

MINERVA

Ghumarwin

Class 10+1 Entrance Exam

Syllabus (Session 2024-2025)

1. CHEMISTRY

- a) Chemical reactions:** Chemical equations, Balanced chemical equations, implications of a balanced chemical equation, types of chemical reactions: (combination, decomposition, displacement, double displacement, precipitation, endothermic and exothermic reactions, oxidation and reduction).
- b) Acids, bases and salts:** Their definitions in terms of furnishing of H^+ and OH^- ions, General properties, examples and uses, neutralization, concept of pH scale (Definition relating to logarithm not required), importance of pH in everyday life; preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.
- c) Metals and non-metals:** Properties of metals and non-metals, Reactivity series, Formation and properties of ionic compounds, Basic metallurgical processes, Corrosion and its prevention.
- d) Carbon and carbon compounds:** Covalent bonding in carbon compounds, Versatile nature of carbon, Homologous series, Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydrocarbons and unsaturated hydrocarbons, Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction), Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.

2. BIOLOGY

- a) Life processes:** Basic concept of nutrition, respiration, transport and excretion in plants and animals
- b) Control and co-ordination in animals and plants:** Tropic movements in plants, Introduction of plant hormones, Control and co-ordination in animals: Nervous system, Voluntary, involuntary and reflex action, Chemical co-ordination: animal hormones.
- c) Reproduction:** Reproduction in animals and plants (asexual and sexual) reproductive health - need and methods of family planning, Safe sex vs HIV/AIDS, Child bearing and women's health.
- d) Heredity and Evolution:** Heredity, Mendel's contribution- Laws for inheritance of traits, Sex determination, brief introduction: (topics excluded - evolution; evolution and classification and evolution should not be equated with progress).
- e) Our Environment:** Ecosystem, Environmental problems, Ozone depletion, waste production and their solutions, Biodegradable and non-biodegradable substances.

3. PHYSICS

a) Natural Phenomena

Reflection of light by curved surfaces, Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification. Refraction, Laws of refraction, refractive index.

Refraction of light by spherical lens; Images formed by spherical lenses, Lens formula (Derivation not required), Magnification, Power of a lens.

Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses.

Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life (excluding colour of the sun at sunrise and sunset).

b) Effects of Current

Electric current, potential difference and electric current, Ohm's law, Resistance, Resistivity, Factors on which the resistance of a conductor depends, Series combination of resistors, parallel combination of resistors and its applications in daily life, Heating effect of electric current and its applications in daily life, Electric power, Interrelation between P, V, I and R.

c) Magnetic effects of current : Magnetic field, field lines, field due to a current carrying conductor,

field due to current carrying coil or solenoid, Force on current carrying conductor, Fleming's Left Hand Rule, Direct current, Alternating current, frequency of AC, Advantage of AC over DC, Domestic electric circuits.

4. ENGLISH

Grammar: Tenses, Modals, Jumbled Words and Comprehension of passages.

5. MATHS

a) NUMBER SYSTEMS:- Real Numbers: Fundamental Theorems of Arithmetic. Proofs of irrationality of $\sqrt{2}, \sqrt{3}, \sqrt{5}$.

b) ALGEBRA:- Polynomials: Zeros of a polynomial, Relationship between zeros and coefficients of quadratic polynomials.

c) Pair of linear equations in two variables: Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency. Algebraic conditions for number of solutions, Solution of a pair of linear equations in two variables algebraically - by substitution, by elimination, Simple situational problems.

d) Quadratic equations: Standard form of a quadratic equation $ax^2 + bx + c = 0, (a \neq 0)$. Solutions of quadratic equations (only real roots) by factorization, and by using quadratic formula, Relationship between discriminant and nature of roots, Situational problems based on quadratic equations related to day to day activities to be incorporated.

e) Arithmetic progressions: Derivation of the nth term and sum of the first n terms of A.P. and their application in solving daily life problems.

f) Coordinate geometry: Concepts of coordinate geometry, graphs of linear equations, Distance formula, Section formula (internal division).

g) GEOMETRY

Triangles: Definitions, examples, counter examples of similar triangles. Question based upon similarity of triangles.

Circles: Questions based upon tangent to a circle at point of contact.

h) TRIGONOMETRY

Introduction to trigonometry: Trigonometric ratios of an acute angle of a right-angled triangle, Proof of their existence (well defined), Values of the trigonometric ratios of $30^\circ, 45^\circ$ and 60° , Relationships between the ratios.

Trigonometric Identities: Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$ (Only simple identities to be given)

Heights and distances: Angle of elevation, Angle of Depression. Simple problems on heights and distances.

i) MENSURATION

Areas related to circles: Area of sector and segment of a circle, Problems based on areas and perimeter/circumference of the above said plane figures (In calculating area of segment of a circle.

Surface areas and volume: Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones.

j) STATISTICS AND PROBABILITY

Statistics: Mean, median and mode of grouped data.

Probability: Classical definition of probability, Simple problems on finding the probability of an event.