TECHNICAL ASSISTANT (Physics)

Skill Test Pattern and Syllabus (Indicative)

17.12.2025

The skill test consists of two parts 1) Practical knowledge test and 2) Laboratory test

The level of test is Under Graduate in Physics.

Practical Knowledge Test

The objective test will be for **60** marks and duration of the test will be for **01** hour.

The medium of language will be English only.

Laboratory Test

The lab test will be for **40** marks and duration of the test will be as per concerned department convenience.

The medium of language will be English only.

The indicative syllabus for practical knowledge test and laboratory test is given below.

The candidate is expected to perform and have working knowledge of the experiments related to following topics:

Error Analysis and Measurements

Units, Errors, Least count, use of vernier calliper, screw gauge, spherometer, travelling microscope.

Electrostatics

Electric flux –Electrostatic induction – capacitor and capacitance – Dielectric and electric polarization – parallel plate capacitor with and without dielectric medium – applications of capacitor – energy stored in a capacitor.

Current Electricity & Effects of Electric Current

Carbon resistors – Colour code for carbon resistors – Combination of resistors –series and parallel – Temperature dependence of resistance – Internal resistance of a cell – Potential difference and emf of a cell, Kirchhoff's law – illustration by simple circuits, Magnetic effect of electric current – Concept of magnetic field, Oersted's experiment – Biot-Savart law – Magnetic field due to an infinitely long current carrying straight wire and circular coil – Tangent galvanometer – Construction and working – Bar magnet as an equivalent solenoid – magnetic field lines.

Electromagnetic Induction and Alternating Current

Self induction – Mutual induction –Eddy current – Applications – Transformer – Long distance transmission. Alternating current – measurement of AC – AC circuit with resistance – AC circuit with inductor – AC circuit with capacitor – LCR series circuit – Resonance and Q – factor: power in AC circuits.

Electromagnetic Waves

Electromagnetic spectrum, Radio, Microwaves, Infra red, visible, ultra violet – X rays, gamma rays.

Atomic Physics

X-rays – production, properties, detection, absorption, diffraction of X-rays – Laue's experiment – Bragg's law, Bragg's X-ray spectrometer – X-ray spectra – continuous and characteristic X-ray spectrum – Mosley's law and atomic number, Photoelectric Effect- photoelectric cell, photovoltaic cell, Frank- Hertz Experiment.

Masers and Lasers – spontaneous and stimulated emission – normal population and population inversion – Ruby laser, He-Ne laser – properties and applications of laser light holography.

Nuclear Physics

Nuclear properties –Stability of nuclei–Bain bridge mass spectrometer. Radioactivity–alpha, beta and gamma radiations and their properties, α-decay and β- decay and Y-decay – Radioactive decay law – half life – mean life, Geiger Muller Counter, Scintillation Counter.

Semiconductor Devices and Their Applications

Formation of P-N Junction – Barrier potential and depletion layer –P-N Junction diode – Forward and reverse bias characteristics – diode as a rectifier – zener diode, Zener diode as a voltage regulator – LED. Junction transistors – characteristics, Hall Effect, Four probe experiment. Measuring Instruments – Digital Storage oscilloscope – Principle – Functional units – uses. Multi-meter – construction and uses.

General Properties of Matter

Young's modulus measurement: Malus' Law and depression at the centre of a bar.

Optics

Focal length of lenses, spectrometer, refractive index and dispersive power of prism, Newton rings experiment, diffraction grating, Michelson interferometer.

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