodal planes, system of two thin lenses, chromatic and spherical	6. Electronics
aberrations.	Intrinsic and extrinsic semiconductors-p-n-p and n-p-n transistors. Amplifiers and
3. Physical Optics	oscillators, Op-amps, FET, JFET and MOSFET, Digital electronics-Boolean Identities, De-
(a) Interference	Morgan's laws, Logic gates and truth tables, Simple logic circuits, Thermistors, solar cells,
Interference of light-Young's experiment, Newton's rings, Interference by thin films,	Fundamentals of microprocessors and digital computers.
Michelson Interferometer. Multiple beam Interference and Fabry-Perot interferometer.	STATISTICS
Holography and simple applications.	PAPER-I
(b) Diffraction	Probability
Fraunhofer diffraction-single slit, double slit, diffraction grating, resolving power. Fresnel	Sample space and events, probability measure and probability space, random variable as
diffraction:- half-period zones and zones plates. Fersnel integrals, Application of Cornu's	
spiral to the analysis of diffraction at a straight edge and by a long narrow slit. Deffraction by	
a circular aperture and the Airy pattern.	random variable, marginal and conditional distributions, stochastic independence of
(c) Polarisation and Modern Optics	events and of random variables, expectation and moments of a random variable,
Production and detection of linearly and circularly polarised light. Double refraction, quarter	conditional expectation, convergence of a sequence of random variable in distribution, in
wave plate, Optical activity, Principles of fibre optics attenuation; pulse dispersion in step	
index and parabolic index fibres; material dispersion, single mode fibres. Lasers-Einstein A	
and B coefficients; Ruby and He-Ne lasers. Characteristics of laser light-spatial and	
temporal coherence, Focussing of laser beams, Three-level scheme for laser operation.	generating function, characteristic function, inversion theorem, Laplace transform, related
SECTION-B	uniqueness and continuity theorems, determination of distribution by its moments.
4. Electricity and Magnetism	Linderberg and Levy forms of central limit theorem, standard discrete and continuous
(a) Electrostatics and Magneto-statics	probability distributions, their Inter-relations and limiting cases, simple properties of finite
Laplace and Poisson equations in electrostatics and their applications. Energy of a system	Markov chains.
of charges, multiple expansion of scalar potential. Method of images and its applications,	Statistical Inference
	Consistency, unbiasedness, efficiency, sufficiency, minimal-sufficiency, completeness,
Dielectrics, polarisation, Solutions, to boundary-value problems-conducting and dielectric	ancillary statistic, factorization theorem, exponential family of distribution and its
spheres in a uniform electric field. Magnetic shell, uniformly magnetised sphere,	properties, uniformly minimum variance unbiased (UMVU) estimation, Rao-Blackwell and
Ferromagnetic materials, hysteresis, energy loss.	Lehmann-Scheffe theorems, Cramer-Rao inequality for single and several-parameter
(b) Current Electricity	family of distributions, minimum variance bound estimator and its properties, modifications
Kirchhoff's laws and their applications, Biot-Savart law, Ampere's law, Faraday's law, Lenz'	and extensions of Cramer-Rao inequality, Chapman-Robbins inequality, Bhattacharya's
law. Self and mutual inductances. Mean and rms values in AC circuits, LR, CR and LCR	bounds, estimation by methods of moments, maximum likelihood, least squares, minimum
circuits-series and parallel resonance, Quality factor, Principle of transformer.	chisquare and modified minimum chi-square properties of maximum likelihood and other
5. EectromagneticTheory & Black Body Radiation	estimators, idea of asymptotic efficiency, idea of prior and posterior distributions, Bayes',
(a) Electromagnetic Theory	estimators.
Displacement current and Maxwell's equations Wave equations in vacuum, Poynting	
theorem, Vector and scalar potentials, Gauge invariance, Lorentz and Coulomb gauges,	lemma, UMP tests, monotone likelihood ratio, generalised Neyman Pearson lemma,
Electromagnetic field tensor, cavariance of Maxwell's equations, Wave equations in	similar and unbiased tests, UMPU tests for single and several-parameter families of
Isotropic dielectrics, reflection and refraction at the boundary of two dielectrics. Fresnel	distributions, likelihood rotates and its large sample properties, chi-square goodness of fit
	test and its asymptotic distribution.
relations, Normal and anamalous dispersion, Rayleigh scattering.	
(b) Blackbody radiation	Confidence bounds and its relation with tests, uniformly most accurate (UMA) and UMA
Blackbody radiation and Planck radiation law-Stefan-Boltzmann law, Wien displacement	unbiased confidence bounds, Kolmogororv's test for goodness of fit and its consistency,
law and Rayleigh-Jeans law, Planck mass, Planck length, Planck time, Planck	sign test and its optimality, Wilcoxon signed-ranks test and its consistency, Kolmogorov-
temperature and Planck energy.	Smirnov two-sample test, run test, Wilcoxon-Mann Whitney test and median test, their
6. Thermal and Statistical Physics	consistency and asymptotic normality.
(a) Thermodynamics	Wald's SPRT and its properties, OC and ASN functions, Wald's fundamental identity,
Laws of thermodynamics, reversible and irreversible processes, entropy, Isothermal,	sequential estimation.
adiabatic, isobaric, isochoric processes and entropy change, Otto and Diesel engines,	Linear Inference and Multivariate Analysis Linear statistical models, theory of least
Gibb's phase rule and chemical potential. Van der Waals equation of state of real gas,	squares and analysis of variance, Gauss-Markoff theory, normal equations, least squares
critical constants, Maxwell-Boltzman distribution of molecular velocities, transport	estimates and their precision, test of significance and interval estimates based on least
	squares theory in one-way, two-way and three-way classified data, regression analysis,
theories of specific heat of solids. Maxwell relations and applications. Clausius-Clapeyron	linear regression, curvilinear regression and orthogonal polynomials, multiple regression,
equation. Adiabatic demagnetisation, Joule-Kelvin effect and liquefication of gases.	multiple and partial correlations, regression diagnostics and sensitivity analysis,
(b) Statistical Physics	calibration problems, estimation of variance and covariance components, MINQUE
Saha ionization formula, Bose-Einstein condensation, Thermodynamic behaviour of an	
ideal Fermi gas, Chandrasekhar limit, elementary ideas about neutron stars and pulsars,	their applications and properties, discriminant analysis, canonical correlations, one-way
Brownian motion as a random walk, diffusion process, Concept of negative temperatures.	MANOVA, principal component analysis, elements of factor analysis.
PHYSICS	Sampling Theory and Design of Experiments An outline of fixed-population and super-
PAPER-II	population approaches, distinctive features of finite population sampling, probability
SECTION-A	sampling designs, simple random sampling with and without replacement stratified

SECTION-A 1. Quantum Mechanics: Wave-particle duality, Schroedinger equation and expectation values. Uncertainty principle, Solutions of the one-dimensional Schroedinger equation free particle (Gaussian wave-packet), particle in a box, particle in a finite well, linear, harmonic oscillator, Reflection and transmission by a potential step and by a rectangular

	Contd
	charts for variables and attributes, X, R, s, p, nn and c charts, cumulative sum chart, V- mask, single, double, multiple and sequential sampling plans for attribute, OC, ASN, AQQ and ATI curves concepts of producer's and consumer's risks, AQL, LTPD and AOQL, sampling plans for variables, use of Dodge-Roming and Military Standard tables, Concepts of reliability, maintainability and availability, reliability of series and parallel
3. Molecular Physics Elementary theory of rotational, vibrational and electronic spectra of diatomic molecules,	I. Industrial Statistics Process and product control, general theory of control charts, different types of control
principle and applications.	PAPER- II
Stern-Gerlack experiment, electron spin, fine structure of hydrogen atom, L-S coupling, J- J, coupling, Spectroscopic notation of atomic states, Zeeman effect, Frank-Condon	
(b) Atomic Physics	missing plot technique, factorial designs: 2n, 3 ² and 3 ³ , confounding in factorial
Pauli spin matrices.	analysis; incomplete block designs, concepts of chronogonality and balance, BIBD,
	classification with equal number of observation per cell), CRD, RBD, LSD and their
(a) Quantum Mechanics II	sensitive characteristics. Fixed effects model (two-way classification) random and mixed effects models (two-way
2. Quantum Mechanics II & Atomic Physics	Thompson estimators, non-sampling errors, Warner's randomised response technique for
barrier, use of WKB formula for the life-time calculation in the alpha-decay problem.	Thompson estimator. Non-negative variance estimation with reference to the Horvitz

systems and other simple configurations, renewal density and renewal function, survival	(b) Population, characteristics, population dynamics, population stabilization,
models (exponential, Weibull, lognormal, Rayleigh, and bath-tub), different types of	(c)Conservation of natural resources mineral mining, fisheries, acquaculture; forestry;
redundancy and use of redundancy in reliability improvement, Problems in life-testing	grassland; wildlife (Project Tiger); sustainable production in agriculture-integrated pest
censored and truncated experiments for exponential models.	management.
II. Optimization Techniques	(d) Environmental biodegradation; pollution and its impact on biosphere and its prevention.
Different types of models in Operational Research, their construction and general methods of solution, simulation and Monte-Carlo methods, the structure and formulation of linear	(a) Behaviour: Sensory filtering, responsiveness, sign stimuli, learning, instinct,
programming (LP) problem, simple LP model and its graphical solution, the simplex	habituation, conditioning, imprinting.
procedure, the two-phase method and the M-technique with artificial variables, the duality	
theory of LP and its economic interpretation, sensitivity analysis, transportation and	
assignment problems, rectangular games, two-person zero- sum games, method of	
solution (graphical and algebraic). Replacement of failing or deteriorating items, group and individual replacement policies,	(c) Orientation, navigation, homing; biological rhythms; biological clock, tidal, seasonal and circadian rhythms.
concept of scientific inventory management and analytical structure of inventory problems,	(d)Methods of studying animal behaviour.
simple models with deterministic and stochastic demand with and without lead time,	III. Economic Zoology:
storage models with particular reference to dam type. Homogeneous discrete-time Markov	(a) Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture.
chains, transition probability matrix, classification of states and ergodic theorems,	(b) Major infectious and communicable diseases (small pox, plague, malaria, tuberculosis,
homogeneous continuous-time Markov chains, Poisson process, elements of queuing theory, M/M/1, M/M/K, G/M/1 and M/G/1 queues. Solution of statistical problems on	cholera and AIDS) their vectors, pathogens, and prevention. (c)Cattle and livestock diseases, their pathogens (helminths) and vectors (ticks, mites,
computers using well-known statistical software packages like SPSS.	Tabanus, Stomoxys)
III. Quantitative Economics and Official Statistics	(d) Pests of sugar cane (Pyrilla perpusiella), oil seed (Achaea Janata) and rice (Silophilus
Determination of trend, seasonal and cyclical components, Box-Jenkins method, tests for	oryzae).
stationery of series, ARIMA models and determination of orders of autoregressive and	
moving average components, forecasting.	Designing of experiments; null hypothesis; correlation, regression, distribution and measure of central tendency, chi square, student t-test, F-test (one-way & two-way F-test)
Commonly used index numbers-Laspeyre's, Peashe's and Fisher's ideal Index numbers, chain-base index numbers, uses and limitations of index numbers, index number of	V. Instrumental methods:
wholesale prices, consumer price index number, index numbers of agricultural and	(a) Spectrophotometry, flame photometry, Geiger-Muller counter, scintillation counting.
industrial production, test for index numbers like proportionality test, time-reversal test,	(b) Electron microscopy (TEM, SEM).
factor-reversal test, circular test and dimensional invariance test.	ZOOLOGY
General linear model, ordinary least squares and generalised least squares methods of	PAPER-II Section A
estimation, problem of multi-collinearity, consequences and solutions of multi-collinearity, autocorrelation and its consequences, heteroscedasticity of disturbances and its testing,	Section-A I. Cell Biology:
	(a) Structure and function of cell an its organelles (nucleus, plasma membrane,
model and its estimation, concept of structure and model for simultaneous equations,	mitochondria, Golgibodies, endoplasmic reticulum ribosomes and lysosomes), cell
problem of identification-rank and order conditions of identifiability, two-stage least	division (mitosis and melosis), mitutic spindle and mitotic apparatus, chromosome
squares method of estimation. Present official statistical sytem in India relating to	movement.
official statistics, their reliability and limitation and the principal publications containing	(b) Watson-Crick model of DNA; replication of DNA, protein synthesis, transcription and transcription factors
such statistics, various official agencies responsible for data collection and their main	II. Genetics
functions.	(a) Gene structure and functions; genetic code.
IV. Demography and Psychometry	(b) Sex chromosomes and Sex determination in Drosophilla, nematodes and man.
Demographic data from census, registration, NSS and other surveys, and their limitation	(c) Mendel's laws of inheritance, recombiriation, linkage, linkage-maps, multiple alleles,
and uses, definition, construction and uses of vital rates and ratios, measures of fertility, reproduction rates, morbidity rate, standardized death rate: complete and abridged life	cistron concept; genetics of blood groups. (d)Mutations and mutagenesis; radiation and chemical.
tables, construction of life tables from vital statistics and census returns, uses of life tables,	(e) Cloning technology, plasmids and cosmids as vectors, transgenics, transposons, DNA
logistic and other population growth curves, fitting a logistic curve, population projection,	sequence cloning and whole animal cloning (Principles and methodology).
stable population theory, uses of stable population and quasi-stable population techniques	(f) Regulation and gene expression in pro-and eu-karyotes.
in estimation of demographic parameters, morbidity and its measurement, standard	(g) Signal transduction; pedigree-analysis; congenital diseases in man.
classification by cause of death, health surveys and use of hospital statistics. Method of standardisation of scales and tests, Z-scores, standard scores, T-scores,	(h) Human genome mapping; DNA fingerprinting.
	III Evolution
percentile scores, intelligence duotient and its measurement and uses, validity of test	III. Evolution (a) Origin of life.
percentile scores, intelligence quotient and its measurement and uses, validity of test scores and its determination, use of factor analysis and path analysis in psychometry.	III. Evolution (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation.
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossilization; evolution of horse, elephant and man.
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossilization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency,
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I SectIon-A	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossilization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency, (e) Continental drift and distribution of animals.
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I Section-A I. Non-chordata and chordata	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossilization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency, (e) Continental drift and distribution of animals. IV. Systematics
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I SectIon-A	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossilization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency, (e) Continental drift and distribution of animals.
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I Section-A I. Non-chordata and chordata (a) Classification and relationship of various phyla up-to sub-classes; Acoelomata and Coelomata; Protostomes and Deuterostomes, Bilateralia and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry.	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossllization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency, (e) Continental drift and distribution of animals. IV. Systematics (a) Zoological nomenclature; international code; cladistics. Section-B I. Biochemistry
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I Section-A I. Non-chordata and chordata (a) Classification and relationship of various phyla up-to sub-classes; Acoelomata and Coelomata; Protostomes and Deuterostomes, Bilateralia and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry. (b) Protozoa: Locomotion, nutrition, reproduction; evolution of sex; general features and	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossllization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency, (e) Continental drift and distribution of animals. IV. Systematics (a) Zoological nomenclature; international code; cladistics. Section-B I. Biochemistry (a) Structure and role of carbohydrates, fats, lipids, proteins, aminoacids, nucleic acids;
scores and its determination, use of factor analysis and path analysis in psychometry. ZOOLOGY PAPER-I Section-A I. Non-chordata and chordata (a) Classification and relationship of various phyla up-to sub-classes; Acoelomata and Coelomata; Protostomes and Deuterostomes, Bilateralia and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry. (b) Protozoa: Locomotion, nutrition, reproduction; evolution of sex; general features and life history of Paramaecium, Monocystis, Plasmodium and Leisismania.	 (a) Origin of life. (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation. (c) Fossils and fossilization; evolution of horse, elephant and man. (d) Hardy-Weinberg law, causes of change in gene frequency, (e) Continental drift and distribution of animals. IV. Systematics (a) Zoological nomenclature; international code; cladistics. Section-B I. Biochemistry (a) Structure and role of carbohydrates, fats, lipids, proteins, aminoacids, nucleic acids; saturated and unsaturated fatty acids, cholesterol.
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(j) Echinodermata; Feeding respiration, locomotion larval forms; general features and life (g) Vision, hearing and olfaction in man.

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history of Asterias.	(h) Mechanism of hormone action.
(k)Protochordata; Origin of chordates; general features and life history of Branchiostoma	(i) Physiology of reproduction, role of hormones and phermones.
and Herdamania.	III. Developmental Biology
(I) Pisces: Scales, respiration, locomotion, migration.	(a) Differentiation from gamete to neurula stage; dedifferentation; metaplasia, induction,
(m) Amphibia: Origin of tetrapods; parental care, paedomorphosis.	morphogenesis and morphogon; fate maps of gastrulae in frog and chick; organogenesis
(n) Reptilia: Origin of reptiles; skull types; status of Sphenodon and crocodiles.	of eye and heart, placentation in mammals.
(o) Aves: Origin of birds; flight adaptation, migration.	(b) Role of cytoplasm in and genetic control of development; cell lineage; causation of
(p) Mammalia: Origin of mammals; dentition; general features of egg-laying mammals,	metamorphosis in frog and insects; paedogenesis and neoteny; growth, degrowth and cell
pouched mammals, aquatic mammals and primates; endocrine glands and other hormone	
producing structures (pituitary, thyroid, parathyroid, adrenal, pancreas, gonads) and their	(c) Invasiveness of placenta; in vitro fertilization; embryo transfer, cloning.
interrelationships.	(d) Baer's law; evo-devo concept.
(q) Comparative functional anatomy of various systems of vertebrates (integument and its	Animal Husbandry and Vet. Science
derivatives, endoskeleton, locomotory organs digestive system, respiratory system,	Paper-I
circulatory system including heart and aortic arches; urinogenital system, brain and sense	Section-A
organs (eye and ear).	Livestock industry - its scope and potential.
Section-B	Human population in relation to wild life.
I. Ecology:	Significance of wild life.
(a) Biosphere: Biogeochemical cycles, green-houses effect, ozone layer and its impact;	Animal Genetics and Breeding
ecological succession, biomes and ecotomes.	Animal Genetics: Mendelian inheritance, Expression of genes, linkage and crossing over,
-	L Contd

Sex influenced and sex linked characters. Chromosomal aberration and gene structure,	and ecosystem organization.
DNA as genetic material, recombinant DNA technology, mutation Quantitative vs	- Ecological Succession: Hydrarch and xerarch, concept of climax and seral
Qualitative traits. Forces changing gene frequency.	communities
Animal Breeding: Breeding systems-Inbreeding, out breeding, up grading, hybridization,	- Concept of ecosystem: biotic and abiotic components, structural and functional
Cross breeding and out crossing system, selection and their merits, Genetic improvement	attributes of ecosystem, productivity, energy flow, food chain, food web and ecological
of cattle, buffaloes, sheep, goat, swine, horses, Poultry and wild animals.	pyramids, terrestrial and aquatic ecosystems. Biogeochemical cycles of C, N and P and
Adaptation to the environment	hydrological cycle.
Thermal balance in animals, direct and indirect effects of weather on animals, Loss of	Part-B
water from body, Growth rate and body weight. Photo sensitive disorder.	- Natural resources:- waterits sources, surface and ground water, global distribution
Section-B	and uses of water, water crisis and conservational strategies.
Animal diseases:	 Soil and land, resources of India and its uses, conservational strategies and Integrated
Immunity and vaccination: Principles and method of immunization of animals against	land use planning.
specific diseases.	 Minerals and matters- their uses and mining operations.
Herd immunity, disease free zone, zero disease concept.	 Forest resources of India, forest cover, community and social forestry, afforestation
Diseases of cattle, Cow, Buffalo, sheep, goats and wild animals-Etiology symptoms,	programmes, forest conservation Act and national forest conservation strategy.
diagnosis, prevention, control and treatment of Antrax, Haemorrhagic Septicaemia, Black	 Biodiversity and its significance, Keystone species and hot spots, measurements of
quarter, mastitis, tuberculosis, John's disease, foot and mouth disease, Rinder pest,	biodiversity, cause of biodiversity loss, conservation of biodiversity -in-situ and ex-situ
Rabies, Trypnosomiasis, milk fever and trympanitis, diseases of newly born calf. Disease	conservation. Biological diversity Act.
of poultry - Etiology Symtoms, diagnosis, prevention, control and treatment of Ranikhet	
disease, Fowl pox, Anian leucosis complex, Marek's diseases and Gumboro Disease.	 Wildlife sanctuaries and national parks in India, Wildlife conservation Act, concept of hisophore record to a
Diseases of swine- swine fever, and hog cholera, diseases of Dog- Canine distemper,	biosphere reserves.
Parvo disease, Rabies in pets in relation to human health.	- Renewable and non renewable sources of energy and its optimization.
Veterinary Public Health- Zoonosis and zoonotic disease. Veterinary Jurisprudence- rule	Environmental Science
and regulations for improvement of animals, quality and prevention of animal disease,	Paper- Second
Materials and methods for collection and samples for veterolegal investigation.	Part-A
Extention- Principles of extention, different methods adopted to educate the farmers under	- Environmental disruptions, soil erosion, deforestation, drought, flood, fire and
rural conditions.	desertification-processes, causal factors and their mitigative measures.
Generation of technology- Its transfer and feed back. Problems and constrains in transfer	- Environmental pollution: Air pollution-sources, effects on plants, animal, man and
of technology Animal husbandry programmes for rural development.	monuments and their Control measures, Air quality standards.
Animal Husbandry and Vet. Science	- Water pollution, types and major sources of water pollutants, effects of water pollutants
Paper-II	on physico-chemical and biological properties of water bodies, process and control of
Section-A	eutrophication, water born diseases with special reference to water pollution.
A- Animal Nutrition: General nutritional considerations, Energy and Protein nutrition,	- Types and major sources of soil pollutants, effects of soil pollutants on fertility and
Mineral and vitamin nutrition, Hormones and additives. Evaluation of nutritional value of	biological properties of soil.
feeds. Ruminant and non-ruminant nutrition of animals. Meeting nutritional requirement of	 Major sources of noise pollution, effects of noise on human health.
various classes of animals. Digestion, metabolism and absorption of nutrients in different	- Anthropogenic and other biotic activities grazing, burning and mining etc. and their
types of animals grazing habit and food intake.	impact on environment and agriculture, effect of industrialization on environment.
B- Animal Physiology	- Introduction to global environmental problems viz: acid rain, ozone depletion, green
Physiological mechanisms and livestock product, Growth rate & animals production.	house gases, Global warming and climatic changes.
Nervous and hormonal controlling mechanism, Physiology of Reproduction. Lactation and	- Solid waste disposal and its effects on surrounding environment and management,
egg laying. Physiology of digestive system of various classes of animals including wild	waste management in domestic, industrial and urban areas, energy generation from
animals, Semen evaluation, preservation & artificial insemination in various classes of	wastes.
animals.	Part-B
Section-B	- Introduction and scope of environmental management, environmental ethics and
A-Livestock production & Management-	dharma of ecology.
General care and management of livestock - Cattle, buffalo, Goats, Sheep, Pigs and	- Basic concepts of sustainable development, industrial ecology and recycling industry.
Poultry. General care and management of wild animals. Feeding and management of	- Basic environmental laws and acts viz: Environmental protection Act, Air Act, Water
livestock and wild animals and under drought, Flood and other natural disaster.	Act.
Classification, grading and marketing of livestock and their products.	
- Siggenegatori, aradina ana mangtina orivostour ana tigli Divuula.	- National and international Environmental conservation strategies and organizations.
Milk and milk products-	 National and international Environmental conservation strategies and organizations. Population and Environment, concept of carrying capacity and population regulation.
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Section "A"

Importance and scope of vegetable and ornamental crops. Vegetable garden, Classification of vegetable crops. Area, Production and Package of practices:- Tomato, Brinjal, Chilli, Okra, Watermelon, Muskmelon, Bottlegourd, Bittergourd, Cabbage, Cauliflower, Onion, Garlic, Beans, French bean, Pea, Potato, Elephant foot, Carrot, Radish, Amaranthus and Palak. Use of phytohormones in vegetable production. Organic production of vegetable. Protected cultivation of vegetables. OFF season vegetable production. Fertigation. Principles of vegetable preservation. Drying, Dehydration and canning of vegetables.

Section "B'

Importance of floriculture and ornamental gardens. Planning of ornamental garden. Style of garden and components of a garden. Use of trees, Shrubs and Climbers, Palm, Succulents and seasonal flowers in the garden. Package of practices for rose, Jasmine, Carnation, Marigold, Tuberose and gladiolus. Use of phytohormones in ornamental crops. Loose, cut and dry flowers. Medicinal and aromatic plant and spices.

Environmental Science

Paper First Part-A

- Basics of Environmental Science, Definition meaning and Scope. Importance of the study of Environmental Science. Environmental Segments: Geosphere, lithosphere, Hydrosphere, atmosphere and biosphere- their spread, composition and Interrelationships.

- **Environmental and ecological principles:** Ecological terminology and definitions, level of organization, habitat and niche, individual, species, population. Community, biome