

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

**Unit-I**

**General Basics and Clinical Considerations**

**1. The History and Physical Examination**

**2. Basic Genetics and Epigenetics of Childhood Lung Disease-**

Types of Genetic Variations, Technologies to Identify Genetic Variations, Interpretation of Genetic Variations, When to Consider Clinical Genetic Testing, Epigenetics, Terminology and Technology, “Multi-Omics” Approach to Refine Genotype- Phenotype Associations.

**3. Environmental Contributions to Respiratory Disease in Children-**

Vulnerability of Children to Adverse Environmental Exposures, Environmental Contributions to Acute Respiratory illness and Pneumonia, Environmental Contributions to Asthma.

**4. The Surfactant System-**

Surfactant Composition and Metabolism, Surfactant Metabolism and Secretion, Alveolar Life Cycle of Surfactant, Surfactant Function, Functions of Surfactant, Surfactant Deficiency, Treatment of Surfactant Deficiency.

**5. The Structural and Physiologic Basis of Respiratory Disease-**

Normal Lung Anatomy and Cell Function, Alveolar Region, Pulmonary Vascular System, Lymphatic System, Innervation of the Lung, Interstitium, Growth and Development of the Lung, The Lung at Birth, Postnatal Lung Growth, Ventilation and Mechanics of Breathing, Elastic Recoil of the Lung, Compliance of the Lung, Elastic Properties of the Chest Wall, Lung Volumes, Regional Lung Volumes, Dynamic (Flow-Resistive) Properties of the Lung, Distribution of Ventilation, Pulmonary Circulation, Pulmonary Vascular Pressures, Pulmonary Vascular Resistance, Distribution of Blood Flow, Methods of Evaluating the Pulmonary Circulation, Muscles of Respiration, Gas Exchange, Alveolar ventilation, Dead Space, Diffusion, Shunt and Ventilation- Perfusion Relationships, Systemic Gas Transport, Oxygen Therapy, Carbon Dioxide transport and Acid- Base Balance, Tissue Respiration, Regulation of Respiration, Sensory Feedback System, Metabolic Functions of the Lung.

**6. Biology and Assessment of Airway Inflammation-**

Allergic Inflammation, Acute Inflammation, Chronic Inflammation, Inflammatory Mediators, Neural Mechanisms, transcription Factors, Anti-inflammatory Mechanisms, Direct Measurements of Airway Inflammation, Therapeutic Implications.

**7. Lung Defenses-**

Intrinsic Lung Defenses, Innate Lung Defenses, Adaptive Lung Defenses, Role of Programmed Cell Death and “Clearing the Garbage” in Lung Homeostasis.

## **Unit-II**

### **Investigative and Therapeutic Aspects of Pulmonary Diseases-**

- 1. Bronchoscopy and Bronchoalveolar Lavage in Pediatric Patients-**  
Instrumentation, Techniques for Bronchoscopy, Anesthesia for Bronchoscopy, Indications for Diagnostic Bronchoscopy, Contraindications to Bronchoscopy, Bronchoalveolar Lavage, Therapeutic Bronchoscopy, Complications of Bronchoscopy.
- 2. Diagnostic Imaging of the Respiratory System-**  
Plain Radiography, Fluoroscopic Techniques, Computed Tomography, High-Resolution Computed Tomography, Magnetic Resonance Imaging, Endobronchial Ultrasonography, Ultrasonography, Radionuclide Imaging.
- 3. Pulmonary Function Tests in Infants and Children-**  
Measurement of Lung Volumes and Capacities, Measurement of Diffusing Capacity of Carbon Monoxide, Measurement of Resistance and Compliance.
- 4. Exercise and Lung Function in Child Health and Disease.**
- 5. Drug Administration by Inhalation in Children-** Advantages and Disadvantages of Aerosols for Drug Delivery, Therapeutic Aerosol, Principles of Aerosol Delivery, Assessment Techniques, Aerosol devices, dosage considerations.
- 6. Physical Therapies in Pediatric Respiratory Disease-**  
General Principles of Physiotherapy, Role of Physiotherapy in Pediatric Respiratory Disease, Respiratory Physiotherapy in Specific Conditions, Conditions Not Generally Amenable to Physiotherapy

## **Unit-III**

### **Pulmonary Infections in Pediatrics-**

- 1. Microbiological Diagnosis of Respiratory Illness-**  
Respiratory pathogens and syndromes, Use of the Clinical Microbiology Laboratory.
- 2. Acute Infections that Produce Upper Airway Obstruction-**  
Viral Laryngotracheobronchitis, Diagnosis and Differential diagnosis, Epiglottitis, Bacterial Tracheitis, Diphtheria, Retropharyngeal abscess, Peritonsillar abscess (Quinsy), Infectious Mononucleosis.
- 3. Bronchiolitis-**  
Epidemiology, Etiology, Pathology/Pathogenesis, Clinical Features, Diagnosis and Differential Diagnosis, Management and Treatment, Prevention, Prognosis.
- 4. Pneumonia in Children-**  
Epidemiology and Etiology, Pathogenesis, Clinical Features, Etiologic Diagnosis, Diagnosis and Differential Diagnosis, General Management, Treatment with Antimicrobials, Slow resolving Pneumonia, Major clinical complications, prevention, prognosis.
- 5. Bronchiectasis and Chronic Suppurative Lung Diseases-**  
Definitions, Bronchiectasis and Chronic Suppurative Lung Diseases.
- 6. Influenza-** Epidemiology, Pathology/Pathogenesis, Clinical Features, Diagnosis and Differential Diagnosis, Management and Treatment, Prevention, Prognosis/Outcome.
- 7. New and Emerging Infections of the Lung-**

Middle East Respiratory Syndrome, Coronavirus, Human Metapneumovirus, Rhinovirus C, Adenovirus.

**8. Tuberculosis-**

Epidemiology, Mycobacteriology, Immunology, Pathophysiology, Clinical Features, Diagnosis, Tests of Infection, Laboratory Diagnosis, Treatment, Control and Prevention.

**9. Nontuberculosis Mycobacterial Disease-**

Microbiology, Epidemiology, Acquisition and Potential for Transmission, Clinical Manifestations of Nontuberculous Mycobacteria Pulmonary Diseases, Diagnosis of Nontuberculous Mycobacteria Pulmonary Diseases. Management, Treatment and Outcomes.

**10. The Pulmonary Mycoses-**

Antifungal Drugs, Endemic Mycoses, Pulmonary Mycoses primarily seen in Hosts with Impaired Immunity.

**11. Pertussis and Other Bordetella Infections of the Respiratory Tract-**

Epidemiology, Etiology, Pathology/Pathogenesis, Clinical Features, Imaging, Pulmonary Function Testing, Laboratory findings, Diagnosis and Differential Diagnosis, Management and Treatment, Prevention, Prognosis.

**12. Parasitic Diseases of Lungs-**

Toxocariasis, Hydatid diseases of the Lung, Strongyloids and Pulmonary Paragonimiasis.

**Unit-IV**

**Pulmonary Intensive Care -**

**1. Principles of Mechanical Ventilation-**

Indications, Modes of Ventilation, Noninvasive Ventilation, High-Frequency Ventilation, Neurally Adjusted Ventilator assistance, Hemodynamic effects of Mechanical Ventilation, Management During Mechanical Ventilation, Complications of Mechanical Ventilation.

**2. Pulmonary Edema-**

Anatomic Considerations, Factors responsible for Fluid Movement, Mechanisms that cause Pulmonary Edema, Clearance of Pulmonary Edema Fluid, Pathophysiologic Consequences of Edema, Clinical Presentation, Clinical Disorder Causing Pulmonary Edema and Therapy.

**3. Acute Respiratory Distress Syndrome-**

Epidemiology, Etiology, Definition and Diagnosis Pathophysiology and Treatment.

**4. Lung Injury from Hydrocarbon Aspiration and Smoke Inhalation-**

**5. Drowning-** Definitions, Epidemiology, Drowning sequence, Sequelae of Submersion/Immersion Events.

**Unit-V**

**Airway and Vascular Diseases-**

**1. Asthma-**

Epidemiology of Asthma, Immunopathogenesis of Asthma, Diagnosis of Asthma, Laboratory Diagnosis, Lung Function tests, Bronchial Challenge tests, Exercise Challenge test, Therapeutic Considerations, Classification of Asthma, Pharmacologic Management of Asthma in Children Older Than 5 Years of Age,

Management of Asthma, Allergen Immunotherapy, Diagnosis and management of Severe Asthma.

- 2. The Influence of Upper Airway Disease on the Lower Airway-**  
Allergic Rhinitis and Asthma, Chronic Rhinosinusitis and Asthma.
- 3. Cystic Fibrosis-**  
Genetics and pathophysiology, diagnosis and presentation of Cystic fibrosis.  
Pulmonary manifestation of Cystic Fibrosis. Molecular therapy for cystic fibrosis.
- 4. Primary Ciliary Dyskinesia-**  
Epidemiology, Etiology, Pathology and Pathogenesis, Clinical Features, Diagnosis, Management, Treatment and Prognosis.
- 5. Pulmonary Vascular Diseases-**  
Pulmonary embolism and Thromboembolic Diseases, Diffuse Alveolar Hemorrhage in Children, The lungs in Sickle Cell Diseases.
- 6. Childhood Pulmonary Arterial Hypertension-**  
Definition and Classification, Epidemiology and Etiology, Neonatal Pulmonary Hypertension, Associated Pulmonary Arterial Hypertension with Congenital Heart disease and its management.

#### **Unit-VI**

##### **Lung Involvement in Systemic Diseases-**

- 1. Pulmonary Involvement in the Systemic Inflammatory diseases of Childhood-**  
Clinical approach to diagnosis and management of Pulmonary involvement in the Systemic Inflammatory diseases of Childhood.
- 2. Rare Childhood Lung Disorders-**  
Niemann-Pick Disease, Neurofibromatosis, Dyskeratosis Congenita, Hermansky-Pudlak Syndrome, Alpha-1 Antitrypsin Deficiency, LAM, Pulmonary alveolar microlithiasis, Ataxia telengictasis, Gaucher diseases.
- 3. Lung Diseases Associated with disruption of Pulmonary Surfactant Homeostasis-**  
Clinical Features of Surfactant Production disorders, Diagnosis and differential diagnosis, management, treatment and Prognosis.
- 4. Lung Injury caused by Pharmacologic Agents-**  
Cytotoxic drugs used in Cancer Therapy, Noncytotoxic and other drugs, other agents.
- 5. Pulmonary disease in the Pediatric Patient with Primary and acquired Immunodeficiency states including Human Immunodeficiency virus infection.**
- 6. Pediatric Lung Transplantation-** Indications and timing, Contraindications, Surgical technique, Post-transplant management, Management issues unique to paediatrics, complications, outcomes.
- 7. Respiratory Complications of Down Syndrome.**

#### **Unit- VII**

##### **Miscellaneous-**

- 1. Disorders of the Respiratory System caused by Trauma.**
- 2. Air and Fluid in the Pleural Space.**
- 3. Chest wall and respiratory muscle disorders-**  
Etiologies, Pathogenesis, Clinical features, diagnosis, management.
- 4. Disorders of breathing during sleep.**
- 5. Tumors of the Chest-**

Epidemiology, Etiology Benign Primary pulmonary lesions, Malignant primary pulmonary lesions, chest wall tumors, Mediastinal Tumors, Primary Cardiac and Pericardial Tumors, Tumors of the Diaphragm, General Approach to Evaluation of Children with suspected Tumors of the Chest, management and treatment of Thoracic tumors.

**6. Feeding and Swallowing Disorders-**

Epidemiology, Anatomy, Physiology and Development, Etiology/Pathogenesis, Conditions associated with feeding, swallowing and airway protection problems, Imaging Instrumental assessment of Swallowing function and airway protection, Diagnosis, Management and treatment.

**7. Gastroesophageal Reflux Diseases and Eosinophilic Esophagitis in Children with Complex Airway Disease-**

Gastroesophageal reflux disease, Disorders of Motility, Eosinophilic Esophagitis.

**Unit- VII**

**Diseases in Early Childhood-**

**1. Respiratory Disorders in the Newborn-**

Initiation of Respiration at Birth, Fetal Lung Fluid, Respiratory Depression at Birth, Delivery Room Resuscitation, Ventilatory Control, Respiratory Distress Syndrome, Transient Tachypnea of the Newborn, Meconium Aspiration Syndrome, Acute Respiratory Distress Syndrome, Early-Onset Pneumonia, Late-Onset Pneumonia, Aspiration Pneumonia, Interstitial Lung Diseases, Persistent Pulmonary Hypertension of the Newborn, Pulmonary Hypertension in Bronchopulmonary Dysplasia, Pneumothorax, Pneumomediastinum, Pneumopericardium, Pulmonary Interstitial Emphysema, Secondary Pulmonary hypoplasia, Patent Ductus Arteriosus, Pulmonary Edema, Pulmonary Hemorrhage, Upper airway obstruction, Gastroesophageal reflux.

**2. Sudden Infant Death Syndrome and Apparent Life-Threatening Events.**

**3. Congenital Lung Diseases-**

The size of the Problem: Epidemiology of Congenital Malformations of the lung, Antenatal Diagnosis and Management of Congenital Lung Diseases. Postnatal diagnosis and management of Congenital lung diseases.

**4. Pulmonary Diseases Associated with Congenital Heart Disease.**

\*\*\*\*\*

**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)**