

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

**A. GENERAL MICROBIOLOGY**

Historical Introduction: Microscopy, Micrometry, Laboratory use & care of instruments in microbiology; Biosafety measures & containment facilities, shipment of microbiological material; Sterilization and Disinfection, Sterility testing, Sterilization indicators; Nomenclature and classification of microorganisms, normal flora of human body, Microbiology of water, milk, air & its application; collection, transportation and processing of clinical specimens for laboratory, diagnosis of infections, various culture medias, culture methods, stains and identification tests, maintenance of stock cultures; Care, use & experimental techniques on laboratory animals; Microbial Infections Molecular genetics and microbiological applications.

**B. BACTERIOLOGY**

Morphology, Physiology, Taxonomy, cultural characteristics, virulence factors, antigenicity & mechanisms of drug resistance in bacteria, Anaerobiosis, Conventional & non-conventional (recent & molecular) methods for detection of bacteria of medical importance viz Gram positive cocci like staphylococci, Streptococci, pneumococci, etc., Gram Negative cocci like Neisseria, peptostreptococci etc. Gram Negative bacilli like Enterobacteriaceae family, Haemophilus Bordetella, Brucella & others including fastidious organisms and Gram positive bacilli like coryne bacterium, B anthracis, clostridium & Mycobacterium. Tuberculosis and Non tubercular mycobacteria, Mycobacterium leprae, Antinomycetes, Rickettsiaceae, orientia ehrlichia & coxiella, chlamydia and chlamydophila mycoplasma and ureaplasma, treponems, borellia, Laptospira other Non spor anaerobes miscellaneous/rarely encountered bacteria of medical importance; Identification of non-cultivable bacterial pathogens; Mechanisms of drug resistance in bacteria & choice of antibacterial agents.

**C. IMMUNOLOGY**

Infection and Immunity; Antigen, antibody, complement, Antigen-Antibody reaction with special reference to simple, rapid & automated techniques like ELISA, Immuno chromatography, blotting techniques etc.; Structure and Function of immune system, Immune response, detection methods and application; Hypersensitivity, Immunodeficiency diseases, Autoimmunity; Immunology of transplantation & malignancy, HLA typing & tissue matching techniques; use of monoclonal

antibodies in disease diagnosis, Immunoprophylaxis, Immuno modulation & Immunotherapy; Immunohaematology, Transfusion transmissible infection (TTI) & use of experimental animals (suckling mice, SCID mice, Nude mice, Knock-out mice etc.) in immunology.

#### **D. MYCOLOGY**

General properties, Nomenclature, classification & Morphology of fungi of medical importance; Epidemiology, pathogenesis, clinical manifestations, prevention, control & treatment of Fungal infections; Lab diagnosis (Cultural techniques including Slide culture, Scotch tape preparation, Germ tube test, Cornmeal agar inoculation & identification based on morphology, Sugar Fermentation & assimilation tests, Exo-antigen test as well as non-cultural techniques like serology, animal inoculation, & molecular methods) of various fungal infections viz-coetaneous, subcutaneous, Deep, Systemic and opportunistic mycoses caused by yeasts, yeast-like fungi, hyalohyphomyces, Phaeohyphomyces, Phycomycetes & dimorphic fungi; Anti-fungal drugs & in-vitro antifungal susceptibility testing and mechanism of drug resistance.

#### **E. VIROLOGY**

General properties, Nomenclature, classification, replication, cultural and non-cultural methods of laboratory diagnosis of various viruses & infections caused by them. Special techniques of virus culture eg-shell vial culture, egg inoculation; collection & transportation & processing of samples for viral disease diagnosis, recent advances in techniques for virus detection; Virus-host interactions, viral genetics & pathogenesis of viral infections caused by various viruses of human importance. viz - DNA viruses, RNA viruses, Bacteriophage Slow Viruses including prions and conventional viruses & oncogenic viruses with special reference to Hepatitis & HIV; miscellaneous viruses,- SARS & corona, zika viruses, Avian influenza virus; Viral haemorrhagic fevers etc. Viral vaccines & antiviral drugs.

#### **F. PARASITOLOGY**

General Introduction :

Taxonomy, Host, Hostparasite relationship, transmission epidemiology, life cycle, pathogenesis, Immunology and laboratory diagnosis and treatment of various parasites of medical Importance.

- Introduction to protozoa, General features and classification.
- Amoeba including free living amoeba
- Intestinal Flagellates and Genital Flagellates
- Hemoflagellates

- Malarial parasites and babesia
- Opportunistic coccidian parasites
- Miscellaneous protozoa
- Helminthology:- General characteristics, morphology and life cycle
- Cestodes
- Trematodes or flukes
- Intestinal Nematodes and nematodes of lower animals
- Somatic nematodes
- Miscellaneous parasite and lab diagnosis

## **G. APPLIED MICROBIOLOGY, SCOPE & RECENT ADVANCES**

Biomedical waste management & techniques for proper disposal of infectious wastes; Monitoring of drug resistance in bacteria especially MRSA, VRSA, VISA, VRE & ESBL production in Gram Negative bacilli; Hospital acquired infections & its control (HAI, HAICC); Epidemiological typing methods & infectious disease outbreak management; Opportunistic infections with special reference to HIV/ AIDS; Cost effective microbiological diagnostic techniques which are simple & rapid as well; Epidemiology of infectious diseases including anthropol, zoonoses; Biological warfare & Bioterrorism; Gene manipulation, Genetic engineering, Gene cloning, Gene therapy; Infectious agents & cancer association; Emerging & reemerging infectious diseases; Recent advances in molecular diagnostic methods like PCR, TMA, DNA probe detection etc. Automation, quality control and assurance, antimicrobial therapy and drug resistance including antimicrobial stewardship, Newer vaccine development against various infectious diseases

- Including all practical techniques related to the above mentioned topics & any other related topic(s) of microbiological interest.

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### **Pattern of Question Paper**

- 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)**