RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS OF SCREENING TEST FOR THE POST OF
ASSISTANT PROFESSOR - MICROBIOLOGY
MEDICAL & HEALTH (C.B.) DEPARTMENT

GENERAL BACTERIOLOGY

1. Historical Introduction
2. Morphology and Physiology of Bacteria
3. Sterilization and Disinfection
4. Culture Media
5. Culture Methods
6. Identification of Bacteria
7. Bacterial Taxonomy
8. Bacterial Genetics
9. Anaerobiosis
10. Nomenclature and classification of microorganisms, normal flora of human body

IMMUNOLOGY

1. Infection including host parasite interaction and microbial pathogenicity
2. Immunity
3. Antigens
4. Antibodies – Immunoglobulins
5. Antigen – Antibody Reactions
6. The Complement System
7. Structure and Functions of the Immune System
8. Immune Response
9. Immunodeficiency Diseases
10. Hypersensitivity
11. Autoimmunity
12. Immunology of Transplantation and Malignancy
13. Immunohematology
14. Immunoprophylaxis

SYSTEMIC BACTERIOLOGY

1. Gram positive cocci
2. Gram negative cocci
3. Corynebacterium
4. Bacillus
5. Clostridium
6. Nonsporing Anaerobes
7. Enterobacteriaceae:
8. Gram negative bacilli other then Enterobacteriaceae:
9. Mycobacterium I: M. Tuberculosis
10. Mycobacterium II: Non-Tuberculosis Mycobacteria (NTM)
11. Mycobacterium III: M Leprae

12. Spirochetes
13. Mycoplasma
14. Actinomycetes
15. Miscellaneous Bacteria
16. Rickettsiaceae
17. Chlamydiae
18. Actinomycetes
19. Miscellaneous bacteria including non fermenters
    Listeria monocytogenes , Erysipelothrix, Rhusiopathiae, alkaligenes faecalis, Chromobacterium violaceum,,Flavobacterium Meningosepticum, Donovanina granulomatis , Acinetobacter, campylobacter, Helicobacter, Legionella pneumophila, Eikenella corrodens, Cardiobacterium hominis, Capnocytophaga, Gardinella vaginallis, Moraxella, Kingella .

VIROLOGY

1. General Properties, Nomenclature, Classification of Viruses
2. Virus – Host Interactions: Viral Infections
3. Bacteriophages
4. Viral genetics, pathogenesis of DNA, RNA, Slow viruses, Prions, Viroids and Onchogenic viruses.
5. Human Immunodeficiency Virus: AIDS

MYCOLOGY

1. Medical Mycology: General properties, nomenclature, classification and morphology of fungi of medical importance, epidemiology, pathogenesis, clinical manifestations, prevention, control and treatment of fungal infections.
2. laboratory diagnosis- culture techniques including slide culture, scoth tape preparation, germ tube test, corn meal inoculation and identification based on morphology , sugar fermentation and assimilation tests, exoantigen tests as well as non-culture techniques like serology, skin test, animal inoculation and molecular methods of various fungal infections like-
    - cutaneous, subcutaneous
    - deep and systemic
    - opportunistic fungi

PARASITOLOGY

GENERAL PAARASITOLOGY

1. General Parasitology

PROTOZOOLOGY

1. Introduction to Protozoa
2. Amoebae
   Entamoeba histolytica
   Non-Pathogenic Amoebae
   Opportunistic Amoebae

3. Flagellates
   Intestinal, Oral and Genital Flagellates
   Blood & Tissue Flagellates
   Old world Leishmaniasis
   New world Leishmaniasis
   Trypanosomes
4. Sporozoa (Apicomplexa)
5. Balantidium Coli
6. Microsporidia

HELMINTHOLOGY

1. Introduction to Helminths
2. Cestodes or Tapeworms
3. Trematodes or Flukes
4. Nematodes

ARTHROPODS AND PARASITES

APPLIED PARASITOLOGY, DIAGNOSTIC PROCEDURES AND OVERVIEW

1. Parasitic Opportunistic Infection in AIDS Cases and Nosocomial Parasitic Infection
2. Diagnostic Procedures
3. Anti protozoal and anti helmenthic drugs

APPLIED MICROBIOLOGY

1. Bacteriology of Water, Milk and Air
2.. Diagnostic Methods in Clinical Microbiology

   - Procedure for Inoculation of the Specimen on Culture Media for isolation and identification of bacteria.
   - common and special staining and biochemical tests for identification of bacteria.

4. Rapid diagnostic test in Microbiology
5. Immunofluorscence and Immunoelectron and dark ground microscopy
6. pH measurement and buffers, Oxidation and reduction potentials, suspension fluids
7. Management of Experimental animals: Experimental animal inoculation test , commonly used animals viz; Guinea pig, Rabbit, Mouse, sheep etc including transgenic animals
8. Inoculation of chick embryonated eggs for virus culture, Use of cell lines for cultivation of viruses
9. Assay of enterotoxins
10. Nosocomial Infections, Control of Hospital acquired infections and Antibiotic policy of hospitals
11. Bio medical waste management

12. HIV / AIIDS : -ICTC (G) & (P), Strategies of HIV testing for Diagnosis of HIV infection / AIDS, EQAS and Sentinel surveillance of HIV infection, viral load and CD4 cell count.

Laboratory and Management

Role of laboratory
Laboratory safety
Laboratory design and organization
Laboratory management , use and care of instruments in microbiology
Quality control and accreditation in clinical microbiology laboratories-

- Bacteriology
- Parasitology
- Virology
- Mycology

Clinical Microbiology

Role of microscopy in diagnosis of infectious diseases
Laboratory cultivation and isolation of bacteria
Conventional and special tests / methods of bacterial identification
Molecular methods for microbial identification and characterization
Immunochemical methods for detection of microorganisms
Serological diagnosis of infectious diseases
Blood stream infections and its laboratory diagnosis
Respiratory tract infections its laboratory diagnosis
Infection of oral cavity, ear and its laboratory diagnosis
Infections of meanings and other central nervous system and its laboratory diagnosis
Infection of urinary tract and its laboratory diagnosis
Infections of genital tract and its laboratory diagnosis
Infections of gastrointestinal tract and its laboratory diagnosis
Infection of skin, soft tissue and its laboratory diagnosis
Pyrexia of unknown origin and its diagnosis
Anaerobic infections and its laboratory diagnosis
Rapid diagnostic tests in microbiology
Laboratory diagnosis of parasitic infections
Laboratory diagnosis of viral infections
Laboratory diagnosis of fungal infections
Transfusion transmitted diseases

Antimicrobials

- Principles of antimicrobial action and resistance
- Laboratory methods of antimicrobial sensitivity
- Laboratory methods of detection of antimicrobial resistance
  Methicillin Resistance staphylococcus Aureus 9 MRSA), Extended Spectrum Beta Lactamases (ESBL'S), High level aminoglycosides resistance, Vancomycin resistance, Cabepenam resistance
- Quality control of antimicrobial sensitivity

Recent advances in Microbiology

Epidemiological study and surveillance of infectious diseases
Surveillance Sentinel surveillance
Newer enterobacteriacea
Bioterrorism
Biofilms
Emerging and reemerging viral infections: fungal, bacterial, and parasitic infections
Emerging Drug Resistance
Antifungal sensitivity
Detection of antigens for diagnosis of fungal infections viz galactomannan, beta D glucon
Vaccine productions, phase trials of vaccine production, newer malarial , HIV, influenza vaccine.
Automation in diagnostic microbiology.
Recent development in malaria and newer method of its diagnosis
Microarray , Nanotechnlogy
Gene therapy
Probiotics
Zymodeme assay
Immunomodulation
Pulse field gel electrophoresis
Chemiluminescent assay
Asay of toxins
Recent Advances in Diagnostic Technique in Clinical Microbiology
Molecular diagnostic methods and New Diagnostic Techniques,Miscellaneous Tests

Genetic engineering , gene manipulation, gene cloning and gene therapy
Molecular markers for cancer

Research methodology in microbiology

QUANTIFICATION IN MICROBIOLOGY

Biostatics

Normal distributions , random numbers
Mean, Mode, Median, Standard Deviation and Standard Error
P distribution (P value)
Z test
Student T test
Chi square test
Regression analysis , regression co-efficient, linear regression and multiple linear regression

Measures and standards
Estimation of live microorganisms in vitro
Estimation of inactivated preparation in vitro
Antibodies assay in vitro
Estimation of live microorganisms and toxins in vivo.
Assays of antibodies and anti toxin in vivo

Estimation of protective potency
Microbiological assay

* including all practical techniques related to the above mentiond topics and any other related topic (s) of microbiological intrest

BOOKS RCOMMENDED –

Text book of Microbiology: Ananthanarayan & Jaya Ram Panikar
Text book of Microbiology : D R Arora & B Arora
Text book of Microbiology : C P Baveja
Medical Microbiology: Jawetz, Melnick & Adelberg
Medical Microbiology : David Greenwood, Richard C.B. Slack, John F . Peutherer
Mackie & McCartney Practical Medical Microbiology: J.G. Collee, A.G.Frasier, B.P.Marmion, A. Simmons
Bailey & Scott Diagnostic Microbiology: Betty A. Forbes, Daniel F. Sahn, Alis S. Weissfeld
Koneman,s colour atlas and text book of Microbiology : Washington C. Winn, Stephen D. Allen et al.
Topley and Wilson,s Principles of Bacteriology, Virology and Immunity

JOURNALS :

Various national and international indexed journals of microbiology, bacteriology, immunology, virology

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Pattern of Question Papers:

1. Objective Type Paper
2. Maximum Marks : 100
3. Number of Questions : 100
4. Duration of Paper : Two Hours
5. All Questions carry equal marks
6. There will be Negative Marking

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