

7. CONCESSIONS:

- (i) Concessions with regard to age and examination fees allowed to SCs, SC(A)s, STs, MBCs/DCs, BC(OBCM)s, BCMs, Destitute Widows, Differently Abled Persons and Ex-servicemen are given in [paras. 12 to 14 of the 'Instructions to Applicants'](#).
- (ii) Persons claiming concessions referred to above and other claims made in the application have to produce evidence for such claims when called for, otherwise their application will be **rejected**.

Note:

In all cases, an **ex-serviceman once recruited** to a post in any class or service or category, **cannot claim the concession** of being called an ex-serviceman for his further recruitment.

(Section 3(j) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016)

8. SCHEME OF EXAMINATION (OBJECTIVE TYPE-OMR METHOD) AND ORAL TEST:

For the posts of DRUGS INSPECTOR & JUNIOR ANALYST:

Subject	Duration	Maximum marks	Minimum qualifying marks for selection	
			SCs, SC(A)s, STs, MBCs/ DCs, BCs & BCMs	Others
<u>Paper –I (SUBJECT PAPER)</u> (200 questions) (Candidate should choose any one of the following subjects based on his/her educational qualification)	3 Hours	300	171	228
i) Pharmacy/ Pharmaceutical Sciences (Code No.246) (Degree standard)				
ii) Clinical Pharmacology (Code No.352) (P.G.Degree standard)				
iii) M.D. Microbiology (Code No.351) (P.G.Degree standard)				
iv) Pharmaceutical Chemistry (Code No.245) (Degree standard)				
v) *Chemistry (Code No.243) (Degree standard)				
ii. Paper - II (GENERAL STUDIES) (Code No.003) (100 Questions) General Studies (Degree standard) – 75 questions and Aptitude and Mental Ability Test (SSLC Standard) – 25 questions.	2 Hours	200		
iii. Interview and Records		70		
Total		570		

ANNEXURE-IV**SYLLABUS FOR WRITTEN EXAMINATION FOR PAPER-I (Objective type)****SUBJECT PAPER: PHARMACY/ PHARMACEUTICAL SCIENCES****(DEGREE STANDARD)****SUBJECT CODE: 246****UNIT- I:**

- a) The physical, physico-chemical and engineering principles governing design, layout and operation of plants for the process employed in pharmaceutical industry.
- b) Unit operations: size reduction, size separation, mixing, compression, filtration, centrifugation, extraction, evaporation, drying, distillation, crystallization.
- c) Industrial Hazards and Safety Precautions: Mechanical, Chemical, Electrical, Fire and Dust hazards, Industrial dermatitis, Accident records.
- d) Containers, closures and packaging materials.
- e) Preformulation Studies
- f) Pharmaceutical excipients: Antioxidants, preservatives, Colouring, Flavouring and Sweetening agents, Solvents.
- g) Facts related with formulation:- Physical properties, particle size. Crystal form, flow cohesiveness. Solubility. Chemical properties, Hydrolysis. Oxidation racemization, enzymatic decompositions.
- h) pH determination, application, buffer equation, buffer capacity, buffered isotonic solutions; Micrometrics: Particle size determinations, derived properties of powders; Interfacial phenomenon : HLB values surfactants, factors influencing interfacial phenomenon, Critical micellar concentration, Electrical properties at interface; Coarse dispersions: Suspensions and emulsions, Theories of emulsification, multiple emulsions.
- i) Pharmaceutical calculations: Calculations of doses, alcohol dilutions, proof spirit, isotonic solutions.
- j) Nuclear Pharmacy- Introduction to Radiopharmaceuticals, radioactive half-life, units of radioactivity. Production of radiopharmaceuticals, methods of isotopic tagging, preparation of radioisotopes in laboratory using radiation dosimetry and radioisotope generators. Permissible radiation dose level, radiation hazards, their prevention and specifications for radioactive laboratory.
- k) Good Manufacturing Practice.

- l) Quality control of the following formulations: Semisolids, Solid dosage forms, Liquid dosage forms, Parenteral and ophthalmic preparations.
- m) New Drug Delivery Systems- Aerosols, Ocusert, Transdermal Drug Delivery Systems, Osmotic Drug Delivery Systems, Targeted Drug Delivery Systems, Prolonged Drug Delivery Systems.
- n) Cosmetics- Dentifrices, Lipsticks, Face powders, shampoos, depilatories and Manicure preparations.

UNIT- II:

- a) **Blood Products and Plasma Substitutes:** Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin foam, plasma substitutes, ideal requirements of PVP, dextran, etc. Control of blood products as per IP.
- b) Basics of pharmacokinetic studies and their importance
- c) Pharmaceutical Biotechnology- General principles of immunology, immunological techniques used in pharmacy; Sterilization of different pharmaceutical dosage forms; Sterility Testing; Methods of preparation of official sera and vaccines; Microbiological assays of antibiotics and vitamins of the pharmacopeia; Disinfectants- Classification, Mechanism and uses of disinfectants in brief. Factors affecting disinfection and methods of disinfectant evaluation.
- d) Immunologicals: Preparation and quality control of products representing various categories like

Toxoids	– Diphtheria and Tetanus Live
Bacterial Vaccines	– BCG
Killed Bacterial Vaccines	– Cholera, DPT
Viral Vaccines	– Polio, Rabies and small pox
Antitoxins	– Diphtheria

UNIT – III:

- a) Chemistry of Alkaloids, Vitamins, Flavanoids, Glycosides, steroids, terpenes, vitamins and hormones.
- b) Catalytic hydrogenation, dehydrogenation, metal hydride reduction. Reduction with hydrazine and its derivatives, Birch reduction, Clemenson's reduction, Meerwin – Ponndrof reduction, oxidation with periodic acid, lead tetra acetate,

mercuric acetate and selenium oxide. Beckmann rearrangement, Schmidt rearrangement and Darzen's reaction.

UNIT – IV:

Synthesis, properties, test for purity, storage of the following categories of drugs - Analgesics and Antipyretics, Anti-inflammatory, Hypnotics and sedatives, Anti convulsants, Anti-psychotics, Anti-histamines, Sympathomimetics, Adrenergic antagonists, Cholinomimetics and anti-cholinergic, Local Anaesthetics, Anti-hypertensives, Anti-anginal, Sulphonamides, antibiotics, Anti-TB, Anti-Viral, Anti-Fungal, Antimalarials, Anti-Neoplastics.

UNIT- V:

- a) Principles and Pharmacopeial Assay Procedures involving Non-aqueous Titration, Oxidation-Reduction, Diazotization, complexometric methods, electrometric titration, gravimetric analysis.
- b) Polarimetry and refractometry, and gasometric analysis of oils, fats and waxes.
- c) Chromatography- TLC, Column, Paper, GC, Ion exchange, HPLC, HPTLC, Gel electrophoresis.
- d) Theory, principle, instruments and applications of colorimetry, UV- Visible Spectrometry, Fluorimetry, Nephelometry, Turbidometry, IR, Mass, NMR, RIA.

UNIT- VI:

- a. General Pharmacology:- Routes of administration, Absorption, distribution, Biotransformation and Excretion of drugs, Bioavailability and bio equivalence, Factors affecting bioavailability, Mechanism of action of drugs at receptor level, adverse drug reaction.
- b. Drugs acting on Central Nervous system: Analgesics, Nonsteroidal anti inflammatory drugs, Sedatives and Hypnotic, Anti convulsants and Antipsychotic drugs. Drugs used in parkinsonism.
- c. Drugs acting on Autonomic Nervous system: Drugs which influence the working of autonomic nervous system, Adrenergic drugs (or) sympathomimetic drugs, Adrenergic blocking drugs, Cholinergic drugs and cholinergic blocking drugs, Drugs acting on autonomic ganglia.
- d. Drug acting on cardiovascular system: cardiac glycosides, Anti hypertensive, anti arrhythmic and anti anginal drugs.
- e. Diuretics & anti diuretics.

UNIT- VII:

- a. Drugs acting on GIT.
- b. Insulin and oral anti diabetic drugs, Thyroid and anti-thyroidal drugs, oral contraceptives. Hormone replacement therapy, drugs acting on uterus.
- c. Antihistaminic drugs and Drugs used in Migraine.
- d. Chemotherapy- sulphonamides penicillins, cephalosporins, quinolones, Tetracyclines, Aminoglycosides, Chemotherapy of Tuberculosis, leprosy, malaria, cancer , Ameobiasis, Helminthiasis.
- e. Toxicology- Systematic & local treatment of poisoning and their treatment.

UNIT- VIII:

- a. General principles of cultivation and collection of drugs from wild & cultivated sources, their merits and demerits, factors affecting cultivation, adulterants and their detection.
- b. Plant growth regulators.
- c. Source, synonym, cultivation, collection, preparation for market, diagnostic characters (both macroscopical and microscopical). Constituents, substitutents, adulterants and uses of Cinnamon, Cinchona, Senna, digitalis, Clove, Saffron, Pyrethrum. Cochineal, Ergot, opium, Aloe, Acacia, Tragacanth, Benzoin, Ginseng, Brahmi, Dioscorea, Cascara, Gelatin, umbelliferous fruits, spirulina, nuxvomica, ginseng, belladonna, taxol , vinca.
- d. Principle and application plant tissue culture.
- e. Basics of fermentation technology & production of Antibiotics, Vitamins.

UNIT- IX:

- a. Biosythetic pathways of Tropane alkaloids, Cholesterol, amino acids.
- b. WHO Guidelines for herbal medicines.

UNIT- X:

- a. Drugs and Cosmetics Act 1940 and Rules 1945.
- b. Pharmacy Act 1948.

PAPER - I**SUBJECT PAPER: CLINICAL PHARMACOLOGY**
(POST GRADUATE DEGREE STANDARD)**Objective Type****SUBJECT CODE: 352****UNIT- I : GENERAL PHARMACOLOGY**

Sources of drugs, Routes of drug administration, Dosage formulations, Pharmacokinetics, Pharmacodynamics - Good Clinical Practice & Good Manufacturing Practice - Patient compliance, and self medication, Placebo medicines and pharmacoconomics.

Discovery and development of drugs - Preclinical studies in animals - Clinical trials - Official regulatory guidelines.

Orphan drugs and diseases, Spurious drugs, Counterfeit drugs - Pharmacoepidemiology and Pharmacovigilance – Pharmacogenetics - Adverse drug reactions and monitoring - Clinical importance of drug interactions (both pharmacokinetic and pharmacodynamic interactions with special reference to antibiotics, anti-bacterials, NSAIDs and cardiovascular drugs) - Therapeutic drug monitoring.

UNIT - II : DRUG THERAPY IN SPECIAL SITUATIONS

Geriatrics – Pediatrics - Pregnancy and Lactation.

UNIT - III : CHEMOTHERAPY

Chemotherapy of bacterial (including Tuberculosis & Leprosy) - viral – fungal - protozoal - helminthic infections - Neoplastic diseases.

UNIT IV : DRUGS ACTING ON NERVOUS SYSTEM - CENTRAL NERVOUS SYSTEM

General anaesthetics – Narcotics – Antiepileptics - Sedatives and Hypnotics - Psychopharmacological drugs - CNS Stimulants - Neurodegenerative disorders – Hallucinogens - Deaddiction for alcohol and other drugs of abuse.

UNIT V : PERIPHERAL NERVOUS SYSTEM & AUTONOMIC NERVOUS SYSTEM

Local Anaesthetics - Skeletal Muscle Relaxants – Atropine & Substitutes – Adrenaline & Derivatives – Drugs in Glaucoma.

UNIT VI : CARDIOVASCULAR DRUGS

Hypertension - Angina & Myocardial Infarction - Congestive Heart failure - Arrhythmias.

UNIT VII : ENDOCRINOLOGY

Anterior pituitary Hormones - Thyroid Hormones – Corticosteroids-Insulin & Oral Hypo glyemic drugs -Male & Female sex Hormones - Oral contraceptives - Uterine stimulants & relaxants.

UNIT VIII : DRUGS ACTING ON HEMOPOEITIC SYSTEM, RENAL AND GIT

Haematinics- Coagulants & Anticoagulants – Fibrinolytics & Antifibrinolytics - Antiplatelets, Hypolipidemic Drugs – Diuretics - Drugs Acting on GIT.

UNIT IX : IMMUNOPHARMACOLOGY& AUTACOIDS

Cell and biochemical mediators involved in allergy, immuno modulation and inflammation, hypersensitivity reactions - therapeutic agents for allergy, asthma and COPD - NSAIDs & DMARDs & gout – Antihistamines - Serotonin agonists & Antagonists.

UNIT X : MISCELLANEOUS

Vaccines - Dermatological preparations - Chelating Agents – Nutraceuticals - Supplementary & formula feeds – Toxicology.

PAPER - I**SUBJECT PAPER: M.D.MICROBIOLOGY**
(POST GRADUATE DEGREE STANDARD)**Objective Type****SUBJECT CODE:351****UNIT – I: GENERAL MICROBIOLOGY**

1. History & Milestone in Microbiology
2. Microscopy
3. Sterilization and disinfection
4. Bio Safety in Microbiology Laboratory
5. Bacterial morphology
6. Staining of Bacteria
7. Nutrition and growth of Bacteria
8. Culture Media & Cultivation of Bacteria
9. Identification of Bacteria & Bacterial Classification
10. Normal Microbial flora
11. Bacterial Genetics

UNIT – II: IMMUNOLOGY

- 1 Immunity
- 2 Structures and functions of Immune system
- 3 Cells of Immune System
- 4 Immune Response/Immunity
- 5 Antigen
- 6 Antibody
- 7 The complement System
- 8 Antigen - Antibody reactions
- 9 Hypersensitivity
- 10 Auto Immunity
- 11 Histo-Compatibility complex
- 12 Transplantation Immunity
- 13 Tumour Immunity
- 14 Immuno Deficiency diseases
- 15 Immuno Hematology
- 16 Immuno Prophylaxis against infectious Diseases

UNIT – III: SYSTEMATIC BACTERIOLOGY

- 1 Staphylococcus
- 2 Streptococcus
- 3 Neisseria
- 4 Coryne bacteria

- 5 Bacillus
- 6 Mycobacteria
- 7 Actinomyecetes & Nocardia
- 8 Coliform bacteria-Escherichia coli & kelsiella 9 Proteus
- 9 Salmonella
- 10 Shigella
- 11 Yersinia
- 12 Pasteurella & Francisella
- 13 Haemophilus
- 14 Bordetella
- 15 Brucella
- 16 V. Cholerae
- 17 Pseudomonas
- 18 Spirochetes
- 19 Rickettsiae
- 20 Chlamydia
- 21 Mycoplasma
- 22 Miscellaneous Bacteria

UNIT - IV PARASITOLOGY

- 1 Classification
- 2 General principles of Diagnosing parasites & treatment of parasitic infection.
- 3 *Protozoology*
Pathogenic and Non-pathogenic amoebae and free living amoebae
Intestinal, Blood & Tissue flagellates Plasmodium, Toxoplasma, Isospora
- 4 Balantidium coli
- 5 Helminthology
Cestodes, Trematodes, Nematodes

UNIT - V GENERAL VIROLOGY

- 1 Classification of viruses
- 2 Replication of Viruses
- 3 Cultivation of Viruses
- 4 Identification of Viruses & Lab diagnosis
- 5 Pathogenesis & Host response to Viral infection
- 6 Bacteriophage
- 7 Antiviral Agents
- 8 Viral Vaccines

UNIT – VI: VIRUSES

- 1 Pox
- 2 Adeno
- 3 Herpes

- 4 Papova
- 5 Parvo
- 6 Picorna
- 7 Orthomyxo
- 8 Paramyxo
- 9 Rota virus
- 10 Rhabdovirus
- 11 Hepatitis
- 12 Arbo
- 13 Retro
- 14 Slow-viruses
- 15 Oncogenic virus
- 16 Miscellaneous
virus

UNIT - VII Mycology

- 1 Classification of fungi
- 2 Fungal Mycotoxins
- 3 Pathogenesis & Lab diagnosis of Mycotic infections
- 4 Superficial Mycosis
- 5 Cutaneous Mycosis
- 6 Subcutaneous Mycosis
- 7 Systematic Mycosis
- 8 Opportunistic Mycosis and common lab contaminants
- 9 Antifungal Agents

UNIT- VIII Clinical Microbiology

- 1 C.N.S infection
- 2 Respiratory Infections
- 3 Urinary Tract Infection
- 4 Gastro intestinal Infection
- 5 Genital Tract Infection
- 6 Congenital Infection
- 7 Infections of Eye, Ear & Skin
- 8 Infections of Cardiovascular System
- 9 P.U.O
- 10 Zoonotic Infections

UNIT - IX Applied Microbiology

- 1 Collection ,Transport and Disposal of Specimens
- 2 Environmental Microbiology (Food, Water, Milk and Air)
- 3 Hospital Infections Prevention & Control
- 4 Microbial Control- anti microbial susceptibility testing
- 5 Bio medical waste management
- 6 Basic molecular biology related to infections
- 7 Emerging and reemerging infections - Bio Terrorism

UNIT - X Recent Advances in Microbiology

- 1 Advanced Molecular Techniques in Relation to Diagnosis of Infectious diseases
- 2 Scope of Medical Microbiology
- 3 Automation in Microbiology
- 4 Anti microbial resistance and antibiotic policy
- 5 Newer Vaccines
- 6 Quality Control, Audit and Accreditation of Standard Microbiology Laboratory

PAPER – I**SUBJECT PAPER: PHARMACEUTICAL CHEMISTRY (DEGREE STANDARD)****Objective Type****SUBJECT CODE.245****UNIT I**

- 1) Atomic structure and valency, Radioactivity, Radio isotopes and Pharmaceutical applications of Radio Pharmaceuticals, hazards and precautions.
- 2) Sources of impurities in Pharmaceutical substances; Limit test as per I.P; Fundamentals of volumetric Analysis.
- 3) A systematic study of inorganic compounds for their preparation, assay and use which includes Gastrointestinal agents, Topical agents and Dental products.

UNIT II

- 1) Assay, test for purity of sodium, calcium, iron, aluminium and ammonium compounds. Major intracellular and extra cellular electrolytes.
- 2) Preparation and use of Chemical reagents and Volumetric Solutions as per Pharmacopia in Pharmaceutical Analysis.
- 3) Theory of Co-ordination Compounds with special reference to application in Pharmaceutical Analysis via EDTA, Dimercaprol, Pencillamine.

UNIT III

- 1) Physiochemical properties of gases, liquids and solids. Density, Surface tension, Viscosity and physical properties.
- 2) Osmosis, osmotic pressure, vapour pressure, Raoult's law, Ostwalds dilution law, Molecular weight determination by osmotic pressure.
- 3) Non- aqueous and complexometric titrations, analysis of fats, oils and waxes. Importance of quality control, Different types of titrations, Gasometric analysis and determination of Nitrogen.

UNIT IV

- 1) Gases in liquids, liquids in liquids, partially miscible, completely miscible and completely immiscible liquids.
- 2) Thermochemistry: Heat of reaction, heat of solution, heat of formation and heat of neutralization and Hess law.
- 3) Stereo chemistry, optical isomerism, Geometrical isomerism.
- 4) Theory of Polarimetry, Refractometry and catalyst.

UNIT V

- 1) Electronic configuration and electron displacement effects, chemical bonds and polarity.
- 2) Chemistry and medicinal uses of cardiac glycosides and vitamins.
- 3) Synthetic utility of acetoacetic ester, Grignard reagent and Diazonium compounds.

UNIT VI

- 1) Aromaticity, concept of resonance, Nucleophilic, Electrophilic substitution reaction, Elimination reactions in aliphatic and aromatic compounds.
- 2) Anti-infective agents comprising of Anti-fungal agents, synthetic antibacterial agents, anti-tubercular Agents, and Anthelmintics agents.

UNIT VII

Chemical structure, Synthesis, assay and therapeutic uses of organic synthetic drugs like, Antidepressants, General anesthetics, Sedatives and hypnotics, Narcotic analgesics, Anti-histaminics, Antimalarials., Sulphonamides, Drugs acting on CVS.

UNIT VIII

- 1) Structural elucidation of natural products - General methods.
- 2) Structure, chemistry, methods of estimation, and uses of Alkaloids, Carbohydrates, and Proteins.
- 3) Chemistry of steroids and natural hormones, currently used steroidal drugs.

UNIT IX

- 1) Study of separations and determination involving TLC, HPTLC, and column chromatography.
- 2) Colorimetry, UV and Visible Spectrophotometry, Spectrofluorimetry-Theory, Principle, Instrumentation and working.
- 3) Theory and principles of separation techniques involving Ultra centrifugation, HPLC and Gel filtration.

UNIT X

- 1) Conductometry, Potentiometry and Amperometric titrations, Basic concepts and application in pharmaceutical analysis.
- 2) Radio Immuno Assay and Electrophoresis.
- 3) Theory, Principle and application of NMR, MS, IR spectroscopy.

PAPER – I**SUBJECT PAPER: CHEMISTRY (DEGREE STANDARD)****Objective Type****SUBJECT CODE.243****UNIT - I****PHYSICAL CHEMISTRY:-**

- a) Gas law and Kinetic Theory:- Ideal gas equation - Deviation from ideal behaviour - vander waals equation for real gases - Molecular velocities - the Maxwell's distribution of molecular velocities –heat capacity and viscosity of gases.
- b) Solid State:- Crystal systems - Bravaislattice - Unit Cell - Miller Indices - Symmetry elements in crystals - Bragg's equation - Radius ratio's and packing in crystals – Determination of crystal structures by Braggs method – structure of Nacl, Kcl, Zns and spinals.
- c) Thermodynamics:- Intensive and extensive variables - First law of thermodynamics – CP and CV relation - Hess's law of constant heat summation - Kirchoff's equation - Second law of thermodynamics - Carnot theorem - entropy and probability, Joule Thomson effect -Free energy and Chemical equilibrium - Temperature and pressure dependence and - Gibb's and Helmholtz functions – Heterogeneous equilibrium and Le – Chatlier principle.

UNIT – II

- d) Chemical Kinetics:- Rate laws - rate constant - order and molecularity of reactions I, II, III, and Zero order reaction Arrhenius theory - collision theory and Transition state theory - catalysis.
- e) Electro-Chemistry:- Types of reversible electrodes - Nernst equation - reference electrode and standard hydrogen electrode - computation of cell e.m.f. calculations of thermodynamic quantities of cell reactions (DG, DH, DS and K) - Over potential and hydrogen over voltage - Arrhenius theory - Debye 'Huckel equation - Kohlraush's law - Ostwald's dilution law - Determination of PH and Pka of acids by potentiometric methods.

UNIT – III

- f) Chemical spectroscopy:- Elementary ideas of microwave, infrared, Raman, uv, NMR, ESR and Mass spectroscopy.
- g) Pharmaceutical chemistry: Terminology pharmacology, pharmacotheraies, toxicology, chemotherapy, classification, and nomenclature of drugs, sources of drugs, assay of drugs by biological, chemical and immunological methods, physiological effects of functional groups of drugs different types of drugs like analgesics, antibiotics, antiseptics, disinfectants, anesthetics, antidepressants, antipsychotic etc.

UNIT - IV

h) Colloids and surface Chemistry:- Classification – preparation, purification - properties - Tyndall effect- Gels - Emulsions Absorption - Langmuir isotherms - Heterogeneous catalysis.

i) Physical properties and Chemical constitution:- Surface tension - parachor and its application to structural problems – Dipole moment - applications of dipole moment measurements to structural studies of simple inorganic and organic molecules - magnetic properties of matter, diamagnetism, paramagnetism, ferromagnetism and anti-ferromagnetism - Applications to structural problems.

UNIT - V**INORGANIC CHEMISTRY:-**

j) Periodic classification:- Classification based on electronic configuration - periodic properties - atomic and ionic radii, ionisation potential, electron affinity and electronegativity- various scales - trend along periods and groups.

k) Chemical bond:- Lattice energy - VSEPR Theory and its applications - partial ionic character from electronegativity - Fajan's Rules.

l) Compounds of Boron:- Electron deficient nature of boron compounds - preparation and properties of halides and nitrates of boron - diborane – Borazine, silicones and structures of silicates

UNIT - VI**LANTHANIDES AND ACTINIDES:-**

m) Occurrence Electronic configuration oxidation state, magnetic properties and complexation behaviour - comparison of lanthanides and actinides, lanthanide contraction and their position in the periodic table.

n) Fertilisers:- Ammonium nitrate, ammonium phosphate, Superphosphate and Diammonium Phosphate, NPK fertilisers.

o) Nuclear Chemistry:- Radio activity – detection and measurement – half life period - Nuclear stability, - n/p ratio - isotopes, isobars and isotones Nuclear reactions Spallation - Nuclear fission and fusion – stellar energy uses of nuclear energy - nuclear power projects in India - applications of tracers in industry, medicine, agriculture.

UNIT - VII

p) Co-ordination Chemistry:- Redox Nomenclature - theories of co-ordination compounds - Werner, valence bond, crystal field and ligand field theories - Effective atomic number - isomerism - Metal Carbonyls of iron and Nickel.

q) Analytical Chemistry:- i) Principles of volumetric analysis - different types of titrations gravimetric analysis - separation and purification techniques.

UNIT - VIII**ORGANIC CHEMISTRY:-**

- r) Types of reactions:- Nucleophilic, electrophilic, free radicals, addition and elimination reactions.
- s) Electron displacement effects:- Inductive, inductometric, electromeric, mesomeric, resonance, hyperconjugation and steric effects.

UNIT - IX

- t) Nature of Bonding:- Hybridisation (Sp , Sp^2 & Sp^3) and Geometry of molecule - cleavage of bonds - homolytic and heterolytic fission of carbon – carbon bonds - Reaction intermediates - free radicals, carbocations and carbonions - their stability.
- u) Stereo Chemistry:- Optical isomerism and Geometrical isomerism - chirality - optical isomerism of lactic and tartaric acid - Racemisation - Resolution - Asymmetric synthesis - walden inversion - cis and trans isomerism of maleic and fumaric acids - R-S-Notations - conformational analysis of cyclohexane - applications of ORD and CD Techniques.

UNIT - X

- v) Dyes:- Classification and Properties of dyes – methyl orange, congo red, malachite green, fluorescein and indigo.
- w) Carbon hydrates:- Classification and reactions - Glucose, Fructose, Sucrose and lactose- structure of glucose and fructose.
- x) Aromatic Substitution:- Mechanism of nitration, Halogenation, sulphuration and Friedel Crafts reaction - Orientation effects - nucleophilic substitution - Benzyne mechanism.

PAPER-II**GENERAL STUDIES (DEGREE STANDARD)****Objective Type****SUBJECT CODE : 003****UNIT-I: GENERAL SCIENCE**

Physics Universe-General Scientific laws-Scientific instruments-Inventions and discoveries-National scientific laboratories-Science glossary-Mechanics and properties of matter-Physical quantities, standards and units-Force, motion and energy-Electricity and Magnetism, Electronics and Communication -Heat, light and sound-Atomic and nuclear physics-Solid State Physics – Spectroscopy- Geophysics - Astronomy and space science.

Chemistry Elements and Compounds-Acids, bases and salts-Oxidation and reduction-Chemistry of ores and metals-Carbon, nitrogen and their compounds-Fertilizers, pesticides, insecticides-Biochemistry and biotechnology-Electrochemistry-Polymers and plastics.

Botany Main Concepts of life science-The cell-basic unit of life-Classification of living organism-Nutrition and dietetics-Respiration-Excretion of metabolic waste-Bio-communication.

Zoology Blood and blood circulation-Endocrine system-Reproductive system-Genetics the science of heredity-Environment, ecology, health and hygiene, Bio- diversity and its conservation-Human diseases-Communicable diseases and non- communicable diseases- prevention and remedies- Alcoholism and drug abuse-Animals, plants and human life

UNIT- II: CURRENT EVENTS

History Latest diary of events – National--National symbols-Profile of States-Defence, national security and terrorism-World organizations-pacts and summits-Eminent persons & places in news-Sports & games-Books & authors -Awards & honours-Cultural panorama-Latest historical events - India and its neighbours - Latest terminology- Appointments-who is who?

Political Science 1. India's foreign policy 2. Latest court verdicts – public opinion 3. Problems in conduct of public elections 4. Political parties and political system in India 5. Public awareness & General administration 6. Role of Voluntary organizations & Govt., 7. Welfare oriented govt. schemes, their utility

Geography Geographical landmarks-Policy on environment and ecology

Economics Current socio-economic problems-New economic policy & govt. sector

Science Latest inventions on science & technology-Latest discoveries in Health Science-Mass media & communication

UNIT-III : GEOGRAPHY

Earth and Universe - Solar system-Atmosphere hydrosphere, lithosphere - Monsoon, rainfall, weather and climate - Water resources - rivers in India-Soil, minerals & natural resources - Natural vegetation - Forest & wildlife-Agricultural pattern, livestock & fisheries -Transport including Surface transport & communication - Social geography – population -density and distribution-Natural calamities – disaster management-Climate change - impact and consequences - mitigation measures - Pollution Control.

UNIT-IV: HISTORY AND CULTURE OF INDIA

Pre-historic events -Indus valley civilization-Vedic, Aryan and Sangam age-Maurya dynasty-Buddhism and Jainism-Guptas, Delhi Sultans, Mughals and Marathas-Age of Vijayanagaram and the bahmanis-South Indian history - Culture and Heritage of Tamil people-Advent of European invasion-Expansion and consolidation of British rule - Effect of British rule on socio-economic factors-Social reforms and religious movements - India since independence-Characteristics of Indian culture-Unity in diversity – race, colour, language, custom-India-as secular state-Organizations for fine arts, dance, drama, music-Growth of rationalist, Dravidian movement in TN- Political parties and populist schemes- Prominent personalities in the various spheres – Arts, Science, literature and Philosophy – Mother Teresa, Swami Vivekananda, Pandit Ravishankar , M.S.Subbulakshmi, Rukmani Arundel and J.Krishnamoorthy etc.

UNIT-V: INDIAN POLITY

Constitution of India - Preamble to the constitution- Salient features of constitution- Union, State and territory- Citizenship-rights amend duties- Fundamental rights- Fundamental duties- Human rights charter- Union legislature – Parliament- State executive- State Legislature – assembly- Status of Jammu & Kashmir- Local government – panchayat raj – Tamil Nadu- Judiciary in India – Rule of law/Due process of law- Indian federalism – center – state relations-. Emergency provisions- Civil services in India- Administrative challenges in a welfare state- Complexities of district administration- Elections - Election Commission Union and State. Official language and Schedule-VIII- Amendments to constitution- Schedules to constitution-. Administrative reforms & tribunals- Corruption in public life- Anti-corruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, - Comptroller and Auditor General of India- Right to information - Central and State Commission- Empowerment of women- Voluntary organizations and public grievances Redressal- Consumer protection forms

UNIT- VI: INDIAN ECONOMY

Nature of Indian economy-Need for economic planning-Five-year plan models-an assessment-Land reforms & agriculture-Application of science in agriculture Industrial growth-Capital formation and investment-Role of public sector & disinvestment-Development of infrastructure- National income- Public finance & fiscal policy- Price policy & public distribution- Banking, money & monetary policy- Role of Foreign Direct Investment (FDI)- WTO-globalization & privatization- Rural welfare oriented programmes- Social sector problems – population, education, health, employment, poverty-HRD – sustainable economic growth- Economic trends in Tamil Nadu - Energy Different sources and development- Finance Commission -Planning Commission- National Development Council

UNIT-VII: INDIAN NATIONAL MOVEMENT

National renaissance-Early uprising against British rule-1857 Revolt- Indian National Congress-Emergence of national leaders-Gandhi, Nehru, Tagore, Nethaji -Growth of militant movements - Different modes of agitations-Era of different Acts & Pacts-World war & final phase struggle-Communalism led to partition-Role of Tamil Nadu in freedom struggle - Rajaji, VOC, Periyar, Bharathiar & Others-Birth of political parties /political system in India since independence.

UNIT-VIII: APTITUDE AND MENTAL ABILITY TESTS

Conversion of information to data-Collection, compilation and presentation of data - Tables, graphs, diagrams-Parametric representation of data-Analytical interpretation of data - Simplification-Percentage-Highest Common Factor (HCF)-Lowest Common Multiple (LCM)-Ratio and Proportion-Simple interest-Compound interest-Area-Volume-Time and Work-Behavioural ability -Basic terms, Communications in information technology-Application of Information and Communication Technology (ICT)- Decision making and problem solving-Logical Reasoning-Puzzles-Dice-Visual Reasoning-Alpha numeric Reasoning-Number Series-Logical Number/Alphabetical/Diagrammatic Sequences.
