TAMIL NADU PUBLIC SERVICE COMMISSION

SYLLABUS

General Science
(IXth & Xth Standard of Samacheer Kalvi of Tamil Nadu Board)

CODE: 467

1. Improvement in Food Resources: Improvement in crop yields, Nutrient management, Uses of manures and fertilizers, Protection from pests and diseases, Hybridization in Plants and animals, Animal husbandry, Poultry farming, Pisciculture, Apiculture, Aquaculture.

Heredity and Evolution: Heredity, Variations, Evolution, Speciation, Human evolution, Evolution tree, Genetic engineering, Bio technology and cloning, Stem cell-Organ culture, Microbial production, Biosensor - Bio chips, Science today – Gene Therapy.

Addiction and Healthy Life Style: Addictions, Kinds of addictions-e-drug, alcohol, smoking, substance abuse, Prevention of addiction, Healthy Life style -Prevention of Heart Diseases, Obesity.

2. Immune System: Health and its significance, Diseases and causes, Diseases caused by microbes and Prevention, Modes of transmission, Immunization, Treatment and prevention, Biotechnology in Medicine, HIV and Prevention.

3. Human Body: Organ System: Skin, Musculoskeletal system, Digestive system, Excretory system, Circulatory system, Respiratory system (Microscopic structure of the tissues involved for each system).

Structure & Function of the Human Body: Organ System, Nervous system, Endocrine system, Cell division - Stages of Meiosis, Heredity.

4. Structure and Physiological Functions of Plants: Plant cells, Plant tissues, Plant Functions, Photosynthesis, Transpiration, Respiration, Transportation, Plant Nutrition.

Reproduction in Plants: Modes of reproduction - vegetative, asexual and sexual reproduction in Plants, Pollination, Fertilization, Fruits and seeds, Movements in plants, Sensitivity in plants formation, Seed dispersal.

5. Animal Kingdom: Invertebrates, Vertebrates — focus on special features in addition to basic functions, Various Modes of reproduction in animals (asexual and sexual reproduction), Reproduction in human, Fertilization, Development of embryo, Viviparous, Oviparous, Young ones to adult.

A Representative Study of Mammals Morphology: Habitats, Adaptations, Basic Physiological Functions, Circulatory system in man, Excretory system in man, Relationship of structure to functions, Animal Behaviour, Behaviour (social, reproductive, parental care) Some case studies from researchers / animals behavior.

6. Cells and Tissues: Prokaryotic and eukaryotic cells, Multi cellular organisms, Cell as a basic unit of Life, Cell membrane and Cell wall, Cytoplasm, Cell organelles, Nucleus, Chromosomes - DNA structure Cell division and types, stages of mitosis, Diffusion / exchange of substances between cells and their environment, Tissues Types, structure and function of plant tissues.

Life Processes: Definition, Types of nutrition and human digestive system, Respiration, Transportation in plants - water and minerals and animals - blood circulation, Excretion in plants and animals, Nervous system, Coordination in plants, Movement due to growth, Hormones in animals.

7. Bio-Geochemical Cycle: Life - non-life interactions (biotic & abiotic factors), Water cycle, Nitrogen cycle, Carbon cycle, Oxygen cycle

Conservation of Environment: Bio-degradable and non bio-degradable wastes, Water management, Wild life sanctuaries, Balance in Ecosystem, Coal and petroleum, Green chemistry, Science today -Towards a global Village.

8. Pollution and Ozone Depletion: Kinds of pollution, Air pollution, Water pollution, Soil pollution, Radio-active pollution, Noise pollution, Global warming, Green house effect, Ozone layer depletion, Science today - Oil spills.

Waste Water Management: Journey of water, Sewage, Treatment, Domestic practices, Sanitation and diseases, Alternate arrangement for sewage disposal, Sanitation in public places, Energy Management, Energy audit (home, school), Renewable sources (solar, hydrogen, wind), Nonrenewable sources - (coal, petroleum, natural gas), Bio-fuels -

generation & use, Energy Conservation & How we can help, Bio-fuels-generation & use, Energy, Conservation & How we can help.

9. Is Matter Around us Pure: Mixtures, Characteristics of Mixtures, Difference between Mixtures, compound, Types of Mixtures, Homogeneous mixtures and their Types, Heterogeneous mixtures and their Types, Separation of different components of Mixtures, Sublimation, Immiscible liquids, Miscible liquids.

Solutions: Solute and Solvent, Types of Solutions, Solubility, Factors affecting Solubility, Problems.

10. Atomic Structure: Discovery of Nucleus, Rutherford Experiment, Rutherford Model of Atom, Limitations, Bohrs Model of Atom, Discovery of Neutrons, Characteristics of Fundamental particles, Composition of Nucleus, Atomic number and Mass number, Isotopes, Electronic Configuration of Atoms, Valence Electrons and valency.

Atoms and Molecules: Modern atomic theory, Avogadro Hypothesis, Atomicity, Relation between vapour density and molecular mass of a gas, Difference between Atom and imme Molecules, Relative Atomic Mass, Relative Molecular mass, Mole Concepts, Mole - Definition. Problems based on mole concept.

11. Chemical equation: Types of ions and radicals, Learning to write chemical symbols and chemical formulae by crisscrossing valencies, Introduction to write chemical reactions, Balancing chemical equations, Informations conveyed by chemical equation, Informations not conveyed by Chemical equation.

Chemical Reactions: Types of chemical reactions, Rate of chemical reaction, Factors influencing the rate of the chemical reaction, Acids, Classification of acids, Chemical properties of acids, Uses of acids, Bases, Classification of bases, Chemical properties of bases, uses of bases, Identification of acids and bases, pH scale, pH paper, Importance of pH in everyday life, Salts, Classification of salts, Uses of salts.

12. Periodic Classification of Elements: Early attempts of classification of elements, Mendeleev's periodic table, Mendeleev's classification of elements, Metals and Non-Metals, Physical properties of Metals and Non Metals, Chemical properties of Metals and Non Metals, Reactivity series, Uses of Reactivity series, Alloys, Uses of Alloys, Nano Science, Modern periodic law, Modern periodic table, Characteristics of modern periodic table, Metallurgy, Introduction, Terminologies in

metallurgy, Differences - between Minerals and Ores, Occurrence of metals, Metallurgy of AI, Cu and Fe, Metallurgy of Aluminium, Metallurgy of Copper, Metallurgy of iron. Alloys. Methods of making alloys, Copper Aluminium and Iron alloys, Corrosion, Methods of preventing corrosion, Chemical Bonds Octet rule, Types of Chemical bond, Formation of Ionic and Covalent bond, Common Properties of ionic compounds, Common Properties of covalent compounds, Differences between Ionic and covalent Compounds, Coordinate covalent bond, Common properties of coordinate compounds.

13. Carbon and its Compounds: Introduction, Compounds of carbon, Modern definition of organic chemistry, Bonding in carbon and its compounds, Allotropy, Physical nature of carbon and its compounds, Chemical properties of carbon compounds, Homologous series, Hydrocarbons and their Types, Functional groups, Classification of organic compound based on functional group, Ethanol, Ethanoic acid.

14. Measuring Instruments: Concept of small Measurements, Measuring Length, Vernier Calipers, Measuring mass Weight -Concept of various balances-common balance, Spring Balance, Physical balance, Digital balance (concept only), Measuring Time - Concept of various Clocks, Analog, Digital, Quartz, Atomic Clocks, Measuring Instruments-Screw Gauge, Measuring long Distances - Astronomical distance, light year.

15. Motion and Liquids: Uniform and non-uniform motion-Measuring the rate of motion, Rate of change of velocity, Graphical representation of motion, Equation of motion by graphical method, Uniform circular motion, Centripetal and centrifugal forces, Liquids, Up thrust & buoyancy, Archimedes, Relative Density, Explanation for a body wholly or partially immersed in a liquid due to gravity.

Laws of Motion and Gravitation: Balanced and imbalanced forces, First law of motion, inertia and mass, Momentum, Second law of motion-(F=ma), Third law of motion, Conservation of momentum and proof, Moment of force and couple, Gravitation, Newton’s law of gravitation, Mass, Weight, Acceleration, Mass of Earth, Science Today-Chandrayan, Cryogenic Techniques and Manned Space Station.

16. Work, Power, Energy, and Heat: Work, Energy, Potential energy, Kinetic energy, Law of Conservation of energy, Rate of doing work or power, Unit of power, Heat, Thermal Capacity-Specific Heat Capacity,

Change of State - melting and boiling point, Kelvin's scale of Temperature, Gas laws and Gas equation.

16a. Electricity and Energy: Electric current and circuit, Electric potential and potential difference, Circuit diagram, Ohm's law, Resistance of a conductor, System of resistors, Heating effect of electric current, Joules law of heating, Role of fuse, Domestic electric circuits, Electric power, Chemical effect of electric current, Electrolysis electro chemical cells, Primary and Secondary cells, Sources of Energy, Conventional sources of energy, Non-conventional source of energy, Nuclear energy, Radioactivity, Nuclear fission and nuclear fusion, Nuclear reactivity advantages, Hazards of nuclear energy, Science today - Energy from seas.

17. Sound: Production of sound, Propagation of sound, Longitudinal and Transverse waves, Reflection of sound, Echo, Reverberation, Range of hearing, Application of ultra sound (Sonar, Doppler effect).

18. Magnetic Effect of Electric Current and Light: Magnetic field and magnetic lines of force, Magnetic field due to current carrying conductor, Magnetic field due to current carrying Straight Conductor, Magnetic field due to current carrying Circular loop, Force on a current carrying conductor in a magnetic field, Fleming left hand rule, Electric motor, Electromagnetic induction, Faraday's Experiments, Electric generator, Light, Reflection of light by Spherical mirrors - image formation and Mirror Formula, Refraction - Laws of refraction, Refractive index, Refraction by spherical lenses, Image formation by lenses, Lens formula and magnification, Power of lens, Refraction of light through a prism, Dispersion-By a glass prism, Atmospheric refraction, Human eye - Defects and rectification, Science today - Hubble space telescope.