प्रश्नपुस्तिका क्रमांक
BOOKLET No.

G10

वेळ : 1 (एक) तास

प्रश्नपुस्तिका   संच क्र.

A

चाळणी परीक्षा

एकूण प्रश्न : 100

एकूण गुण : 200

सूचना

(1) सदर प्रश्नपुस्तिकेत **100 अनिवार्य प्रश्न** आहेत. उमेदवारांनी प्रश्नांची उत्तरे लिहिण्यास सुरुवात करण्यापूर्वी या प्रश्नपुस्तिकेत सर्व प्रश्न आहेत किंवा नाहीत याची खात्री करून घ्यावी. असा तसेच अन्य काही दोष आढळल्यास ही प्रश्नपुस्तिका समवेक्षकांकडून लगेच बदलून घ्यावी.

(2) आपला परीक्षा-क्रमांक ह्या चौकोनांत
न विसरता बॉलपेनने लिहावा.

परीक्षा-क्रमांक							

केंद्राची संकेताक्षरे   शेवटचा अंक

(3) वर छापलेला प्रश्नपुस्तिका क्रमांक तुमच्या उत्तरपत्रिकेवर विशिष्ट जागी उत्तरपत्रिकेवरील सूचनेप्रमाणे **न विसरता नमूद करावा.**

(4) या प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाला 4 पर्यायी उत्तरे सुचविली असून त्यांना 1, 2, 3 आणि 4 असे क्रमांक दिलेले आहेत. त्या चार उत्तरांपैकी सर्वात योग्य उत्तराचा क्रमांक उत्तरपत्रिकेवरील सूचनेप्रमाणे तुमच्या उत्तरपत्रिकेवर नमूद करावा. अशा प्रकारे उत्तरपत्रिकेवर उत्तरक्रमांक नमूद करताना तो संबंधित प्रश्नक्रमांकासमोर छायांकित करून दर्शविला जाईल याची काळजी घ्यावी. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

(5) सर्व प्रश्नांना समान गुण आहेत. यास्तव सर्व प्रश्नांची उत्तरे द्यावीत. घाईमुळे चुका होणार नाहीत याची दक्षता घेऊनच शक्य तितक्या वेगाने प्रश्न सोडवावेत. क्रमाने प्रश्न सोडविणे श्रेयस्कर आहे पण **एखादा प्रश्न कठीण वाटल्यास त्यावर वेळ न घालविता पुढील प्रश्नांकडे वळावे.** अशा प्रकारे शेवटच्या प्रश्नापर्यंत पोहोचल्यानंतर वेळ शिल्लक राहिल्यास कठीण म्हणून वगळलेल्या प्रश्नांकडे परतणे सोईस्कर ठरेल.

(6) उत्तरपत्रिकेत एकदा नमूद केलेले उत्तर खोडता येणार नाही. नमूद केलेले उत्तर खोडून नव्याने उत्तर दिल्यास ते तपासले जाणार नाही.

(7) प्रस्तुत परीक्षेच्या उत्तरपत्रिकांचे मूल्यांकन करताना उमेदवाराच्या उत्तरपत्रिकेतील योग्य उत्तरांनाच गुण दिले जातील. तसेच ''उमेदवाराने वस्तुनिष्ठ बहुपर्यायी स्वरूपाच्या प्रश्नांची दिलेल्या चार उत्तरांपैकी सर्वात योग्य उत्तरेच उत्तरपत्रिकेत नमूद करावीत. अन्यथा त्यांच्या उत्तरपत्रिकेत सोडविलेल्या प्रत्येक चार चुकीच्या उत्तरांसाठी एका प्रश्नाचे गुण वजा करण्यात येतील''.

ताकीद

ह्या प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपेपर्यंत ही प्रश्नपुस्तिका आयोगाची मालमत्ता असून ती परीक्षाकक्षात उमेदवाराला परीक्षेसाठी वापरण्यास देण्यात येत आहे. ही वेळ संपेपर्यंत सदर प्रश्नपुस्तिकेची प्रत/प्रती, किंवा सदर प्रश्नपुस्तिकेतील काही आशय कोणत्याही स्वरूपात प्रत्यक्ष वा अप्रत्यक्षपणे कोणत्याही व्यक्तीस पुरविणे, तसेच प्रसिद्ध करणे हा गुन्हा असून अशी कृती करणाऱ्या व्यक्तीवर शासनाने जारी केलेल्या ''परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचा अधिनियम-82'' यातील तरतुदीनुसार तसेच प्रचलित कायद्याच्या तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

तसेच ह्या प्रश्नपत्रिकेसाठी विहित केलेली वेळ संपण्याआधी ही प्रश्नपुस्तिका अनधिकृतपणे बाळगणे हा सुद्धा गुन्हा असून तसे करणारी व्यक्ती आयोगाच्या कर्मचारीवृंदापैकी, तसेच परीक्षेच्या पर्यवेक्षकीयवृंदापैकी असली तरीही अशा व्यक्तीविरूद्ध उक्त अधिनियमानुसार कारवाई करण्यात येईल व दोषी व्यक्ती शिक्षेस पात्र होईल.

पुढील सूचना प्रश्नपुस्तिकेच्या अंतिम पृष्ठावर पहा

कच्च्या कामासाठी जागा/SPACE FOR ROUGH WORK

1. In the determination of Ca with AAS, interferences occur due to formation of refractory oxides CaO . P_2O_5 and CaO . SiO_3. It can be eliminated by
   a. Changing air-acetylene flame to nitrous-oxide-acytlene flame
   b. Decreasing oxygen concentrations
   c. Adding of a releasing agent
   d. Using fuel-rich flame
   (1) a and b only   (2) a and c only
   (3) a and d only   (4) a, b, c and d

2. Iron (III) is best determined by uv- visible spectroscopy with
   (1) Thiocyanate   (2) Acetate
   (3) Cyanide   (4) Dimethylglyoxime

3. In the AAS, $Ne^{\oplus}$ gaseous ions bombarded the cathode (Hollow Cathode Lamp) and eject metal atoms from cathode, The process is referred to as
   (1) Sputtering   (2) Ejectoning
   (3) Excitation   (4) Ionisation

4. Moment of nuclei is negligible during the time taken by an electronic transition. It is called
   (1) Franck-Condon principle
   (2) Born-Oppenheimer approximation
   (3) Lambert-Beer's law
   (4) None of the above

5. In flame photometry the negative deviation from the straight line are observed because of
   (1) high concentration   (2) low concentration
   (3) does not depend on concentration   (4) high temperature

6. In some spectrophotometers a prism is used with a grating which have the following advantage(s)
   (1) It gives double dispersion and reduces stray light
   (2) It eliminates maximum light
   (3) It reduces red light
   (4) All of the above

7. In uv-visible spectroscopy, for optimum dispersion, the slits should be put

 (1) as far as possible   (2) as near as possible

 (3) anywhere near each other   (4) None of the above

8. In scanning electron microscopy the electrons in the beam interact with the sample and give information about the surface _____ and _____ .

 (1) topography, morphology   (2) topography, monography

 (3) polarography, sampling   (4) None of these

9. The emission spectroscopy is useful because

 (1) It is extremely sensitive

 (2) It is very specific

 (3) It is sensitive as well as specific

 (4) It is neither sensitive nor specific

10. Scanning Transmission Electron Microscope (STEMS) can be used for studies of particulate and thin foil having beam of diameter as small as

 (1) 1 nm   (2) 2 nm   (3) 3 nm   (4) 4 nm

11. The emission spectra are of

 (1) Two types   (2) Single type

 (3) Three types   (4) Four types

12. Match the following :

 a. Polarography   I. N_2 gas

 b. Supporting Electrolyte   II. Triton X-100

 c. Oxygen is removed   III. KCl

 d. Maxima Suppressor   IV. Jaroslav Heyrovsky'

	a	b	c	d
(1)	I	II	IV	III
(2)	II	I	III	IV
(3)	III	IV	II	I
(4)	IV	III	I	II

13. In polarography the equation

$$607 \, n \, D^{1/2} \, C \, m^{2/3} \, t^{1/6} \left\{ 1 + A \, \frac{D^{1/2} \, t^{1/6}}{m^{1/3}} \right\}$$

Solution   Electrode   Correction
factor   factor   factor

is known as

(1) Lingane and Loveridge equation

(2) Ilkovic equation

(3) Heyrovsky' equation

(4) None of these

14. In amperometry the potential applied between the indicator electrode and reference electrode is

(1) changed slowly   (2) changed rapidly

(3) kept constant   (4) None of these

15. In the amperometric titrations, which one is the best example of using rotating platinum electrode

(1) Nickel with DMG

(2) Lead with dichromate ion

(3) Arsenite by $KBrO_3$

(4) Cu, Co, Pt with α-nitroso-β-naphthol

16. In the voltammetry technique following are the statements :

a. It is based on the potential-current behaviour of unpolarisable electrode in analyte.

b. In which potential of the micro-working electrode is varied and the resulting current is recorded.

c. Where, cathodic current is positive and anodic current is negative.

d. If the analyte solution is dilute, the current will reach a limiting value.

Which of the above statements is/are correct ?

(1) a only   (2) a, b and c only

(3) b, c and d only   (4) a, c and d only

17. In stripping voltammetry analysis of solution in the range of _____ to _____ is possible.

    (1) 10^{-6} to 10^{-9} M

    (2) 10^{-4} to 10^{-11} M

    (3) 10^{-3} to 10^{-10} M

    (4) 10^{-9} to 10^{-12} M

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18. The most important requirement/s for electro gravimetric analysis is/are

    a.   The deposition of the substance of interest must be complete.

    b.   The deposit must be inert i.e. it may not undergo any change in its weight during the process of electrolysis.

    c.   The deposit must be of known composition.

    d.   The deposit must adhere firmly so that the electrode can be rised and weighted without loss.

Which of the above statements is/are correct ?

    (1)   a only   (2)   a and b only

    (3)   a, c and d only   (4)   All of the above

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19. In the voltammetry technique, substance from analyte reduced or oxidised at a micro-electrode is said to be

    (1)   depolariser   (2)   polariser

    (3)   semi-polariser   (4)   None of these

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20. In the determination of copper by electrogravimetry, when solution is electrolysed with an emf 2 – 3 volts; then the following reactions occur :

    • $Cu^{2\oplus} + 2e^{\ominus} \rightleftharpoons Cu;\ \ 2H^{\oplus} + 2e^{\ominus} \rightleftharpoons H_2$

    • $4OH^{\ominus} \rightleftharpoons O_2 + 2H_2O + 4e^{\ominus}$

Which ions go for reduction and deposited ?

    (1) $Cu^{\oplus}$ (2) $H^{\oplus}$

    (3) $Cu^{2\oplus}$ and $H^{\oplus}$ (4)   None of the above

21. Cyclic voltammetry can be applied to _____ electrode as well as to _____ mercury drop and to reaction for which stripping analysis is _____ due to _____ irreversible electrode process.

   (1) stationary, single, inapplicable, highly

   (2) moving, single, applicable, slowly

   (3) stationary, double, inapplicable, highly

   (4) moving, double, applicable, slowly

22. Electromagnetic radiation is characterised by

   (1) Amplitude

   (2) Periodicity

   (3) Wavelength and wave number of frequency

   (4) All of the above

23. The region of greatest importance for emission analysis is

   (1) 200 + 300 nm

   (2) 200 + 500 nm

   (3) 250 + 400 nm

   (4) 400 + 600 nm

24. In amperometry either the titrant (reagent) or the species being titrated should be

   (1) Radioactive

   (2) Photoactive

   (3) Electroactive

   (4) Gas sensitive

25. The polarographic method may be used for the determination of which of the following inorganic anions ?

   (1) Cyanide

   (2) Bromide

   (3) Dichromate

   (4) All of the above

26. The sampling of gas filled cylinder is done by

    (1)   Stack sampling   (2)   Flushing sampling

    (3)   Ambient sampling   (4)   Random sampling

27. The retention factor for a particular solute depends upon

    (1)   Stationary phase   (2)   Mobile phase

    (3)   Both (1) and (2)   (4)   None of these

28. Which one of the following is a limitations of HPTLC ?

    (1)   It requires an internal standard

    (2)   It is not useful in herbal analysis

    (3)   It cannot be fully automated

    (4)   The mobile phase consumptions of sample is high

29. TLC is a separation technique based on

    (1)   Solubility   (2)   Adsorption

    (3)   Partition   (4)   Fractional distillation

30. Which of the following statements about preamplifier, IF amplifier and RF amplifier is *wrong* ?

    (1)   The outputs of IF and RF amplifiers are adjustable

    (2)   A preamplifier is located near or inside a probe

    (3)   They are all frequency tunable amplifiers

    (4)   RF amplifier has a linear dependence of attenuation

31. How many signals will diethyl ether give in PMR spectra ?

    (1)   One   (2)   Two

    (3)   Three   (4)   Four

32. The absence of double band at about 2800 cm^{-1} in the IR spectrum of unknown organic compound eliminates from consideration the possibility of the

    (1)   acetophenone   (2)   aldehyde

    (3)   ketone   (4)   ester

33. When a molecule absorbs uv or visible light of frequency v or wavelength λ, an electron undergoes a transition from a lower to a higher energy level. The energy difference ΔE is given by

(1) $\Delta E = hv$

(2) $\Delta E = hcv$

(3) $\Delta E = \dfrac{1}{2} mv^2$

(4) $\Delta E = \dfrac{c}{\lambda}$

34. In uv, visible spectroscopy of organic compound, the $n - \sigma^*$ electronic transition which arises in saturated compounds containing the hetero atoms S, N, Br and I is of less importance because

(1) They are inactive

(2) Their absorption is just above 700 nm

(3) Their absorption is just below 200 nm

(4) The bond ruptures

35. In uv-visible spectrum, the term auxochrome is used to designate groups possessing

(1) bonding electron pairs conjugated with a π-bond system.

(2) non-bonding electrons pairs conjugated with a π-bond system.

(3) bonding electron pair conjugated with a σ bond system.

(4) non-bonding electron pair conjugated with a σ-bond system.

36. The strength of Earth's magnetic field is about _____ gauss.

(1) 0·10

(2) 0·57

(3) 0·23

(4) 0·37

37. The _____ shift is the position of an absorption peak relative to that of a reference compound (usually TMS).

(1) red

(2) blue

(3) chemical

(4) red and blue

38. In _____ NMR spectral determination, mostly carbon tetrachloride and deuterochloroform are used as solvents for dissolving the samples.

(1) ^1H

(2) ^{13}C

(3) ^{15}N

(4) ^{19}F

39. In _____ analysis, gas chromatograph separates the components of the mixture while the mass spectrometer gives the structural information via fragmentation.

(1) GC (2) MS

(3) GC – MS (4) Chemical

40. The loss of an alkene fragement by a cyclic rearrangement of a carbonyl compound with _____ hydrogens is termed as MCL afferty rearrangement.

(1) α (2) β

(3) γ (4) δ

41. If an organic compound is not absorbed in uv radiations, it means that it does **not** contain

(1) Sigma bond

(2) Single bond

(3) Dative bond

(4) Conjugate double bond

42. Which of the following quantities is **not** changed at a different magnetic field strength ?

(1) Chemical shift (in Hertz)

(2) Nucleus spin population in an energy state

(3) Coupling constant (J)

(4) Energy difference between two energy states of nuclei with non-zero spin quantum number

43. The base ion peak at m/z – 43 in the mass spectrum is due to the loss of

(1) Methoxy group (2) Carbonyl group

(3) Methyl group (4) Acetyl group

44. Which proton readily exchanges with deuterium ?

(1) Aldehydic proton

(2) Hydrocarbon proton

(3) Aromatic ring proton

(4) Hydroxyl proton

45. _____ is used as a reference standard in NMR spectroscopy.

   (1) Tetramethylsilane   (2) Trimethylsilane

   (3) Dimethyl Sulphone   (4) Dimethyl Sulphoxide

46. In mass spectrometry, the molecular rearrangements, the most frequently encountered example is the McLafferty rearrangement which involves the transfer of

   (1) α-H atom in an unsaturated system via a low energy six-membered transition state

   (2) N-atom in aldehyde system

   (3) β-hydrogen atom in an unsaturated system

   (4) γ-H atom in an unsaturated system

47. How many signals will be obtained in the PMR spectra of propan-2-ol ?

   (1) One   (2) Two

   (3) Three   (4) Four

48. In NMR spectroscopy, in every sample, a small amount of _____ is added as a reference.

   (1) Dimethylformamide

   (2) Dimethyl sulfoxide

   (3) Tetramethylsilane

   (4) Tetramethyl silanol

49. The peak of highest intensity in a mass spectrum is referred to as the

   (1) Front peak   (2) Base peak

   (3) Molecular peak   (4) Back peak

50. In NMR spectroscopy the tau scale value is

   (1) $\tau = 10 - \sigma$

   (2) $\tau = 10 - \beta$

   (3) $\tau = 10 - \delta$

   (4) $\tau = 10 - \gamma$

51. Which of the following is the Henderson –Hasselbalch equation ?

(1) $pH = pKa + \log \dfrac{[acid]}{[salt]}$ (2) $pH = \dfrac{pKw}{pOH}$

(3) $pH = \dfrac{pOH}{pKw}$ (4) $pH = pKa + \log \dfrac{[salt]}{[acid]}$

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52. Which serological technique utilises competition between radioisotope labelled antigen and test antigen for detection ?

(1) Flow cytometry   (2) Immunoelectrophoresis

(3) Radioimmuno assay   (4) Immunofluorescence assay

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53. To identify an individual on the basis of DNA analysis of the blood, investigators look for

(1) RNA primers   (2) DNA fingerprints

(3) DNA probes   (4) nucleosomes

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54. The buffering capacity of a buffer is maximum at pH equal to _____ of a weak acid used in the preparation of the buffer.

(1) 2 pKa   (2) pKa   (3) pKa + 1   (4) pKa – 1

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55. The specific palindrome sequence and site of cleavage identified by restriction endonuclease EcoRI is

(1) $G^{\downarrow}AATTC$ (2) $A^{\downarrow}AGCTT$ (3) $GTT^{\downarrow}AAC$ (4) $C^{\downarrow}AATGC$

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56. Isoenzymes are enzymes that

(1) Catalyse the same reaction

(2) Do not catalyse the same reaction

(3) Have same K_m and V_{max}

(4) Have identical amino acid composition and sequence

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57. Okazaki fragments are synthesized by DNA polymerase during

(1) DNA replication   (2) Translation

(3) Cloning   (4) Transcription

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58. The heat stable isozyme of alkaline phosphatase, which is inhibited by phenyl alanine and is characteristically seen in the circulation of cases of carcinoma of lung, liver and gut is named as

(1) Leukocyte alkaline phosphatase   (2) Beta isozyme

(3) Regan isoenzyme   (4) Pre-beta alkaline phosphatase

कच्च्या कामासाठी जागा / **SPACE FOR ROUGH WORK**

59. Which key feature of Taq polymerase allows PCR to be conveniently performed ?
(1) Taq polymerase does not require primers.
(2) Taq polymerase does not require templates.
(3) Taq polymerase is heat stable.
(4) Taq polymerase can work at very low temperatures.

60. In liver disease the elevated serum LDH is primarily due to increase in
(1) LDH – 1 and LDH – 2
(2) LDH – 2 and LDH – 3
(3) LDH – 3 and LDH – 4
(4) LDH – 4 and LDH – 5

61. In radioimmunoassay, the commonly used gamma emitter radioisotope label with half-life of about 60 days is
(1) ^{3}H
(2) ^{125}I
(3) ^{131}I
(4) ^{57}Co

62. The K_m of an enzyme is
(1) one half of V_{max}
(2) a dissociation constant
(3) the substrate concentration at half the maximal velocity
(4) the substrate concentration at the maximal velocity

63. DNA fingerprinting is based on
(1) Non-repetitive sequence
(2) Sequence polymorphism
(3) Constant tandem repeats
(4) Variable number tandem repeats

64. The most suitable traditional method of quantitative assay for pure protein is based on reaction of aromatic amino acids with phospho-tungstic acid is
(1) Micro-Kjeldahl method
(2) Nephalometric method
(3) Folin–Ciocalteu (Lowry) method
(4) Folin–Wu method

65. The degree of unsaturation in a lipid is measured by
(1) Saponification number
(2) Iodine number
(3) Acid number
(4) Reichert–Meissl number

66. In reverse transcriptase PCR method (RT-PCR), the DNA polymerase that has both polymerase and reverse transcriptase activities at high temperature, is obtained from.
(1) Escherichia coli (Korenberg's enzyme)
(2) Thermus aquaticus
(3) Thermus termophilus
(4) Haemophilus influenzae (Rd)

67. The buffer which is used for nucleic acids separation and typically contains EDTA, has low ionic strength and pH range of 7·5 – 7·8 is
(1) Phosphate buffer
(2) Acetate buffer
(3) Barbitone buffer
(4) Tris–Phosphate buffer

68. What is the role of sodium dodecyl sulphate (SDS) in SDS-PAGE ?
(1) Protein unfolding
(2) Imparting net positive charge to the protein
(3) Imparting equal mass to all proteins
(4) Protein denaturing and imparting net negative charge to the protein

69. Which of the following techniques is used for the detection of Restriction Fragment Length Polymorphism (RFLPs) ?
(1) Northern blotting   (2) Southern blotting
(3) Western blotting   (4) Eastern blotting

70. Proteins when heated with concentrated nitric acid give a yellow colour and when NaOH is added, deep orange colour is obtained. This test is known as
(1) Xanthoproteic test   (2) Hoppe's test
(3) Acid-base test   (4) Biuret test

71. Prenatal diagnosis is a wide array of genetic diseases is best done by
(1) PCR   (2) Linkage analysis
(3) RFLP   (4) Cytometry

72. Which of the following is required for DNA synthesis but not for RNA synthesis ?
(1) Nucleotides   (2) Sugar   (3) Polymerase   (4) Primer

73. Which of the following seperation techniques depends on the molecular size of the protein ?
(1) ISO electric focussing   (2) Gel filtration chromatography
(3) Ion-exchange chromatography   (4) Affinity chromatography

74. _____ method is used for quantitation of the viruses present in a sample (for example viral load in HIV or HBV), which would help in planning of the treatment modalities and assessment of the response to the treatment.
(1) Nested PCR   (2) Real Time PCR
(3) RACE- PCR   (4) Multiplex- PCR

75. The most efficient buffer system in blood plasma, accounting for 65% of buffering capacity in plasma and 40% in the whole body, that regulate pH between 7·35 – 7·45 is
(1) Hemoglobin buffer   (2) Protein buffer
(3) Bicarbonate buffer   (4) Acetate buffer

कच्च्या कामासाठी जागा / **SPACE FOR ROUGH WORK**

76. The solubility product of barium sulphate at 298 K is $1 \cdot 1 \times 10^{-10}$. Which one of the following cases, on mixing equal volumes of two solutions at 298 K, shall precipitate barium sulphate ?

(1) $1 \cdot 1 \times 10^{-5}$ M barium nitrate and $1 \cdot 1 \times 10^{-6}$ M sulphuric acid

(2) $1 \cdot 1 \times 10^{-3}$ M barium chloride and $1 \cdot 1 \times 10^{-8}$ M sodium sulphate

(3) $1 \cdot 1 \times 10^{-5}$ M barium nitrate and $1 \cdot 1 \times 10^{-5}$ M potassium sulphate

(4) None of these

77. Calculate the number of moles of H_2O produced per mole of magnesium :

$$Mg + HNO_3 \longrightarrow Mg(NO_3)_2 + NH_4NO_3 + H_2O$$
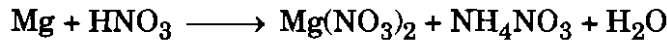
(1) $\dfrac{3}{4}$

(2) $\dfrac{4}{3}$

(3) 1

(4) None of these

78. The correct statements among the following are :

a. The alkali salts are largely adsorbed by the porous charcoal.

b. The oxides of noble metals eg. Ag are decomposed without the aid of charcoal to the metal, which is often obtained as a globule, and oxygen.

c. The oxides of Pb, Cu are reduced to a fused metallic globule.

d. The oxides of Zn, Cd are readily reduced to the metal, but these are so volatile that they vaporize.

(1) a, c and d only

(2) a, b and c only

(3) b, c and d only

(4) All of the above

79. 800 cm^3 of ozonised oxygen at NTP were passed through potassium iodide solution. The iodine liberated required 200 cm^3 of $0 \cdot 1$ N sodium thiosulphate for titration. Calculate the percent volume of ozone in the mixture.

O = 16, K = 39, Na = 23, S = 32, I = 127

(1) 14%

(2) 56%

(3) 28%

(4) None of these

80. Match the following *Flame tests* (List I) with Colouration observed through cobalt glass (List II) :

	List I		*List II*
a.	Sodium	I.	Bluish green
b.	Potassium	II.	Purple
c.	Strontium	III.	Crimson
d.	Barium	IV.	Golden yellow
		V.	No colour
		VI.	Apple green

	a	b	c	d
(1)	IV	III	II	VI
(2)	IV	II	III	VI
(3)	V	III	II	I
(4)	II	IV	I	V

81. The volume strength of H_2O_2 solution is the volume of O_2 in cm^3 evolved at NTP on complete decomposition of 1 cm^3 of the H_2O_2 solution. 25 cm^3 of _____ volume H_2O_2 solution would decolourize 100 cm^3 of 0·25 N acidified $KMnO_4$ solution. (H = 1, O = 16)

(1) 5·6 (2) 6·5 (3) 25 (4) 100

82. 10 cm^3 of the solution containing a mixture of oxalic acid and potassium oxalate is titrated against 0·1 N NaOH. At exactly 5·0 cm^3, the phenolphthalein indicator in the solution became pink. 25 cm^3 of the same solution containing oxalic acid and potassium oxalate is heated with 25 cm^3 of dil. H_2SO_4. The hot solution is titrated against 0·1 N $KMnO_4$ solution. Exactly at 20 cm^3, the $KMnO_4$ drop was decolorized. The amount of oxalic acid and potassium oxalate in 500 cm^3 of the solution is _____ and _____ respectively.
(H = 1, C = 12, O = 16, K = 39)

(1) 1·80 g, 1·66 g (2) 3·60 g, 3·32 g

(3) 1·80 g, 3·32 g (4) 3·6 g, 1·66 g

83. 25 cm^3 of aqueous solution with 0·1 M with reference to a substance is equilibrated with 10 cm^3 of ether. At equilibrium the aqueous layer contained 0·5 millimol of the substance. Calculate the percent extraction.

(1) 97·50% (2) 80% (3) 95·25% (4) None of these

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84. Borax bead test is performed in an oxidizing flame : Match the columns :

	Hot	Cold		Metal
a.	Green	Blue	I.	Chromium
b.	Yellow	Green	II.	Nickel
c.	Violet	Reddish brown	III.	Cobalt
d.	Blue	Blue	IV.	Copper

	a	b	c	d
(1)	I	III	IV	II
(2)	II	I	IV	III
(3)	IV	I	III	II
(4)	IV	I	II	III

85. Calculate the pH of 0·01 M sodium phenoxide at 298 K.

$k_w = 10^{-14}$, ionisation constant of phenol $= 10^{-10}$

(1) 11   (2) 12   (3) 3   (4) 2

86. Using K_2SO_4, 250 cm^3 of solution which is 1·92 ppm with respect to sulphate ion is prepared, the molarity of the solution with respect to the solute is

(K = 39, S = 32, O = 16)

(1) 8×10^{-5} M   (2) 2×10^{-5} M

(3) 5×10^{-6} M   (4) None of these

87. 1·2 g of pure magnesium is treated with excess of hot concentrated sulphuric acid. The weight of the gas evolved is _____ g. By taking all required care the salt formed during the process is allowed to crystallize, filtered, washed and dried. The weight of the crystalline product is _____ g.

(Mg = 24, H = 1, O = 16, δ = 32)

(1) 0·1 g, 12·3 g   (2) 0·1 g, 6 g

(3) 3·2 g, 12·3 g   (4) None of these

88. 100 cm^3 of 0·1 M acetic acid (k_a = 1·8 × 10^{-5}) at 298 K is treated against 0·1 M NaOH. The pH of the solution on addition of (a) 40 cm^3 of 0·1 M NaOH, and (b) 60 cm^3 of 0·1 M NaOH is respectively _____ and _____ .

(1) 4·564, 5·920   (2) 3·564, 3·920

(3) 4·564, 4·920   (4) None of these

89. With reference to co-precipitation, select the correct statement from the following :
   a. Surface adsorption and mixed crystal formation are equilibrium processes.
   b. Occlusion and mechanical entrapment arise from the kinetics of crystal growth.
   c. Contamination of a precipitate by a second substance whose solubility product has been exceeded causes co-precipitation.
   d. It affects purity which can be easily detected.
   (1) a only   (2) b only
   (3) a and b only   (4) a, b, c and d

90. Select the correct statement from the following :
   a. When relative supersaturation is large, the precipitate tends to be colloidal.
   b. When relative supersaturation is large, a crystalline solid is formed.
   c. If nucleation predominates, a large number of fine particles are produced.
   (1) a only   (2) b only
   (3) a and c only   (4) b and c only

91. Calmagite is a/an
   a. ore of calcium   b. precipitating agent for calcium
   c. protolytic indicator   d. metallochromic indicator
   (1) a only   (2) b and c only   (3) c only   (4) d only

92. For dissolution and digestion of inorganic species of biological samples, which of the following technique(s) is employed ?
   a. Microwave assisted digestion   b. High pressure digestion
   c. Dry and wet ashing   d. Use of ion-pair forming agent
   (1) a only   (2) a and b only
   (3) a, b and c only   (4) a, b and d only

93. Select the correct statement from the following :
   For the gross sample
   a. Mass 'm' is proportional to the number of particles.
   b. Degree of heterogeneity is not influenced by the number of particles.
   c. In Gamell's sampling, constant 'k_s' is equal to mass if percentage relative standard deviation is 1%.
   d. The number of particles required in gross sample ranges from few particles to 10^{12} particles.
   (1) a and b only   (2) a, b and c only
   (3) a, c and d only   (4) b and d only

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94. 105 mg of impure sample of calcium carbonate (containing impurity inert to acid) when treated with 0·05 N H_2SO_4, exactly at 40 cm^3, the effervescence ceased. The percent purity of the sample is _____ %.

(1) 95·24   (2) 94·76   (3) 90·00   (4) 99·00

95. 54 mg of pure aluminium (27) is treated with 100 cm^3 of 0·05 N H_2SO_4, the maximum volume of the gas evolved at NTP is _____ cm^3.

(1) 112   (2) 56   (3) 67·2   (4) None of these

96. For the conversion of Al^{3+} to aluminium hydroxide precipitate, the preferred set of reagent is

(1) NaOH only   (2) $NH_3 + H_2O$ only

(3) $NH_4Cl + NH_3 + H_2O$ only   (4) All of these

97. In qualitative analysis, the ion/s that could be precipitated in more than one group is/are

(1) Pb^{2+} only   (2) Mn^{2+} only

(3) Both Pb^{2+} as well as Mn^{2+} (4) Neither Pb^{2+} nor Mn^{2+}

98. 100 cm^3 of 0·2 M HCl is mixed with 400 cm^3 of 0·45 M HNO_3. Assuming there is no change in the volume on mixing, the pH of the resultant solution is approximately

(1) 0·4   (2) 0·6   (3) 0·8   (4) None of these

99. Calculate the concentration of Ni^{2+} ion in solution that was prepared by mixing 50 cm^3 of 0·03 M Ni^{2+} with 50 cm^3 of 0·05 M EDTA. The mixture is buffered at pH = 3. The equilibrium constant of the reaction : $Ni^{2+} + EDTA^{4-} \rightleftharpoons Ni\ EDTA^{2-}$ is $1·05 \times 10^8$.

(1) $1·4 \times 10^{-8}$ (2) $1·4 \times 10^8$

(3) $0·02 \times 10^{-8}$ (4) None of these

100. What is the pH of the solution obtained by mixing equal volumes of solution of pH = 1 and pH = 3 ? [Temperature 298 K]

(1) 0·71   (2) 2

(3) 1·296   (4) None of these

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Differences								
											1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Differences								
											1	2	3	4	5	6	7	8	9
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9217	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9360	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9916	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	3	4

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Differences								
											1	2	3	4	5	6	7	8	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	3
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	2	3	3	4
.25	1778	1782	1786	1791	1795	1798	1803	1807	1811	1816	0	1	1	2	2	2	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	3	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	4	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	3	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	4	4	5	6	6
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
																	Mean Differences		
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12
.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	3	5	6	8	9	11	12	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	13	14	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	15	17
.93	8511	8531	8551	8570	8590	8616	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
.99	9772	9793	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20

कच्च्या कामासाठी जागा / SPACE FOR ROUGH WORK

सूचना – (पृष्ठ 1 वरून पुढे.....)

(8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त उत्तरपत्रिकेवर वा इतर कागदावर कच्चे काम केल्यास ते कॉपी करण्याच्या उद्देशाने केले आहे, असे मानले जाईल व त्यानुसार उमेदवारावर शासनाने जारी केलेल्या "परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचे अधिनियम–82" यातील तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

(9) सदर प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपल्यानंतर उमेदवाराला ही प्रश्नपुस्तिका स्वतःबरोबर परीक्षाकक्षाबाहेर घेऊन जाण्यास परवानगी आहे. **मात्र परीक्षाकक्षाबाहेर जाण्यापूर्वी उमेदवाराने आपल्या उत्तरपत्रिकेचा भाग-1 समवेक्षकाकडे न विसरता परत करणे आवश्यक आहे.**

नमुना प्रश्न

Pick out the correct word to fill in the blank :

Q. No. 201. I congratulate you _____ your grand success.

(1) for   (2) at

(3) on   (4) about

ह्या प्रश्नाचे योग्य उत्तर "(3) on" असे आहे. त्यामुळे या प्रश्नाचे उत्तर "(3)" होईल. यास्तव खालीलप्रमाणे प्रश्न क्र. 201 समोरील उत्तर-क्रमांक "③" हे वर्तुळ पूर्णपणे छायांकित करून दाखविणे आवश्यक आहे.

प्र. क्र. 201.   ①   ②   ●   ④

अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तर-क्रमांक हा तुम्हाला स्वतंत्ररीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित वर्तुळ पूर्णपणे छायांकित करून दाखवावा. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

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