



छत्तीसगढ़ पर्यावरण संरक्षण मंडल  
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## रसायनज्ञ परीक्षा हेतु पाठ्यक्रम

### SYLLABUS

### GENERAL KNOWLEDGE

#### सामान्य ज्ञान

(100 प्रश्न, कुल 100 अंक)

- भाग 1 तथा भाग 2 में 50-50 प्रश्न दिये जाएंगे, प्रत्येक प्रश्न 01 अंक का होगा।

#### भाग 1 – सामान्य ज्ञान :-

1. भारत का इतिहास एवं भारत का स्वतंत्रता आंदोलन।
2. भारत का भौतिक, सामाजिक एवं आर्थिक भूगोल।
3. भारत का संविधान एवं राज्य व्यवस्था।
4. भारत की अर्थव्यवस्था।
5. सामान्य विज्ञान एवं प्रौद्योगिकी।
6. भारतीय दर्शन, कला साहित्य एवं संस्कृति।
7. समसामयिक घटनाएं एवं खेल।
8. पर्यावरण।

#### भाग 2 – छत्तीसगढ़ का सामान्य ज्ञान :-

1. छत्तीसगढ़ का इतिहास एवं स्वतंत्रता आंदोलन में छत्तीसगढ़ का योगदान।
2. छत्तीसगढ़ का भूगोल, जलवायु, भौतिक दशाएं, जनगणना, पुरातात्विक एवं पर्यटन केन्द्र।
3. छत्तीसगढ़ का साहित्य, संगीत नृत्य, कला एवं संस्कृति, जनऊला, मुहावरे, हाना एवं लोकोत्तियां।
4. छत्तीसगढ़ की जनजातियां, विशेष परंपराएं, तीज एवं त्यौहार।
5. छत्तीसगढ़ की अर्थव्यवस्था, वन एवं कृषि।
6. छत्तीसगढ़ का प्रशासनिक ढांचा, स्थानीय शासन एवं पंचायती राज।
7. छत्तीसगढ़ में उद्योग, ऊर्जा, जल, खनिज संसाधन एवं पर्यावरण।
8. छत्तीसगढ़ की समसामयिक घटनाएं।

## विषय(ऑप्शनल)–

जीवविज्ञान / पर्यावरण-विज्ञान / वनस्पति-शास्त्र / रसायन-शास्त्र / भौतिक-शास्त्र (सिलेबस संलग्न) (इनमें से किसी एक विषय का चयन करना होगा। प्रत्येक विषय में 50 प्रश्न होंगे और प्रत्येक प्रश्न 02 अंक का होगा। ) – 100 अंक

### **Subject- ENVIRONMENTAL SCIENCE**

1. NATURAL RESOURCES : Renewable and Nonrenewable Resources.  
(a) Forest resources (b) Water resources (c) Mineral resources (d) Food resources (e) Energy resources (f) Land resources and associated problems.
2. ECOSYSTEM  
Concept, Structure and Function of and ecosystem, Energy flow in the ecosystem, primary and secondary production, population, attributes and interactions, Biotic community characters and Ecological succession, Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.
3. BIODIVERSITY AND ITS CONSERVATION : Introduction – Definition : genetic. Species and ecosystem diversity, Bio-geographical classification of india, Value of biodiversity, Biodiversity at global, National and local levels, Hot spots of biodiversity, Threats to biodiversity, Endangered and endemic spesies of India In situ and Ex-situ conservation of biodiversity.
4. POLLUTION : Causes, effect and control measures of – Air, water, soil, marine, noise, and nuclear pollution Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation, Solid waste management : Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Disaster Management.
5. ENVIRONMENTAL TOXICOLOGY : Translocation, Biotransformation, Bioaccumulation and Toxicity test.
6. ENVIRONMENTAL MICROBIOLOGY : Types, distribution, effect and control of Microorganism.
7. ENVIRONMENTAL BIOTECHNOLOGY : Biotechnology in abatement of pollution.
8. INSTRUMENTATION TECHNIQUE : principle and applications of Spectroscopy, Chromatography, Electrophoresis. Remote sensing and GIS, its role in Environmental studies.
9. ENVIRONMENTAL MANAGEMENT : Sustainable development, urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environment Impact Assessment, Environmental Audit and Environmental ethics : Issues and possible solutions.

10. ENVIRONMENTAL PROTECTION ACT : water, Air, Forest and Wild life Act, Environmental policies, Issues involved in enforcement of environment legislation, Role of Information Technology in Environment and Human Health.

### **Subject - Chemistry**

1. Atomic structure, periodic properties and chemical bonding.
2. Inorganic chemicals analysis, Acid & bases, non-aqueous solvents.
3. Electronics structure & bonding in organic compounds, aliphatic and aromatic ring compounds,
4. Liquid state, solution colloidal and solid state -
5. Chemical kinetics, catalysis
6. Chemistry of coordination compounds -
7. Alcohols, phenols, aldehydes ketones and carboxylic acids
8. Electrochemistry, electrochemical cell, Ionic e<sup>-</sup> equilibrium.
9. Organometallic chemistry, bioinorganic chemistry,
10. Biomolecules - Carbohydrates, Proteins and nucleic acids
11. Synthetic Polymers, Synthetic polymers, synthetic Dyes and medicines
12. Spectroscopy - Mass, IR, UV-Visible and NMR Spectroscopy
13. Extraction of metals, cements, cement and steel

### **Subject - Physics**

1. Scalars and vectors, Laws Of motion, Kepler's laws. Gravitational law, conservation of liner & angular momentum, conservation of energy. Simple harmonic oscillations, Elasticity, viscosity surface tension.
2. Columb's law in vacuum expressed in vector forms calculations of E for simple distributions of charges at rest, dipole, Gauss,s law and its applications, capacitors.
3. Kirchhoff's law. AC circuits, lorentz force equation and definition of B, Biot and Savart's law, Electromagnetic induction, Faraday's law,
4. Thermodynamics, optics - reflection, refraction interference and diffraction.
5. Wave-particle duality, photoelectric effect, Radioactivity, fission fusion, Semiconductor, diode, transistor,

## **Subject - BOTANY**

**General diversity of microbes and cryptogams** – General account of viruses, bacteria, mycoplasma and cyanobacteria. General characters and economic importance of Algae, Fungi, Lichens. Important characteristics, structure and reproduction of Bryophytes and Pteridophytes

### **Diversity of seed plants and their systematic –**

General features of Gymnosperms and Angiosperm, diversity of flowering plants, general account of the families. Structure and secondary growth of dicot and monocot stem and root. Structure and arrangement of leaf. Structure and diversity of flower, structure of male and female gametophyte, pollination, fertilization, development of seed and fruit.

**Cell biology, genetics and biotechnology** – Structure and functions of cell and cell organelles. Structure of chromosome, chromosomal aberrations. Cell division. Structure and replication of DNA, extra nuclear genome. Structure of Gene, genetic code, RNA, transcription; translation, regulation of gene expression, structure of protein. Mutations, transposable genetic elements; DNA damage and repair. Mendelism, linkage analysis, allelic and non allelic interactions. Tools and techniques of recombinant DNA technology, plant tissue culture.

**Plant physiology, biochemistry and ecology** – Plant water relations transpiration, mineral nutrition, enzymes, photosynthesis, photorespiration, respiration, nitrogen and lipid metabolism. Plant growth and movements, photoperiodism, plant hormones.

Structure of ecosystem, abiotic and biotic components, food chain, food web, ecological pyramids, energy flow, bio-geochemical cycles, ecological adaptations, ecological succession, Biogeographical regions of India, vegetation types of India: Forests and grasslands. Utilization of plants-food, fodder, fibres, spices and fuel yielding plants. General account of medicinal plants.

# Subject- ZOOLOGY

**Taxonomy:** General characters and classification of invertebrates and Chordates up to orders.

**Physiology in Vertebrates:** Physiology of Digestion, Respiration, Excretion, Osmoregulations, Physiology of heart, cardiac cycle and ECG, Blood, Physiology of muscle contraction, Physiology of nerve impulse, Synaptic transmission, Ear and Eye :structure and function.

**Developmental Biology in Vertebrates:** Gametogenesis, Fertilization and Parthenogenesis, Development of Frog and Chick up to formation of three germ layers, Embryonic induction, Organizers and Differentiation.

**Cytology and Genetics:** Cell and Cell organelles: Structure and Function, DNA, RNA, Chromosomes, Cell division, Varieties of gene expression, Sex linked inheritance, Sex determination, Mutation, Human genetics, chromosomal & single gene disorders, Recombinant DNA & Gene cloning, Protein Synthesis and Applications of biotechnology.

**Biotechniques:** Principles & techniques of Microscopy- Light microscopes, Phase contrast & Electron microscopes, PH meter, Colorimeter, Centrifugation, Separation of biomolecules by chromatography & electrophoresis.

**Biochemistry:** Structure and metabolism of Protein lipid & carbohydrates.

**Endocrinology:** General Characters of Hormones, Hormone receptor, Structure of Endocrine glands and Biosynthesis of their hormones, Endocrine disorder due to hormones, Mechanism and hormonal regulation of gametogenesis, Parturition, menstruation, lactation and pregnancy, Structure and hormonal regulation of Extra-embryonic membrane.

**Immunity:** Innate and Acquired immunity, B and T lymphocyte, Structure of Antigen and Antibody, Antigen and Antibody reaction, Cancer and AIDS.

**Parasitology in relation to human:** Protozoa and Diseases, Pathogenic protozoans –Structure and Life Cycle of Entamoeba, Trypanosoma, Plasmodium & Giardia, Pathogenic helminthes, Pathogenic Nematode, Insects as a Vector, Pathogenic microorganisms: Rickettsia, Spirochaetes & Bacteria.

**Evolution:** Theories of organic evolution(Lamarckism, Darwinism and Synthetic theory of evolution), Variation, Mutation, Isolation and Natural selection.

**Behaviour:** Social behavior of honey bee, Reproductive behavior of animals, Predatory behavior, Imprinting, Conditioning, Taxes, Reflexes, Drives and Stereotyped behaviours, Hormones, drugs and behavior.

**Economic Zoology:** Sericulture, Apiculture, Fish culture, Prawn Culture, Poultry, Pearl Culture.

**Toxicology:** Classification of toxicants, Principle of systematic toxicology, Toxic agents & their action, Animal poisons- Poisonous & Non Poisonous Snakes, Poison apparatus snake venom, scorpion & bee poisoning, Food poisoning.

**Ecology and Environmental Biology:** Ecosystems, Bio-geo chemical cycles, Ecological succession, Population -Characteristics and regulation of densities, Pollution, Wild life Conservation.

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