

FURTHER DETAILS REGARDING MAIN TOPICS

HSA (PHYSICAL SCIENCE) – KANNADA MEDIUM **(CATEGORY NO.228/2008 & 229/2008)**

PART I - PHYSICS

1. Measurement

Basic Units, Derived Units, International System of Units, Dimensional formula

2. Light

Electromagnetic theory, quantum theory, Dual nature, Photo electric effect, reflection refraction, interference, diffraction, composite light, dispersion of light, colours, pigments, lenses, mirrors, scattering, LASER, Hydrogen spectrum.

3. Motion

Displacement, Velocity, Acceleration, circular motion, projectile motion, momentum, inertia, Newton's laws of motion, Friction.

4. Energy

Potential Energy, Kinetic Energy, Work, power, Elastic collision, Conservation of momentum.

5. Gravitation

Gravitation of Earth, Free fall, Orbital velocity, escape velocity, geo-stationary satellite, centre of gravity, Kepler's laws.

6. Fluids

Pressure, Thrust, Pascal's law, capillarity, viscosity, surface tension, buoyancy, Archimedes's Principle, Bernoulli's Principle, cohesion, adhesion.

7. Heat

Specific heat capacity, latent heat, regelation, evaporation, boiling, thermal conductivity, thermometry, isothermal process, adiabatic process, heat engine, carnot cycle.

8. Wave motion

Simple harmonic motion, Resonance, forced vibration, wave, longitudinal wave, transverse wave, sound waves, echo, wave velocity, superposition of waves, Doppler effect, acoustics, noise and music.

9. Electricity and magnetism

Static electricity, Coulomb's law, Gauss's law, capacitor, Heat and chemical effects of Electricity, Joule's law, seebeck effect, Peltier effect, electrolysis, voltage, resistance, simple electric circuits.

10. Power Production

Bio- Savart law, Fleming's law, magnets, magnetic permeability, diamagnetic, paramagnetic and ferromagnetic substances, hysteresis, electromagnetic induction, a.c, d.c, generator, transformer, power transmission.

11. Nuclear Physics

Properties of Nucleus, Nuclear Force, Fission, Fusion, Nuclear reactor, Radio activity.

12. Electronics

Semiconductor, p-n junction diode, transistor, transistor characteristics.

PART II - CHEMISTRY

1. Basic concepts

Mole concept, gram atom, gram molecular mass, Gay-Lussac's law of combining volumes, S.T.P, molecular *formula*, stoichiometry.

2. Periodic Table

Modern Periodic law, Earlier attempts to classify elements, General trends shown by elements in a period and in a group, transition elements, electronic configuration.

3. Structure of Atom

Structure of atom as proposed by Thomson, Rutherford and Bohr, electron, proton, neutron, shell, sub shell, quantum number, auf-bau principle, Pauli's exclusion principle, Hund's rule.

4. Chemical Bond

Ionic bond, co-valent bond, metallic bond, co-ordinate bond, hydrogen bond, Fajan rules, atomic orbital, bond length, hybridisation, bond angle, VSEPR theory, lone pair, sigma bond, pi bond.

5. Chemical kinetics

Rate of chemical reaction and factors influencing the rate of reaction, reversible reaction, catalyst, equilibrium, le-chatelier principle, activated complex, threshold energy.

6. Solution

Solution, Colloid, Suspension, osmosis, vapour pressure, molarity, molality, colligative properties, absorption, adsorption, occlusion, Tyndall effect, Brownian motion.

7. Electrochemistry

Redox reactions, electrolysis and Faraday's laws, electrochemical cells, fuel cell, corrosion of metal, electrochemical series.

8. s-block elements

Properties of Hydrogen, isotopes of Hydrogen, water molecule, heavy water, alkali metals, alkaline earth metals.

9. p-block metals

Properties and compounds of Boron, Carbon, Nitrogen and Oxygen, halogens, noble gases.

10. Transition elements

Common properties of transition elements, Refining of metals like iron, copper, aluminium etc. , co-ordinate compounds.

11. Chemistry in Daily life

Medicines, Preservatives, soap, detergents, polymers, esters, Bio-molecules like carbohydrates, proteins, vitamins., environmental pollution and related factors like ozone depletion.

12. Organic chemistry

Hydrocarbons- alkanes, alkenes, alkynes. IUPAC naming, functional groups, displacement reactions and addition reactions

PART III - METHODOLOGY

1. Instruction and its aims

Objective based instruction, formative evaluation, summative evaluation, Instructional Objectives — Bloom's taxonomy, scientific attitude, scientific aptitude, scientific method, process skills of science, correlation, resource unit, lesson planning.

2. Theories associated with Learning and Instruction

Curriculum, Learning theories of Skinner, Pavlov, Piaget, Bruner, Gagne etc. Gestalt theory, Viewpoints like idealism, naturalism, pragmatism, realism etc.

3. Methods and materials of instruction

Lecture method, demonstration method, Laboratory method, Heuristic method, Project Method, Dalton Plan, Managing library and laboratory, Use of audiovisual aids and equipments, improvisation, programmed learning, science club.

4. Evaluation

Standardised test, achievement test, diagnostic test, blue-print, Different types of test items.

5. New Trends

Constructivism, Critical pedagogy, collaborative learning, social constructivism, Instruction using multimedia.

6. General Knowledge

A general understanding of bodies like NCERT, NCTE, UGC etc. Important Education Commissions, Famous educationists and their works, National events related with Education.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.