

**DETAILED SYLLABUS FOR THE POST OF E.E.G TECHNICIAN GRADE II
(MEDICAL EDUCATION)**

(Cat.No.410/2022)

(Total Marks - 100)

Module 1 : Anatomy and Physiology - 10 Marks

- i. Skeletal System: Classification and types of bones, names and parts of bones, blood supply, ossification of bone, definition, types of joints and classification, major joints of human body, movements of joints
- ii. Muscular system: Components of muscle, types of muscles based on function, structure, nervous control, and activity, innervation, reflexes, names of the major limb, truncal and facial muscles and their principal actions on joints, muscles of respiration, mastication, eye, larynx, pharynx
- iii. Nervous system: General organization of nervous system. Structure of a neuron and Synapse, Name and functions of glial cells, General description of autonomic nervous system, Classification of peripheral and central nervous system. names of cranial and spinal nerves, dermatomal distribution of body, cutaneous innervation. Central nervous system – General organization of central nervous system, General organization of parts of brain, layers and functions of meninges, Parts of spinal cord, enlargements, coverings, blood supply. Lumbar puncture – site, procedure and complications, Parts of brainstem: External features, blood supply, Cerebellum: External features and major nuclei of cerebellum, blood supply, function. Cerebrum: lobes and its functions , Sulci and Gyri, blood supply, External features of medial surface, inferior surface and Supero-lateral surface of cerebrum. Thalamus and Hypothalamus – Location, Parts and function, Basal nuclei – parts, function and its applied aspect, White fibres: classification and Names of the white fibres, Parts of corpus callosum, Parts of internal capsule and its function. Ventricles of brain and circulation of CSF. Peripheral nervous system – General organization, origin and classification of peripheral nerves, roots, plexus and individual peripheral nerves – course and distribution, peripheral receptors, neuromuscular junction and muscles.
- iv. Muscle: Structure in brief, mechanism of muscle contraction, isotonic and isometric contractions, energy sources of muscle contractions, motor unit.

- v. Nerve and Central Nervous System: Structure of a neuron, nerve impulse, myelinated and non-myelinated nerve. Brief account of resting membrane potential, action potential and conduction of nerve impulse. Neuro-muscular transmission. Various parts of central nervous system, C.S.F., Functions of muscle spindle and motor tracts including reflexes, cutaneous receptors, joint receptors, sensory pathways. Ascending reticular formation, EEG, functions of cerebellum, basal ganglia, thalamus & hypothalamus, vestibular apparatus and functions. Autonomic Nervous System: Divisions and functions.

Module 2 : Basic Physics and computer applications – 10 Marks

1. Mechanics and laws of motion: Laws of motion, Oscillations and simple harmonic motion, Lissajous figures, Damped, forced harmonic oscillator, coupled oscillators, motion of charged particles in electrical and magnetic fields
2. Electricity, magnetism and electromagnetic theory: Electrostatics, electric field, electric potential, electric currents, magnetic fields
3. Kinetic theory of matter
4. Waves, acoustics, and optics
5. Solid state physics, solid state electronics
6. Concepts of computers, Hardware and Software, Trends and Technology, Application of Computers

Module 3 : Biophysics and Electronics - 20 Marks

1. Resistors, Capacitors, transistor
2. Filters, Analog – Digital Converter, Sampling Rate, Amplifiers
3. Simple Circuits
4. Impedance
5. Electrical Safety
6. Transducers
7. Basics of Electronics
8. Block Diagrams of EEG Machine, ENMG Machine, EP systems
9. Storage Devices
10. Creation of files and folders and Storing data

11. Simple Circuits
12. Maintenance of systems and accessories
13. Block diagrams of EEG, ENMG systems
14. Electrode maintenance, Electrode application
15. Basic electricity and electronics
16. Role of technologists

Module 4 : Basics of Electroencephalography – 20 Marks

1. Physiological basis of EEG
2. Principles, methodology, interpretation and clinical applications of the procedures listed.
 - i. Electroencephalography (EEG)
 - ii. Terminology, waveforms, frequencies and artifacts
 - iii. Polarity and montages
 - iv. Technical specification of the international 10-20 system of EEG . Minimal technical requirements for EEG, EP of American EEG society
 - v. Historical aspects of EEG and EP recording- conventions and procedures
 - vi. Normal EEG and benign variants
 - vii. Activation procedures and specialized recording techniques
 - viii. Normal EEG maturation; EEG resting, sleep, activation procedures.
 - ix. Artifacts and rectification.

Module 5 : Basics of Nerve conduction studies and electromyography- 20 Marks

- 1) Membrane action potential and signal transmission: nerve action potential, motor units, nerve signal transmission
- 2) Excitation-contraction coupling, Physiology of different types of muscles
- 3) Physiological basis of EMG and NCV Principles, methodology, interpretation and clinical applications of the procedures listed.
- 4) Prerequisites of nerve conduction study
- 5) Normal nerve conduction parameters
- 6) F wave response and H reflex

- 7) Needle EMG study
- 8) Normal EMG patterns
- 9) Repetitive nerve stimulation
- 10) Sympathetic skin response
- 11) Blink Reflex
- 12) Sterilization of ENMG electrodes and care of Electrodes
- 13) Safety precautions in ENMG lab

Module 6 : dvanced electroencephalography and advanced electromyography - 20 Marks

1. Nerve Conductions in pathological states: Demyelination, Axonopathy, Entrapment neuropathy, Plexopathy, Radiculopathy
2. Long loop reflexes
3. Electromyography: Qualitative EMG, Quantitative EMG, EMG in myopathy and neuropathy, Single fiber EMG, Macro EMG, Turns amplitude ratio
4. Evoked Potentials: Visual Evoked potential (VEP), Brainstem Auditory Evoked Potential(BAEP), Somatosensory evoked potential (SSEP), Motor Evoked Potential (MEP)
5. Event related potentials
6. Electroconvulsive therapy
7. Surface recording of EMG in movement disorder
8. EMG recordings in intensive care units
9. Pediatric EEG and EEG maturation
10. EEG patterns in generalized and focal seizures, epilepsy syndromes, ictal rhythms
11. EEG in metabolic disease of cerebrum
12. EEG changes in CNS infections
13. EEG in head trauma, strokes, tumors

14. Video EEG: seizure recording and response checking
15. Sphenoid EEG
16. Invasive EEG monitoring
17. Spike detection and source localization
18. EEG recordings in critical care unit: Emergent EEG recording procedures and techniques, Status epilepticus, Generalized and lateralized Periodic Discharges
19. Brain death recording
20. Magnetoencephalography

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper