

**RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**  
**SYLLABUS FOR SCREENING TEST FOR THE POST OF**  
**ASSISTANT PROFESSOR (Super Speciality)**  
**NEURO SURGERY**  
**MEDICAL EDUCATION DEPARTMENT**

**Unit I - Historical aspects of Neurosurgery**

History of Neurosurgery, History of Micro-neurosurgery.

**Unit II - History and Examination**

Higher Mental Functions Assessment, Cranial Nerve Examination, Neuro-ophthalmology, Examination of the Motor and Sensory Systems and Reflexes.

**Unit III - Ancillary Diagnostic Tests**

Cerebrospinal Fluid : Techniques of Access and Analytical Interpretation, Neuro-ophthalmology, Neuro-otology, Monitoring of nervous systems, Intracranial Pressure Monitoring, Electroencephalography, Transcranial Doppler Ultrasonography, Positron Emission Tomography, Computed Tomography and Magnetic Resonance Imaging, Cerebral and Spinal Angiography.

**Unit IV - General and Perioperative Care, Neuro Anaesthesia**

Initial Evaluation and Treatment of the comatose Patient, Blood-Brain Barrier; Cerebral Edema, Increased Intracranial Pressure, Brain Herniation and their Control, Preoperative Evaluation of a Neurosurgical Patient, Intensive Care.

**Unit V - Neurosurgical and Related Techniques**

Principles of Neurosurgical Operative Techniques, Instrumentation for Microneurosurgery, Endoscopic Neurosurgery, Use of Magnetic Resonance Imaging for Intraoperative Localization, Self-Retaining Retractors and Handrests, Ultrasonic Dissection in Neurosurgery, Application of the Laser to Neurosurgery, Use of Fibrin Glue in Neurosurgery, Endovascular Therapy of Vascular Lesions of the Central Nervous System, Complications of Interventional Neuroradiology : Neurosurgical Management.

**Unit VI- Cranial and Spinal Trauma**

Mechanisms of Primary Head Injury, Pathophysiology of Traumatic Brain Injury, Pathology of Closed Head Injury, Neurological Evaluation of a Patient with Head Trauma : Coma Scales, Radiologic Evaluation of Head Trauma, Resuscitation of the Multiply Injured Patient, Intensive Management of Traumatic Brain Injury, Pediatric Head Injury, Outcome Prediction in Severe Head Injury, Minor Head Injury Management and Outcome, Skull Fractures, Growing Skull Fractures of Childhood, Cerebrospinal Fluid Fistula and Pneumocephalus, Cranial Defects and Cranioplasty,

Penetrating Wounds of the Head, Sequelae of Head Injury, Pathophysiology and Pathology of Spinal Cord Injury, Management of Acute Spinal Cord Injury, Atlanto-Occipital Dislocation, Cervical Spine Injuries : Diagnosis and Management, Management of Upper Cervical Spinal Instability, Management of Lower Cervical Spinal Instability, Occipitocervical and High Cervical Fusion, Anterior Stabilization of the Cervical Spine Using Locking Plate Systems, Injuries to the Thoracic and Lumbar Spine, Management of Thoracic and Lumbar Spinal Instability, Lumbosacral Stabilization Using Screw Fixation Techniques, Anterior Fixation Devices for the Thoracic and Lumbar Spine.

### **Unit VII - Infections**

Cranial and intracranial bacterial infections, viral infections of the CNS: Neurosurgical considerations, parasitic diseases of the CNS, granulomatous diseases of the CNS, infections of the spine and spinal cord, Prophylactic Antibiotics.

### **Unit VIII - Neuro-Oncology**

Oncogenes and Nervous System Tumors, Genetic Factors in Brain Tumors, Neurofibromatosis and Other Phakomatoses, Biochemistry of Brain Tumors, Immunology of Brain Tumors, Tumor Markers, Primary Brain Tumors : Aspects of Imaging and Functional Localization, Gliomas, Meningiomas, Metastatic Brain Tumors, Epidermoid and Dermoid Tumors, Tumors of the Pineal Gland Region, Cerebellopontine Angle Tumors, Posterior Fossa Tumors, Sellar and Parasellar Tumors, Lateral and Third Ventricular Tumors : Microsurgical Anatomy of the Lateral Ventricles, Operative Approaches to the Third Ventricle, Masses of the Lateral and Third Ventricles – Pathology, Imaging and Treatment, Tumors of the Orbit, Tumors of the Scalp, Skull Base and Upper Cervical Spine, Tumors of the Skull, Chordomas and Chondrosarcomas of the Cranial Base, Trigeminal Neurinomas, Other Cranial Nerve Schwannomas, Paragangliomas of the Carotid Body and Temporal Bone, Surgical Approaches to Tumors of the Skull Base, Transoral Approaches to the Clivus and Upper Cervical Spine, Anterolateral Cervical approach to the Craniovertebral Junction, Surgical Anatomy of the Cavernous Sinus, Surgical Treatment of Tumors Involving the Cavernous Sinus, Approaches to Petroclival Tumors, Primitive Neuroectodermal Tumors, Primary Central Nervous System Lymphomas, Intracranial Sarcomas, Choroid Plexus Papillomas.

### **Unit IX- Adjunctive Therapy of Central Nervous System Tumors**

Principles of Radiotherapy of Central Nervous System Tumors, Conventional Radiotherapy of Specific Central Nervous System Tumors, Charged-Particle Irradiation of Intracranial Lesions, Radiosurgery for Tumors, Interstitial Brachytherapy of Primary Brain Tumors, Immunotherapy of Human Gliomas, Chemotherapy of Primary Brain Tumors, Blood Brain Barrier, Modification in the Delivery of Antitumor, Hyperthermia in the Treatment of Intracranial Tumors.

## **Unit X - Benign Spine Lesions**

Biomechanics of the spine, extradural spinal cord and nerve root compressions from benign lesions of the cervical area and their management by the posterior approach, treatment of disc and ligamentous diseases of the cervical spine by the anterior approach spondyloarthropathies, including ankylosing spondylitis, concepts and biomechanics of instrumentation of the spine, posterior instrumentation of the cervical spine, benign extradural lesions of the dorsal spine, ossification of the posterior longitudinal ligament and other enthesopathies, metabolic and other nondegenerative causes of low back pain, extradural cauda equine-nerve root compression from benign lesions of the lumbar spine, diseases of the intervertebral disc in children, intradiscal treatment of lumbar disc disease, lumbar spinal stenosis, spondylolysis and spondylolisthesis, evaluation and management of the failed syndrome, Morphology and metabolism of fusion of the lumbar spine, indications and techniques of lumbar spine fusion. Scoliosis, kyphosis and lordosis, lumbosacral arachnoiditis.

## **Unit XI - Pain**

Physiological anatomy of pain, medical management of chronic pain, management of pain by anesthetic techniques, diagnosis and non operative management of trigeminal neuralgia, treatment of trigeminal and other facial neuralgias by percutaneous techniques, MVD of the trigeminal nerve for Tic Douloureux, alternative treatments for trigeminal neuralgia and other cranial neuralgia, neurosurgical management of intractable pain, dorsal rhizotomy and dorsal root ganglionectomy dorsal root entry zone lesions for pain, cordotomy for pain, mesencephalotomy and other brain stem procedures for pain, sympathectomy for pain, spinal cord and peripheral nerve stimulation for chronic, intractable pain, deep brain stimulation for the control of intractable pain, peri aqueductal and periventricular stimulation for pain, intractable ablative procedure for pain, intrathecal drug infusion for pain.

## **Unit XII - Vascular Diseases of the Nervous System**

Cerebral Blood Flow, Measurement of Cerebral Blood Flow, Pathophysiologic Consequences of Brain Ischemia, Pathology of Ischemic Cerebrovascular Disease, Clinical Syndromes of Brain Ischemia, Non-invasive Diagnosis of Carotid Occlusive Disease, Moyamoya Disease, Medical Management of Ischemic Cerebral Vascular Disease. Surgery for Acute Brain Infarction with Mass Effect, Extracranial to Intracranial Bypass Grafting, Aneurysm and Subarachnoid Hemorrhage, Vascular Malformations and Fistulas.

## **Unit XIII- Developmental and Acquired anomalies**

Genetics of Developmental Defects, Spinal Dysraphism, Tethered Cord Syndrome, Management of Spinal Cord Lipomas and Lipomyelomeningoceles, Diastatomyelia, Lateral and Anterior Spinal Meningoceles, Encephaloceles, Craniovertebral Junction Anomalies, Chiari Malformations, Hydromyelia,

Syringomyelia, Hydrocephalus : Pathophysiology and Clinical Features, Hydrocephalus : Treatment, Shunt Systems, Shunt Complications, Double Compartment Hydrocephalus, Dandy-Walker Malformation, Craniosynostosis.

#### **Unit XIV- Stereotactic and Functional Neurosurgery**

Stereotactic Surgery : Principles and Techniques, Image-Guided Stereotactic Surgery, Frameless Stereotactic, Interactive Image-Guided Neurosurgery, Radiofrequency Lesion-Making in the Nervous System, Surgical Therapy of Movement Disorders.

#### **Unit XV - Epilepsy & Antiepileptic drug**

Basic Mechanisms of Epilepsy: Their Relationship to Medical and Surgical Therapy, Surgical Treatment of Epilepsy.

#### **Unit XVI- Neuro Rehabilitation**

#### **Unit XVII- Minimal invasive spine surgery**

Brain Death, Transplantation of Cadaver Tissues and Organs, Robotics in ms.

#### **Unit XVIII - Peripheral nerve surgery & Brachial Plexues surgery**

#### **Unit XIX - Neuro Anatomy**

#### **Unit XX - Miscellaneous & Recent Advance in Neurosurgery**

Artificial intelligence in Neurosurgery, Robotics in Neurosurgery, Diffuse Tensor imaging, Brain death, Transplant of cadaver tissue & organ, Nanotechnology in Neurosurgery, Role of stem cell in neurosurgery.

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#### **Pattern of Question Papers:**

- 1. Objective Type Paper**
- 2. Maximum Marks: 180**
- 3. Number of Questions: 180**
- 4. Duration of Paper : Three Hours**
- 5. All Questions carry equal marks**
- 6. Medium of Screening Test: English**
- 7. There will be Negative Marking**  
(1/3 part of the mark(s) of each question will be deducted for each wrong answer)