

**SCHEME AND SYLLABUS TO THE POST OF
ANALYST GRADE-II IN A.P. POLLUTION CONTROL BOARD**

SCHEME

(As per Annexure-VII of G.O.Ms.No.201, Finance (HR-I, Plg. & Policy) Dept.,dt: 21.12.2017)

WRITTEN EXAMINATION (OBJECTIVE TYPE) DEGREE STANDARD				
Paper	Subject	No. of Questions	Durationh Minutes	Maximum Marks
Paper-I	General Studies & Mental Ability	150	150	150
Paper-II	Common Paper	150	150	300
TOTAL				450 Marks
N.B: As per G.O.Ms. No.235 Finance (HR-1, Plg & Policy) Dept, Dt: 06/12/2016, for each wrong answer will be penalized with 1/3 rd of the marks prescribed for thequestion in all Objective type papers.				

SYLLABUS

PAPER – I

GENERAL STUDIES AND MENTAL ABILITY

1. Major Current Events and Issues pertaining to International, National and State of Andhra Pradesh.
2. General Science and its applications to the day to day life Contemporary developments in Science & Technology and Information Technology.
3. History of India – emphasis will be on broad general understanding of the subject in its social, economic, cultural and political aspects with a focus on AP and Indian National Movement.
4. Geography of India with focus on Andhra Pradesh.
5. Indian polity and Governance: constitutional issues, public policy, reforms and e-Governance initiatives.
6. Indian Economy and planning
7. Sustainable Development and Environmental Protection
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster
9. Logical reasoning, analytical ability and logical interpretation.
10. Data Analysis: Tabulation of data Visual representation of data Basic data analysis (Summary Statistics such as mean, median, mode and variance)and Interpretation.

Paper-II (Common Paper)

Chemistry

Unit.1:

Chemistry of Non-Transition Elements: Characteristics of Non-Transition Elements and its halides & oxides properties, Polymorphism of Carbon and sulphur, Boranes and Carboranes properties, Electronic counting in boranes.

Photochemistry: Thermal and Photochemical Processes, Laws of Photochemistry, Photochemical reaction mechanism – HCl & HBr, Fluorescence and Phosphorescence, Jablonski diagram.

Unit. II:

Spectroscopy: Electromagnetic radiation, Interaction with matter, Beer Lambert's law, Single & Double beam Spectrophotometers, Applications of Beer Lamberts law for Quantitative analysis of Chromium and Manganese in $K_2Cr_2O_7$ and $MnSO_4$.

Chromatography: Principles and classification of chromatography. Retention time, retardation factor, R_f values in chromatography. TLC, Gas Liquid, Paper, Column and High performance Liquid Chromatography basic principles, instrumentation, detectors and applications.

Terpenoids: Classification, occurrence, isolation, Isoprene rule, Structural determination and synthesis of Zingiberine and cadinene.

Unit.III

Amino acids and proteins: Classification of amino acids, Natural and essential amino acids with examples, classification of alpha amino acids with examples, Synthesis of alpha amino acids (Glycine, Valine) by halogenated carboxylic acid and malonic ester synthesis methods with physical and chemical properties. Structure and nomenclature of peptides and proteins.

Solvent free reactions: Solvent free techniques – reactions on solid mineral support and Phase transfer catalysis (N-alkylation, Wittig reaction), Ultrasound assisted green synthesis (Oxidation and reduction), Microwave assisted green synthesis (Biginelli reaction and Suzuki reaction)

Heterocyclic compounds: Simple five membered ring compounds with hetero one atom (Furan, pyrrole), Aromatic character, preparation from 1,4- dicarbonyl compounds. Synthesis and properties of pyrrole.

Biochemistry

Unit:1

Enzyme Inhibition: Types of Enzyme Inhibition – Reversible (Competitive, Non-competitive). Mechanism of reaction catalysed by chymotrypsin, trypsin and lysozyme.

Co-enzyme: The mechanistic role of Co-enzymes in enzyme catalysed reactions: nicotinamide nucleotides, flavin nucleotides, Co-enzymes A lipoic acid, biotin and Co-enzyme B12. Modern concepts of evaluation of catalysis-catalytic RNA (ribozyme).

Monomeric enzyme: Definition & structure – serine protease, zymogen activation, oligomeric enzymes, and multi-enzyme complexes (pyruvate dehydrogenase complex).

Immunology: Organs and cells of immune system, Innate and adaptive immune system, classification of immunoglobulins, structure of IgG. Concepts of haptens, antigen- antibody reactions, Blood group antigens. Immunodiagnostics – ELISA, Vaccines and their classification. Outline of hypersensitive reactions.

Unit:II

Composition of blood and lymph: Plasma and cells- RBC, WBC, Platelets, blood clotting, plasma protein, separation and applications, lymph.

Autoimmunity: Definition, Class of auto immune diseases

Immunoglobins(Igs)Types of Igs, nature and structure of Igs (light & heavy chain functions), enzymatic cleavage of Igs, haptens.

Nervous system and excretory system: General organization of nervous system, Neurons-structure, types, properties and functions; Excretory system-Organisation of kidney, structure and functions of nephron, Role of kidney in maintain acid-base and electrolyte balance in the body.

Unit:III

Endocrinology: Organization of Endocrine system, classification of hormones, physical role & chemistry and disorder of hormones of (thyroid, pituitary and hypothalamus). Gastrointestinal hormones – mechanism of hormonal action - Glucocorticoids and insulin.

Nutritional Biochemistry: Balanced diet, calorific value of food and its determination by bomb calorimeter, Specific dynamic action of foods, energy requirement and recommended dietary allowance for children and adults. Sources of complete and incomplete proteins. **Biological value of proteins.** Vitamins- Source, structure and biochemical roles, deficiency disorder of water and fat soluble vitamins. Nutraceutical and functional foods. Bulk and trace elements.

Clinical Biochemistry: Plasma protein in health and disease. Liver disease jaundice . Liver functional test – Conjugated and total bilirubin in serum, albumin (globulin ratio, serum enzymes in liver diseases. Normal and abnormal constituents of urine. Renal, GTT, gastric and pancreatic function tests.

Biology

1. Cell biology : Bacteria: General characters of Bacteria, Ultra structure of typical Bacterial (E.Coli) Classification of bacteria based on nutrition, Bacterial reproduction and Economic importance of bacteria (harmful and Beneficiary).Virus: Discovery of Virus, types of virus based on symmetry and nucleic acids Structure of TMV (plant virus), polio(animal virus) and HIV (retrovirus).Ultra Structure of typical plant cell and Animal cell (Paramecium) and functions of cell organelles (chloroplast, Mitochondria, Ribosome, Nucleus and Cytoskeleton) observed in ultra structure. Outlines of mitosis and meiosis, types of chromosomes (based on both centromere, and size)

2. Genetics and Evolution: Mendel's laws of inheritance ,Mono hybrid cross ,Dihybrid cross Linkage and Crossing over Cytoplasmic inheritance .Mutations :Types of Mutations ,Classification of mutagens, Point mutations and Chromosomal mutations (both number and aberration).Evolution: Origin of life, Darwin's theory of evolution Natural selection Divergent evolution and convergent evolution (outlines); Hardy -Weinberg law
3. Molecular Biology: Structure of Nucleosome and organization of chromosome. Structure of DNA, types of DNA (A, B and Z) Semi conservative method of DNA replication, DNA damage and repair, Structure of RNA, Types of RNA and their structures (m-RNA, r-RNA and t-RNA) Protein synthesis: Transcription Translation (Polypeptide chain initiation, elongation and termination)

Environmental Science

1. Fundamental environmental concepts and Ecology: Definition and importance of environment, Components of environment (Atmosphere, Hydrosphere, Lithosphere and Biosphere), Concepts of Ecology, Definition and divisions of ecology, structure and function of ecosystem, energy flow, food chain food web and ecological pyramids, ecological succession.
2. Natural Resources and environment pollution: Forest resources, water resources, mineral resources, and energy resources. Environment pollution; Sources, methods of management of Air pollution water pollution, soil pollution and waste management
3. Environmental issues and sustainable development: Green house gases, Global warming Ozone hole. Waste management, conventional and non conventional energy sources biogas production. Environmental assessment methods: plant survey, flora assessment animal assessment and aquatic assessment. Eco planning in India: Land use policy, urban and rural planning.
