

SYLLABUS FOR TAMILNADU COMMON ENTRANCE TEST (TANCET)

PART – III

20. PHYSICS

Mechanics, Heat and Sound : Vectors – equilibrium - moment of a force – Newton’s laws of motion – gravitation – work – energy – power – Impulse and momentum – collisions – recoil. Thermometry of thermal expansion – calorimetry and specific heats – transfer for heat – thermal process of matter - Law and processes of thermodynamics - Applications. Travelling waves – oscillations – spring – simple pendulum – forced oscillations – resonance – sound waves –Acoustic Phenomena and its applications- Doppler effect.

Light and Properties of matter : The nature and propagation of light – reflection of refraction at plane surfaces – interference – diffraction – polarization. Elasticity – Stress-strain diagram -- hydrostatics – Pressure in a fluid – Pumps – Archimede’s principle – Surface tension – Contact angle – Capillarity - hydrodynamics - Bernoulli’s equation – Applications and viscosity – Poiseuille’s law – Stokes law – Reynolds number.

Electricity and Magnetism : Coloumb’s law – Gauss’s law – Applications - electrostatic potential – capacitors – dielectrics - current – resistance – emf – Kirchoff’s law – thermo electric effect – applications. Magnetism - magnetic effects of current – motion of charge particles in magnetic field – cyclotron – magnetic forces on current carrying conductor – Hall effect – electromagnetic induction – Faraday’s law – Lenz’s law – eddy current – Inductance – mutual and self inductance – magnetic properties of matters – diamagnetism – paramagnetism – ferromagnetism - domains– Hysteresis - alternating current – circuits containing resistance, inductance or capacitance – transformer.

Modern physics : Emission and absorption of light – thermionic emission – photoelectric effect – atomic spectra - atom models – molecular spectra – dual nature of matter and radiation – nuclear structure – properties – natural radioactivity – nuclear stability - nuclear reactions – fission – fusion – fundamental particles – high energy physics.

Solid State Electronics : Structure and bonding in solids - properties of solids – semiconductors – intrinsic – extrinsic – PN junction – diode characteristics – Zenar diode – LED, laser diode – Photodiode – Transistor – action and characteristics – amplifier – oscillator – basic logic gates.

Electron theory of solids: Classical free electron theory – density of states- electron in a periodic potential – origin of energy band gap – electrical conductivity – thermal conductivity – Widemann-Franz law

Dielectric and magnetic materials: Different types of polarization – Internal field – Clausius- Mosotti equation- dielectric breakdown- applications of dielectric materials – Different types of magnetic materials – domain theory of ferromagnetism – hysteresis - hard and soft magnetic materials- applications of magnetic materials.

Superconducting materials: General properties of superconducting materials – Meissner effect – types of superconductors – Hi T_c superconductors- applications

Nanomaterials: Preparation – properties – applications – Carbon nanotubes.