

SYLLABUS FOR TAMILNADU COMMON ENTRANCE TEST (TANCET)

PART – III

11. BIO MEDICAL ENGINEERING

Physiology: Cell, cell potentials, sodium potassium pump, joints, respiratory mechanism conducting system of heart, volume and pressure changes, regulation of heart rate, structure of neuron conduction of action potential in neuron, brain lobes.

Biochemistry: Carbohydrates, structural importance, metabolic pathways and metabolic disorders, lipid chemistry, its metabolic pathways and disorders.

Circuit analysis: DC circuit analysis, Thevenin's and Norton's equivalent circuits, sinusoidal steady state analysis, Transient and resonance in RLC circuits.

Electron devices and circuits: Diodes, Bipolar junction transistor, FET, MOSFET, UJT, Thyristor, Feedback amplifier, oscillators, Differential amplifier, common mode and difference mode analysis.

Digital Electronics: Logic gates, combinational circuits, sequential circuits.

Linear Integrated Circuits: Operational amplifiers and its applications, voltage regulators, A/D and D/A converters.

Microprocessor and Applications: Microprocessors – 8085 and 8086 architectures and interfaces, microcontrollers and applications.

Signals and Systems: Continuous time signals and systems, Fourier transform, Laplace transform, Discrete time signals and systems, DTFT, DFT, Z transforms.

Digital signal processing: IIR and FIR filters, realisation and implementation.

Control systems: Transfer function, Time and frequency response analysis, stability analysis.

Communication theory: AM, FM, PM, sampling and quantisation, TDM, FDM, Entropy, Huffman coding, FDMA, TDMA.

Bio Medical Instrumentation: Strain gauge, applications, capacitive transducer, RTD, Scintillation counter, Photo multiplier tube, phototransistor, piezoelectric transducer, thermal recorder, indirect measurement of blood pressure, pH electrode, GSR, spirometer, Electrodes, Half cell potential, offset potential, types of electrodes and their equivalent circuits, artifacts during biopotential recording, characteristics of bio amplifier. ECG and EEG, lead system.

Bio Medical Equipment : Blood cell counter, Holter monitor, pacemaker and types, Need for defibrillator, types of defibrillator, biofeedback, Waveforms in stimulators, need for telemetry, modulation schemes used in telemetry, parameters to be monitored in heart lung machine and hemodialyser units, tissue response to different types of diathermy, physiological effects of electricity.

Bio Mechanics: Elasticity, Viscoelasticity, Flow properties of blood, mechanical properties of bones, types of joints, lubrication of joints.

Medical Imaging Systems: Ionising radiation and non ionising radiation, effects, cavitation effect, types of radioactive decay, interaction with matter, attenuation, annihilation, Compton scattering, Production of X- Ray, radiation units: Roentgen, Gray Sievert, CT generations, MR signal generation, T1 and T2 relaxation processes, Doppler shift, ultrasound Echo generation, PACS.