Syllabus for Science Entrance Test

Chemistry


2. Elements, compounds and mixtures. Differences between elements, compounds and mixtures. Differences between metals and non-metals.


4. Types of oxides. Classify oxides as either acidic, basic, or amphoteric related to metallic/non-metallic character.

5. Preparation, separation and purification of salts by the use of a suitable solvent, filtration, crystallisation and distillation.


7. Uses of metals such as mild steel, stainless steel, aluminium, zinc and copper.


Mechanics

9. S.I. base units and derived units. Prefixes: micro (µ), milli (m), centi (c), deci (d), kilo (k), and mega (M).


12. Speed, velocity and acceleration. Motion for which the acceleration is constant. Speed-time graph. Acceleration of free fall.


15. Define pressure as force/area. Units of pressure; N m\(^{-2}\), Pa, bar. Pressure due to a liquid column \( p = h \rho g \). Barometer. Manometer.

Heat

16. Qualitative treatment of the thermal expansion of solids, liquids and gases. Everyday applications and consequences of thermal expansion (including the expansion of water).


Waves

21. Properties of waves. Wave motion in vibrating ropes and springs and in a ripple tank. Transverse and longitudinal waves. The wave equation \( c = f \lambda \). The main components of the electromagnetic spectrum.


Magnetism

Electricity

25. Insulators and conductors. Electric charge, current, electromotive force, potential difference, resistance, electrical energy and power. Ohm’s Law. IV characteristic graphs for metallic (ohmic) and non-ohmic conductors.

26. Use of ammeter and voltmeter. Simple circuit diagrams containing sources, switches, resistors (fixed and variable), ammeters, voltmeters. Simple circuits with resistors in series and parallel.


Electromagnetism

28. Qualitative treatment of the magnetic effects of current in straight and circular conductors and solenoids. The right-hand screw and grip rules.

29. Uses of electromagnets.


32. Simple form of alternating-current generators (alternators).

33. Basic iron-cored transformer as used for voltage transformation (including the equations \( V_p/V_s = (N_p/N_s) \) and \( V_p I_p = V_s I_s \) for an ideal transformer).

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