

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS OF COMPETITIVE EXAMINATION FOR THE POST OF ASSISTANT PROFESSOR (Super Speciality) NEONATOLOGY MEDICAL EDUCATION DEPARTMENT

Unit-I - BASIC SCIENCES:

- Basic genetics
- Fetal and neonatal immunology.
- Applied anatomy and embryology.
- Feto-placental physiology.
- Neonatal adaptation.
- Development and maturation of lungs, respiratory control, lung functions, ventilation, gas exchange, ventilation perfusion.
- Physiology and development of cardiovascular system, developmental defects, physiology and hemodynamics of congenital heart disease.
- Fetal and intrauterine growth.
- Development and maturation of nervous system, cerebral blood flow, blood brain barrier.
- Development and maturation of skin.
- Fetal and neonatal endocrine physiology.
- Developmental pharmacology.
- Developmental hematology, bilirubin metabolism.
- Renal physiology.
- Physiology of gastrointestinal tract, digestion, absorption.
- Metabolic pathways pertaining to glucose, calcium and magnesium.
- Biochemical basis of inborn errors of metabolism.

Unit-II - RESEARCH & TEACHING-LEARNING METHODOLOGY:

- Research methodology including research project writing & biostatistics.
- Principles of Medical Education (objectives, curriculum, assessment, competency based medical education and use of media simulation).
- Computer, information technology, internet, telemedicine consultation.
- Preparing learning resource material.
- How to do distant mentoring (SNCUs)?
- Quality Improvement.
- Data Management.

Unit-III – PERINATOLOGY:

- Perinatal and neonatal mortality, morbidity & its epidemiology.
- High-risk pregnancy: detection, monitoring and management including PIH, diabetes, GDM, thyroid disorder.
- Fetal monitoring, clinical, electronic, invasive, and non-invasive.
- Intrapartum monitoring and procedures.
- Assessment of fetal risk, and decision for termination of pregnancy.
- Diagnosis and management of fetal diseases.
- Medical diseases affecting pregnancy and fetus, psychological and ethical considerations.

- Brain death.
- Fetal interventions including fetal surgery.
- Intrauterine growth restricted neonates (Understanding of nutrient transfer across placenta, uteroplacental insufficiency & special problems in IUGR infants including long-term neuro developmental issues).
- Cord stem cell banking.

Unit-IV - NEONATAL RESUSCITATION:

- Establishing Newborn corner.
- Neonatal resuscitation Program.
- Issues around period of viability.
- Stillbirth – causes and system analysis.

Unit-V - RESPIRATORY SYSTEM :

- Neonatal airways: physiology, pathology, management.
- Pulmonary diseases: Hyaline membrane disease, transient tachypnea, aspiration pneumonia, pulmonary air leak syndromes, pulmonary hemorrhage, developmental defects, broncho-pulmonary dysplasia, apnea, MAS, pleural effusions.
- Oxygen therapy and its monitoring.
- Pulmonary infections.
- Miscellaneous pulmonary disorders.
- Neonatal ventilation (invasive and non-invasive).
- Blood gas and Acid-base disorders.
- Lung ultrasound for diagnosing common disorder.
- Interpreting Chest X-rays and CT chest.
- ECMO.

Unit-VI - CARDIOVASCULAR SYSTEM:

- Fetal circulation, transition from fetal to neonatal physiology.
- Examination and interpretation of cardio vascular signs and symptoms.
- Special tests and procedures (Functional Echocardiography, angiography).
- Diagnosis and management of congenital heart diseases.
- Rhythm disturbances.
- Hypertension in neonates.
- Shock: patho-physiology, monitoring, management.
- Pulmonary Hypertension- primary and secondary: Etiology, pathophysiology and management.
- Patent ductus arteriosus.

Unit-VII - GASTROINTESTINAL SYSTEM:

- Disorders of liver and biliary system.
- Bilirubin metabolism.
- Neonatal jaundice: diagnosis, monitoring, management, phototherapy, exchange transfusion.
- Prolonged Hyperbilirubinemia.
- Conjugated Hyperbilirubinemia.
- Acute bilirubin encephalopathy & Kernicterus.
- Congenital malformations.
- Feeding intolerance.
- Necrotizing enterocolitis.
- Gastro-esophageal reflux disease.

Unit-VIII–NUTRITION:

- Fetal nutrition.
- Physiology of lactation.
- Breastfeeding.
- Lactation management, breast milk banking, maternal medications and nursing.
- Enteral nutrition.
- Parenteral nutrition.
- Vitamins and micronutrients in new born health.

Unit-IX - RENAL SYSTEM:

- Developmental disorders.
- Renal functions.
- Fluid and electrolyte management.
- Insensible water loss.
- Electrolyte imbalance of sodium, potassium, calcium and magnesium including hypernatremic dehydration.
- Acute renal failure (diagnosis, monitoring, management).
- Chronic kidney disease.
- Peritoneal dialysis.

Unit-X - ENDOCRINE AND METABOLISM:

- Glucose metabolism, hypoglycemia, hyperglycemia.
- Calcium disorders.
- Magnesium disorders.
- Thyroid disorders.
- Adrenal disorders.
- Hypothalamic and pituitary disorders.
- Disorders of sex development.
- Inborn errors of metabolism.

Unit-XI - HEMATOLOGY:

- Physiology.
- Anemia.
- Polycythemia.
- Bleeding and coagulation disorders.
- Rh haemolytic disease.
- Use of various blood products.
- Neonatal thrombosis.

Unit-XII – NEUROLOGY:

- Clinical neurological assessment.
- Hypoxic ischemic encephalopathy.
- Neonatal seizures.
- White matter injury in preterm.
- Intracranial hemorrhage.
- Brain imaging – ultra sonography, CT scan & MRI Brain.
- Neuro-muscular disorders.
- Floppy neonate.

- Degenerative diseases.
- CNS malformation.

Unit-XIII-NEONATAL SCREENING, BIRTH DEFECTS & TRAUMA:

- Diagnosis of neonatal surgical conditions including orthopaedic problems.
- Osteopenia of prematurity.
- Surgical emergencies.
- Pre and post-operative care.
- Neonatal anesthesia including intra-operative temperature, fluid/electrolyte maintenance.
- Metabolic changes during anesthesia and surgery.
- Neonatal screening, birth defects & trauma.
- All congenital malformations including anatomical and functional defects.
- Screening for intra-ventricular hemorrhage and white matter injury.
- Screening.
- Retinopathy of Prematurity Screening and broad management plan.
- Hearing screening.
- Metabolic screening.
- Pulse oximetry screening.
- Birth trauma.

Unit-XIV-NEONATAL THERMO REGULATION & DERMATOLOGY:

- Thermo regulation in neonates.
- Physiology of thermoregulation.
- Hypothermia and hyperthermia.
- Development and maturation of fetal to neonatal skin.
- Common developmental peculiarities.
- Common pathological lesions of skin.
- Common skin injuries from nasal interface, IV Cannula/central lines/skin adhesives, probes-temperature or saturation probes, bed sore.

Unit-XV- NEONATAL INFECTIONS:

- Neonatal Immunology.
- Intra-uterine infections including TORCH, congenital tuberculosis, perinatal HIV.
- Perinatal Infections.
- Sepsis- Early onset/late onset including community acquired and Health-care associated Infections.
- Investigating and managing an outbreak of infection in NICU/SNCU.
- Housekeeping protocol including equipment cleaning/decontamination/disinfection.
- Biomedical waste management.
- Prevention of Healthcare Associated Infections.
- Management of needle-stick injury.
- Systemic infections including meningitis, ventriculitis, brain abscess, arthritis, osteomyelitis.

Unit-XVI- ESTABLISHING NEONATAL SERVICES:

- How to design neonatal unit?
- Equipment life cycle (Procurement, maintenance, trouble shooting and dumping).
- System understanding for procuring articles.
- Establishment of level II and level III neonatal unit.
- Establishing CLMC (Comprehensive lactational management center).
- Establishing Follow-up services for high risk neonates including NICU graduates.
- Establishing DEIC (Development early intervention center) and follow-up services.
- Mentoring including distant mentoring of regional neonatal units.

Unit-XVII- SOCIAL/COMMUNITY NEONATOLOGY:

- Maternal & Neonatal Program/schemes – global, national, regional, state and local (RBSK, JSSK, Ayushman, Bhamashah, Lakshya etc.)
- Home Based New born care.
- Facility based New born care.
- Vital statistics, health system.
- Causes of neonatal, perinatal death.
- Neonatal care priorities.
- Care at secondary level of care.
- Care at primary health centre.
- Role of different health functionaries.
- National Neonatology Forum.
- Collaboration with other Neonatal units/NICU.
- Understanding of Neonatal Organisation in India and World.

Unit-XVIII- MISCELLANEOUS:

- Examination of a New born.
- Care of a well New born.
- Multiple births.
- Pain and stress management of the neonate.
- Office practice in Neonatology.
- Organ donation and harvesting after neonatal death.
- Bereavement.
- Counselling
- Medico-legal issues.
- Surrogacy.
- Adoption.
- Effect of maternal drugs on fetus and lactation.
- Ethics in perinatology/neonatology.
- Principles of Communication with parents, families and communities.
- Eye and ENT problems.
- Neonatal Transport.
- Neonatal procedures.
- Immunization.

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Pattern of Question Papers:

- 1. Objective Type Paper**
- 2. Maximum Marks: 150**
- 3. Number of Questions: 150**
- 4. Duration of Paper: 2.30 Hours**
- 5. All Questions carry equal marks**
- 6. There will be Negative Marking**

(For every wrong answer one-third of the marks prescribed for that Particular question shall be deducted.)

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