

**KAMALNAYAN BAJAJ NURSING COLLEGE, AURANGABAD**

**QUESTION BANK**

**FIRST YEAR BASIC B.SC(N)**

**SUB: MICROBIOLOGY**

## **UNIT 1: INTRODUCTION**

### **Long Answer Question**

1. Historical Introduction.

### **Short Answers Question**

1. Contribution of Louis Pasteur
2. Robert Koch

## **UNIT 1: GENERAL CHARACTERISTICS OF MICROBES**

### **Long Answer Question**

1. Describe the morphology of a bacterial cell with the help of a diagram and mention the functions of the various appendages.
2. Classify culture media with example.
3. What is the effect of temperature, moisture & presence of oxygen on the growth of bacteria.

### **Short Answers Question**

1. Differences between prokaryotes and eukaryotes
2. Difference between gram positive & gram negative bacteria.
3. Bacterial capsule
4. Flagella
5. Bacterial spore
6. Bacterial cell wall
7. Bacterial growth curve
8. Enriched media
9. Enrichment media
10. Negative staining
11. The reasons for gram positivity of bacteria
12. Draw a diagram of the cell wall of gram-negative bacteria
13. The characteristics of gram-negative cell wall
14. The characteristics of gram-positive cell wall
15. Fimbriae
16. Give two examples of motile bacteria.
17. Thermophili
18. Name four pigment producing bacteria.
19. Selective media
20. Transport media
21. Blood culture
22. Blood agar, its constituents, preparation and uses
23. Ingredients of potassium tellurite medium
24. Triple sugar iron (TSI) media
25. Ingredients of MacConkey medium
26. Name four commonly used selective media and their uses.
27. Anaerobic culture media
28. Milk agar media

29. Chocolate agar
30. Describe some blood culture methods.
31. What are the selective media used for Staphylococci, bacillus anthracis, Neisseria gonorrhoeae and Corynebacterium diphtheriae?

### **UNIT 3: INFECTION CONTROL**

#### **Long Answer Question**

1. Define sterilization and list the methods of sterilization. Discuss their application in medical practice.
2. Discuss sterilization methods by moist heat.
3. Define disinfectants and antiseptics. Discuss their mode of action. Add a note on evaluation of disinfectants.
4. Classify physical methods of sterilisation with suitable example.
5. Classify & explain the use of chemical disinfectants in hospital.
6. Describe the methods of segregation and disposal of biomedical waste from a hospital.
7. What is infection? Define Nosocomial Infection? Enlist organism causing Nosocomial infection
8. Describe in detail role of Hospital Infection Control Nurse.

#### **Short Answer Question**

1. Sterilisation
2. Hot air oven
3. Concurrent disinfection
4. Antiseptics & disinfection
5. Pasteurization
6. Autoclave
7. Moist heat Sterilization.
8. Disinfectants
9. Antibiotics acting on cell wall
10. Antibiotic susceptibility testing.
11. Biomedical waste Management
12. Methods for the disposal of biomedical waste.
13. Biomedical waste segregation

## **UNIT II: Immunology**

### **Long Answer Question**

#### **1. INFECTION**

#### **Short Answer Question**

1. Various types of carriers with examples
2. Various virulence factors in bacteria
3. Exotoxins
4. Two zoonotic bacterial diseases
5. Define zoonotic infections.

#### **2. IMMUNITY**

#### **Long Answer Question**

1. What is innate immunity? Discuss its mechanism. Briefly describe the cells involved in innate immunity.
2. Define and classify immunity. Explain the different types of immunity with examples.
3. Classify immunity and describe active immunity with examples.

#### **Short Answer Question**

1. What is innate immunity? Discuss its mechanism.
2. Active immunity
3. Passive immunity
4. Name four live attenuated vaccines.
5. Name four killed vaccines.
6. Name four bacterial vaccines.
7. Name two antibacterial sera used for passive immunisation.
8. Herd immunity

#### **3. ANTIGENS**

#### **Short Answer Question**

1. What are the main attributes that make a substance a good antigen?
2. Define and give an example of haptens.
3. Four important properties of antigens
4. Define and give examples of heterophile antigens.

#### **4. ANTIBODIES—IMMUNOGLOBULINS**

#### **Long Answer Question**

1. Describe the structure and properties of each of the immunoglobulin classes.

#### **Short Answer Question**

1. Structure of immunoglobulin
2. Enumerate immunoglobulins
3. Diagrammatic representation of IgG
4. Diagrammatic representation of IgA
5. Function of IgA
6. Diagrammatic representation of IgM

## **5.ANTIGEN—ANTIBODY REACTIONS**

### **Long Answer Question**

1. Mention the various antigen-antibody reactions. Describe the principle, methodology and clinical applications of the precipitation reactions.
2. Enumerate antigen-antibody reactions. Describe the principle, methodology and clinical applications of agglutination reactions with suitable examples.

### **Short Answer Question**

1. Precipitation in gel
2. Agglutination tests and its applications
3. Coombs test
4. Weil-Felix test
5. Immunofluorescence test
6. ELISA test, its principle and applications
7. Types of hemagglutination test with examples
8. Principle and uses of heterophile agglutination
9. Sensitivity and specificity
10. Agglutination definition and two examples
11. Application of slide agglutination in microbiology laboratory
12. Principle of Paul-Bunnell test
13. Neutralisation test and two examples

## **6.COMPLEMENT SYSTEM**

### **Short Answer Question**

1. Complement and its biological functions
2. Complement deficiency states

## **7.STRUCTURE AND FUNCTIONS OF THE IMMUNE SYSTEM**

### **Long Answer Question**

1. Mention the cells involved in immune response. Describe the development, identification and functions of different types of lymphocytes.

### **Short Answer Question**

1. Central lymphoid organs
2. Peripheral lymphoid organs
3. Differences between T cells and B cells
4. Functions of macrophages
5. Major histocompatibility complex
6. Describe HLA antigens and add a note on their role in immunity.
7. Antigen presenting cell
8. Four properties of T lymphocytes
9. Plasma cell

10. Four properties of B lymphocyte
11. Main function of macrophages and NK cells
12. Uses of HLA typing

## **8. IMMUNE RESPONSE**

### **Long Answer Question**

1. Explain the mechanism of antibody production.

### **Short Answer Question**

1. Monoclonal antibody, its principle and its applications
2. Cytokines
3. Immunological tolerance
4. Immunosuppressive agents
5. Adjuvants
6. Interleukin II
7. What is the test for cell mediated immunity?
8. Immunomodulators

## **9. IMMUNODEFICIENCY DISEASES**

### **Short Answer Question**

1. Classify primary immunodeficiency syndromes.

## **10. HYPERSENSITIVITY**

### **Long Answer Question**

1. Define and classify hypersensitivity. Explain in detail type I hypersensitivity.
2. Define and classify hypersensitivity and describe anaphylaxis in detail.

### **Short Answer Question**

1. Type I hypersensitivity
2. Anaphylaxis
3. Atopy
4. Serum sickness
5. Type III hypersensitivity reactions
6. Arthus phenomenon

## **11. AUTOIMMUNITY**

### **Long Answer Question**

1. Mechanism of autoimmunity
2. Name two autoimmune disease and their autoantibodies.

## **12. IMMUNOLOGY OF TRANSPLANTATION AND MALIGNANCY**

### **Long Answer Question**

1. Allograft
2. Graft-versus-host reactions
3. Different types of transplantation
4. Tumour antigens

### **13. IMMUNOHEMATOLOGY**

#### **Long Answer Question**

1. ABO blood group system
2. Blood transfusion reaction
3. Hemolytic disease of the newborn

### **UNIT III. Bacteriology**

#### **1. STAPHYLOCOCCUS**

##### **Long Essays**

1. Classify staphylococci. Describe morphology, cultural characteristics, important biochemical reactions, antigenic composition, antibiogram, pathogenicity and laboratory diagnosis of staphylococcus aureus.
2. Discuss the morphology, cultural characteristics, pathogenicity and laboratory diagnosis of staphylococcus aureus.
3. What are the factors that govern the pathogenicity of staphylococci? Mention the cultural characteristics and other biochemical activities by which the different members of this group are differentiated.
4. Describe the laboratory investigations of staphylococcal infection.

##### **Topics for Short Answers**

1. Coagulase test.
2. Toxins produced by Staphylococcus aureus
3. Toxic shock syndrome
4. Staphylococcal food poisoning
5. Coagulase test
6. Free coagulase
7. Bound coagulase
8. Enterotoxins of Staphylococcus aureus
9. Name two lesions caused by Staphylococcus epidermidis.
10. Coagulase-negative staphylococci
11. Staphylococcus epidermidis

#### **2. STREPTOCOCCUS**

##### **Long Essays**

1. Describe classification, morphology, cultural characteristics, biochemical reactions, different diseases caused by streptococci and their laboratory diagnosis.
2. How are streptococci classified? Enumerate various toxins and infections produced by Streptococcus pyogenes. Discuss laboratory diagnosis of rheumatic heart disease.
3. Discuss the classification of streptococci. Enumerate the lesions caused by streptococcus pyogenes.
4. Classify streptococci and describe the pathogenesis and laboratory diagnosis of rheumatic fever.

5. Give a classification of streptococci and mention the pathological lesions produced by *Streptococcus viridians*.
6. Enumerate microbiological agents causing sore throat. Describe in brief the morphology, cultural characteristics and pathogenicity of streptococci.
7. Describe the morphology, cultural characteristics and pathogenicity of *Streptococcus pyogenes*.
8. Describe the morphology, cultural characteristics and pathogenicity of *Streptococcus haemolyticus*.
9. Enumerate toxins and enzymes produced by streptococci. Describe the pathogenesis and laboratory diagnosis of streptococcal disease.
10. Discuss the pathogenesis of beta-hemolytic streptococci.

#### **Topics for Short Answers**

1. ASO test
2. Non-suppurative complications of *Streptococcus pyogenes*
3. Laboratory diagnosis of rheumatic fever
4. Enterococcus
5. Viridians group of streptococci
6. Enzymes produced by streptococci
7. Two non-suppurative post-streptococcal sequelae
8. CAMP test

### **3. PNEUMOCOCCUS**

#### **Long Essay**

1. List out the organisms causing pyogenic meningitis. Describe the morphology and cultural characteristics of *Streptococcus pneumoniae*. Outline the laboratory diagnosis of acute pyogenic meningitis.

#### **Topics for Short Answers**

1. C-reactive protein
2. Laboratory diagnosis of pneumococcal meningitis
3. Bile solubility test
4. Quelling test
5. Four differences between *Streptococcus viridians* and *Streptococcus pneumoniae*

### **4. NEISSERIA**

#### **Long Essays**

1. What are the organisms of the *Neisseria* group that are pathogenic to humans? Describe their habitat and pathogenic effect. Outline the laboratory investigations you will carry out to find out the etiology from an exudate caused by them.

2. Enumerate bacteria causing pyogenic meningitis. Describe morphology, cultural characteristics of N meningitides. Outline its laboratory diagnosis.
3. Describe the common characteristics of an organism belonging to the genus Neisseria. Give the laboratory diagnostic procedures in meningococcal meningitis.
4. Describe the morphology, cultural characteristics, biochemical reactions, antigenic composition, antibiogram and pathogenicity of Neisseria gonorrhoeae. Write a note on the laboratory diagnosis of gonorrhoea.
5. Describe the bacteriology of Neisseria gonorrhoeae.
6. Describe the morphology of Neisseria gonorrhoeae and complications caused by its infection.

#### **Topics for Short Answers**

1. Morphology and cultural characteristics of Neisseria gonorrhoeae
2. Laboratory diagnosis of gonorrhoea
3. Non-pathogenic neisseria
4. List four organisms causing non-gonococcal urethritis.

### **5. CORYNEBACTERIUM**

#### **Long Essays**

1. Enumerate bacteria causing sore throat. Describe the morphology, cultural characteristics, biochemical reactions and pathogenicity of Corynebacterium diphtheriae. Outline the laboratory diagnosis of diphtheria.
2. Describe the morphological, cultural characteristics and toxins produced by Corynebacterium diphtheria.
3. Describe the morphology and cultural characteristics of Corynebacterium diphtheria. How would you immunize a person against diphtheria?
4. Describe the morphology, cultural characteristics, pathogenicity and laboratory diagnosis of Corynebacterium diphtheria.
5. Describe the morphology and enumerate the characteristics of diphtheria bacillus. How would you determine its virulence?

#### **Topics for Short Answers**

1. Elek's test
2. DPT vaccine
3. Name two special stains used for Corynebacterium diphtheria.
4. Metachromatic granules
5. Morphology of Corynebacterium diphtheria
6. Two complications of diphtheria

## **6.BACILLUS**

### **Topics for Short Answers**

1. Pathogenicity of Bacillus anthracis
2. Malignant pustule
3. M'Fadyean's reaction
4. Hide porter's disease

## **7.CLOSTRIDIUM**

### **Long Essays**

1. Enumerate the clostridia pathogenic to humans. Discuss the morphology, cultural characteristics and toxins of CI welchii.
2. Classify clostridia. Name the disease produced by Clostridium welchii. How will you investigate such a case?
3. Name the clostridia pathogenic to humans. Describe the pathogenesis of gas gangrene.
4. Enumerate pathogenic clostridia. Write the steps of laboratory diagnosis of tetanus.
5. Enumerate the organisms causing gas gangrene. Describe the morphology of cultural characteristics and pathogenicity of CI welchii. Add a note on laboratory diagnosis of gas gangrene.
6. What are gas gangrene clostridia? Describe their morphology, cultural characteristics and laboratory diagnosis.
7. Name the pathogenic anaerobic bacteria. Describe the laboratory diagnosis of gas gangrene.
8. Enumerate methods of anaerobiosis. Describe the morphology and cultural characteristics of CI tetani. Discuss the prophylaxis of tetanus.
9. Describe the morphology, cultural characteristics and pathogenicity of Clostridium tetani.
10. Describe the morphology, cultural characteristics and pathogenicity of Clostridium tetani. How would you immunize a person against tetanus?

### **Topics for Short Answers**

1. Stormy clot reaction
2. Toxins of Clostridium welchii
3. Nagler reaction
4. Pathogenesis and immunoprophylaxis of tetanus
5. Gas gangrene
6. Name four clostridia causing gas gangrene.
7. Diagnosis of gas gangrene
8. Morphology of Clostridium tetani

## **8.NONSPORING ANAEROBES**

### **Long Essay**

1. What is anaerobiosis? Describe the morphology, cultural characteristics, and animal and human pathogenicity of any one of the anaerobic organism.

### **Topics for Short Answers**

1. Nonsporing anaerobic infections
2. Name four nonsporing anaerobes.
3. What is the natural habitat of *Bacteroides fragilis*? What infection do they cause?

## **9. ENTEROBACTERIACEAE I: COLIFORMS-PROTEUS**

### **Long Essays**

1. What are coliform group of organisms? Describe the pathogenicity of important members of this group. How would you proceed to diagnose it in the laboratory?
2. Describe the morphology, cultural characteristic and biochemical reactions of *E. coli*.
3. Describe the morphology, cultural characteristics and pathogenicity of *E. coli*.
4. Describe antigenic structure, pathogenesis and laboratory diagnosis of *E. coli*.
5. What are the different organisms responsible for urinary tract infection? How would you identify *E. coli*?

### **Topics for Short Answers**

1. Significant bacteriuria
2. Enterotoxigenic *E. coli*
3. Weli- Felix test
4. Hemolytic uremic syndrome (*E. coli*)
5. Enteropathogenic *E. coli*
6. Name the *Escherichia coli* groups causing diarrhea.
7. Enteroinvasive *Escherichia coli* (EIEC)

## **10. ENTEROBACTERIACEAE II: SHIGELLA**

### **Long Essay**

1. Describe the morphology, cultural characteristics and pathogenicity of shigella.
2. Classify shigella. Describe the laboratory diagnosis of acute bacillary dysentery.

### **Topics for Short Answers**

1. Bacillary dysentery
2. Pathogenesis and laboratory diagnosis of bacillary dysentery

## 11. ENTERBACTERIACEAE III: SALMONELLA

### Long Essay

1. Describe the morphology, cultural characteristic and biochemical reactions of Salmonella typhi. Give a brief account of laboratory diagnosis of enteric fever.
2. Describe the microscopic, cultural, biochemical and serological characteristics of salmonella typhi.
3. Classify salmonella. Enumerate the salmonellae causing enteric fever and describe pathogenesis and laboratory diagnosis of enteric fever.
4. Describe the pathogenicity and laboratory diagnosis of infections caused by Salmonella typhi.
5. What are the pathogenic lesions or clinical disease induced by salmonella? Describe the laboratory procedure for diagnosis of typhoid fever.
6. Enumerate four bacteria causing pyrexia of unknown origin. Mention the incubation period and pathogenicity of Salmonella typhi. Describe the laboratory diagnosis of typhoid fever in the second week of infection.
7. Enumerate the non-lactose fermenting group of intestinal organism. How would you diagnose a suspected case of typhoid in the laboratory in the first week?
8. Enumerate bacteria causing pyrexia of unknown origin. Outline the laboratory diagnosis of enteric fever (typhoid).

### Topics for short Answers

1. Antigens of salmonella
2. Laboratory diagnosis of enteric fever
3. Widal test
4. Salmonella food poisoning
5. Vi antigen
6. Causative agents of enteric fever

## 12.VIBRIO

### Long Essays

1. Enumerate the organisms causing diarrhea. Describe the morphology, cultural characteristics, biochemical reactions and laboratory diagnosis of Vibrio cholera.
2. Describe the morphology, cultural characteristic and pathogenicity of Vibrio cholera.
3. Classify vibrios. Describe the pathogenesis, laboratory diagnosis and immunoprophylaxis of cholera.
4. Classify vibrios. List out the differences between classical cholera and EI tor vibrio. Describe the laboratory diagnosis of a case of cholera.
5. Explain in detail the laboratory diagnosis of a case of cholera. How would you differentiate between classical and EI tor cholera vibrio.

#### Topics for Short Answers

1. El tor vibrios
2. Halophilic vibrio
3. Name four culture media used for Vibrio cholera.
4. Cholera red reaction
5. Two rapid tests for diagnosis of cholera

### **13.PSEUDONONAS**

#### **Long Essays**

1. Describe the morphological, cultural characteristics and toxins produced by pseudomonas.
2. Describe the morphology, cultural characteristics and pathogenicity of Pseudomonas pyocyaneus.
3. Describe the morphology, cultural characteristics and pathogenicity of Pseudomonas aeruginosa.

#### **Topics for Short Answers**

1. Pigments produced by Pseudomonas aeruginosa
2. Blue pus

### **14.YERSINIA, PASTEURELLA, FRANCISELLA**

#### **Topics for Short Answers**

1. Ghee broth culture
2. Bubonic plague
3. Pseudotuberculosis
4. Tularemia

### **15.HAEMOPHILUS**

#### **Topics for Short Answers**

1. Satellitism
2. Haemophilus ducreyi
3. X and V factors
4. What are two methods of preventing Haemophilus influenza meningitis?

### **16.BORDETELLA**

#### **Topics for Short Answers**

1. Cough plate technique

## 17. BRUCELLA

### Long Essays

1. Give an account of Brucella abortus. How would you diagnose this infection in the laboratory?
2. Describe the laboratory investigations in a patient suspected to be suffering from brucellosis.

### Topics for Short Answers

1. Laboratory diagnosis of human brucellosis (undulant fever)
2. Three species of brucellae
3. Classify brucellae
4. Milk ring test

## 18. MYCOBACTERIUM I: TUBERCULOSIS

### Long Essays

1. Describe the morphology, cultural characteristics and pathogenicity of Mycobacterium tuberculosis.
2. Name the organisms belonging to genus mycobacterium and describe the differentiating characteristics. Briefly describe the laboratory procedures used in the diagnosis of tuberculous infections.
3. Describe the morphology, cultural characteristics and pathogenicity of Myobacterium tuberculosis. Mention the laboratory diagnosis of pulmonary tuberculosis.
4. Enumerate the mycobacteria. Describe the morphology, cultural characteristics of M tuberculosis. Mention in brief about the BCG vaccine.
5. Enumerate the organism causing lower respiratory tract infections. Describe the morphology and cultural characteristics of M tuberculosis. Discuss the laboratory diagnosis of pulmonary tuberculosis.
6. Classify mycobacteria. Discuss the laboratory diagnosis of pulmonary tuberculosis.
7. Describe the bacteriology of Mycobacterium tuberculosis. Mention its pathogenicity. How would you diagnose a case of tuberculous meningitis by laboratory methods?
8. Classify acid-fast bacilli and indicate their pathogenicity. Outline the laboratory diagnosis and immunoprophylaxis of pulmonary tuberculosis.
9. Describe one of the concentration methods for isolation of Mycobacterium tuberculosis from the sputum. Describe its cultural characteristics in any two common media used for its isolation.
10. Name the organism responsible for meningitis. Describe the laboratory diagnosis of tuberculous meningitis.

### Topics for Short Answers

1. Concentration techniques for sputum
2. BCG vaccine
3. Name four media used for tubercle bacilli.
4. Lowenstein-jensen media (LJ media)
5. Mantoux test

## **19.MYCOBACTERIUM II: ATYPICAL MYCOBACTERIA**

### **Topics for Short Answers**

1. Atypical mycobacteria
2. Photochromogens

## **20.MYCOBACTERIUM III: M LEPRAE**

### **Topics for Short Answers**

1. Lepromin test
2. Armadillo
3. What are the two important differences between tuberculoid and lepromatous leprosy?
4. Mitsuda reaction

## **21.SPIROCHETES**

### **Long Essays**

What is a spirochete? Enumerate the spirochetes you know. Describe the laboratory diagnosis of syphilis.

1. Mention spirochetes pathogenic to humans. Describe the laboratory diagnosis of syphilis.
2. Enumerate the sexually transmitted bacterial infections. Describe the morphology, pathogenesis and laboratory diagnosis of infection caused by *Treponema pallidum*.
3. Classify spirochetes and name the diseases produced by pathogenic ones. Describe the bacteriology of any one of these and its laboratory diagnosis.
4. Classify pathogenic treponemes. Describe serological tests for diagnosis of syphilis.
5. Enumerate the treponemes and the diseases produced by them. Give a brief outline of the procedure for laboratory diagnosis of syphilis.
6. Name spirochetes of medical importance. Describe the pathogenicity and laboratory diagnosis of leptospirosis.
7. How would you diagnose a case of primary syphilis?
8. Discuss recent advances in serodiagnosis of syphilis.
9. What are the serological tests for syphilis? Describe the principles of Wasserman reaction.

### **Topics for Short Answers**

1. VDRL test
2. Standard test for syphilis
3. Weil's disease
4. Pathogenic spirochetes
5. Nichol's strain of *Treponema pallidum*
6. Direct demonstration of spirochetes
7. Causative agent and clinical picture of Lyme disease

## **22.MYCOPLASMA**

### **Topic for Short Answer**

1. Laboratory diagnosis of Mycoplasma pneumonia

## **23.ACTINOMYCETES**

### **Topic for Short Answer**

1. Actinomycosis

## **24.MISCELLANEOUS BACTERIA**

### **Topic for Short Answer**

1. Campylobacter

## **25.RICKETTSIACEAE**

### **Long Essay**

1. Classify rickettsiae. Give their general characteristics, pathogenicity and toxin formation.
2. What are rickettsiae bodies and how do they differ from bacteria? Mention their popular classification and give the laboratory diagnosis of classical typhus fever.
3. Define rickettsia and give its classification in relation to vector, diseases and causative agents.
4. Name various rickettsia. Tabulate diseases caused by them. What laboratory methods are used to diagnose them?

### **Topics for Short Answers**

1. Rickettsiae prowazekii
2. Epidemic typhus
3. Vectors for rickettsial infections
4. Scrub typhus
5. Weil-Felix test
6. Q fever
7. Name four rickettsial diseases and their vectors.
8. Name two vectors of typhus fevers.
9. List the arthropod vectors involved in rickettsial diseases.
10. Neil-Mooser reaction

## **26.CHLAMYDIAE**

### **Topics for Short Answers**

1. Inclusion bodies and their importance
2. Name the serotypes of chlamydiae and the diseases caused by them.

## **UNIT IV: Virology**

### **LONG ESSAY AND SHORT ANSWER QUESTIONS**

#### **GENERAL PROPERTIES OF VIRUSES**

##### **Topics for Short Answers**

1. Viral hemagglutination
2. Reproduction in viruses
3. Cultivation of viruses
4. Tissue cultures
5. State four differences between bacteria and viruses
6. Diploid cell culture
7. What is plaque assay? List two uses of it.
8. Define viral interference. Give one example.
9. Broad classification of viruses

#### **1. VIRUS-HOST INTERACTIONS: VIRAL INFECTIONS**

##### **Topics for Short Answers**

1. Viral inclusion bodies
2. Inclusion bodies and their importance
3. What are interferons? Describe their mode of action and clinical use.
4. Antiviral agents
5. Explain the importance of inclusion bodies with examples
6. Cowdry type A inclusions
7. List four rapid diagnostic tests in virology.
8. Mention briefly about the use of microscopy in the laboratory diagnosis of viral infections.

#### **2. BACTERIOPHAGE**

Topic for Short Answer

1. Draw a neat diagram of bacteriophage and label it.

#### **3. POXVIRUSES**

Topics for Short Answers

1. Enumerate pox viruses and the diseases caused by them.
2. Molluscum contagiosum

#### **4. HERPESVIRUS**

##### **Long Essay**

1. Classify herpes viruses. Mention their general characteristics. Add a brief note on herpes simplex virus.

##### **Topics for Short Answers**

Describe the lesions caused by the Herpes simplex virus and their laboratory diagnosis.

1. Etiology and pathogenesis of herpes zoster
2. Properties, lesions produced by the Epstein-Barr virus
3. Infectious mononucleosis
4. Classify Herpes virus.
5. Name the diseases caused by the Herpes simplex virus
6. Clinical manifestations of cytomegalovirus
7. Mention the complications of intrauterine infections due to cytomegalovirus.
8. Name two clinical manifestations which may result from Epstein-Barr virus infection.
9. Paul-Bunnell test

## **5. ADENOVIRUSES**

### **Topic for Short Answer**

1. Laboratory diagnosis of adenovirus

## **6. PICORNAVIRUSES**

### **Long Essay**

1. Classify picorna viruses. Describe the pathogenesis, laboratory diagnosis and prophylaxis of acute paralytic poliomyelitis.

### **Topics for Short Answers**

1. Differences between live and killed poliomyelitis vaccines
2. Oral polio vaccine
3. Polio vaccines
4. Classification of picorna virus
5. List four picorna viruses.
6. Differentiate Coxsackie's A from Coxsackie's B virus.
7. Infections caused by Coxsackie's virus

## **8. ORTHOMYXOVIRUS**

### **Long Essay**

1. List the differences between orthomyxoviruses and paramyxoviruses. Add a note on the antigenic variations seen in orthomyxoviruses and their epidemiological importance.

### **Topics for Short Answers**

1. Antigenic variation in influenza virus
2. What are the differences between influenza and parainfluenza viruses?
3. Draw a labeled diagram of the influenza virus.
4. Antigenic shift and antigenic drift

## **9. PARAMYXOVIRUSES**

### **Topics for Short Answers**

1. Pathogenesis and complications of mumps virus infections
2. Pathogenicity and laboratory diagnosis of measles
3. Name the paramyxoviruses

## **10.ARBOVIRUSES**

### **Long Essay**

1. What are general properties of arboviruses? List the arboviral infections in India. How are they diagnosed?
2. Describe the pathogenicity and laboratory diagnosis of dengue virus.

### **Topics for Short Answers**

1. Laboratory diagnosis of Japanese B encephalitis
2. Dengue virus
3. Kyasanur Forest disease (KFD)
4. Two arbovirus infections present in India
5. Complications of dengue viruses

## **11.RHABDOVIRUSES**

### **Long Essay**

1. Describe the morphology, pathogenesis, laboratory diagnosis and immunoprophylaxis of rabies virus.

### **Topics for Short Answers**

1. Differences between fixed and street virus in rabies
2. Anti-rabies vaccines
3. Tissue culture vaccines in rabies
4. Neural vaccines against rabies

## **12.HEPATITIS VIRUSES**

### **Long Essay**

1. List the viruses affecting the liver. Describe the pathogenesis, various markers and its significance in Hepatitis B virus infection.

### **Topics for Short Answers**

1. Hepatitis B virus
2. Draw a neat labeled diagram of the hepatitis B virus
3. Laboratory diagnosis of HBV infections
4. Hepatitis B vaccines
5. Laboratory diagnosis of hepatitis C virus (HCV) infection
6. Draw a neat diagram of the hepatitis B virus
7. HBsAg
8. How is the neonate born to a hepatitis B-positive mother protected?
9. Delta agent

## **13.MISCELLANEOUS VIRUSES**

### **Topics for Short Answers**

1. Rubella virus
2. Pathogenesis and laboratory diagnosis of rubella fever
3. Viral hemorrhagic fevers
4. List the etiology of acute viral hemorrhagic fever.

5. Viruses causing diarrhea
6. Define slow viruses
7. Name two slow virus infections.
8. List the viruses causing acute hemorrhagic fevers.
9. How is rotaviral diarrhea diagnosed?

#### **14.ONCOGENIC VIRUSES**

##### **Topics for Short Answers**

1. List four viruses associated with human malignancies.

#### **15. HUMAN IMMUNODEFICIENCY VIRUS: AIDS**

##### **Long Essay**

1. Describe the structure, pathogenicity and laboratory diagnosis of human immunodeficiency virus.

##### **Topics for Short Answers**

1. Draw a neat labeled diagram of HIV.
2. HIV
3. Western blot test and its use in virology
4. Opportunistic fungal infections in AIDS
5. Methods of HIV transmission
6. Prophylaxis against HIV
7. Window period in HIV infection
8. Labeled diagram of human immunodeficiency virus
9. Antigens of HIV
10. Three peptides of HIV-1 used for serodiagnosis
11. Parasites that occur in AIDS patients.

#### **UNIT V: Mycology and Applied Microbiology**

##### **LONG ESSAY AND SHORT ANSWER QUESTIONS**

##### **1. NORMAL MICROBIAL FLORA OF THE HUMAN BODY**

##### **Topics for Short Answers**

1. Normal flora of the intestinal tract

##### **2.BACTERIOLOGY OF WATER, MILK AND AIR**

##### **Topics for Short Answers**

1. Presumptive coliform count
2. Differential coliform count

##### **3.MEDICAL MYCOLOGY**

##### **Long Essay**

1. Write an essay on dermatophytes.

### Topics for Short Answers

- Describe dimorphic fungi.
- Classification of fungi based on sexual spore
- Describe dermatophytes
- Laboratory diagnosis of dermatophytosis
- Candida albicans
- Pathogenicity of Candida albicans
- Laboratory diagnosis of oral candidiasis
- Laboratory diagnosis of candidiasis
- Subcutaneous mycosis
- Eumycotic mycetoma
- Sporotrichosis
- Describe morphology, pathogenesis and diagnosis R seeberi
- Rhinosporidiosis
- Cryptococcosis
- Cryptococcus neoformans
- Opportunistic fungi
- Morphology and cultural characteristics of Aspergillus species
- Name the fungi causing otomycosis. Describe the laboratory diagnosis of otomycosis.
- Mucormycosis
- Mycotoxicosis and mycetism
- Mycotoxins
- Mention three antifungal agents
- Differences between mucor and rhizopus
- Sabouraud's dextrose agar
- Classify fungi morphologically.
- Name four classes of fungi.
- Enumerate three species of pathogenic dimorphic fungi.
- Name two media used for growing fungi.
- Classify fungi based on sexual spores.
- Name four asexual spores of fungi.
- Name four fungi causing superficial mycosis.
- Describe the classification of fungal infections.
- List out the different species of dermatophytes.
- Draw the microscopic morphology of the three genera of dermatophytes.
- What is ID reaction? Name two fungi causing this reaction.
- Name the units of the body that can be infected by trichophyton.
- Mention the conidia of dermatophytosis.
- Name four clinical types of dermatophytosis.
- Describe the Germ tube test.
- Name four species of candida of importance to humans.

- Reynolds-Braude phenomenon
- Name four species of candida of importance to humans.
- Name the fungi causing systemic infections.
- How do you collect specimen in cases of mycetoma?
- Mycetoma
- Name four opportunistic fungi causing diseases in humans.
- Name four fungi causing eye infections.
- Otomycosis
- Draw a labeled diagram of mucor.
- Draw a labeled diagram of rhizopus.
- Name two mycotoxins.
- Slide culture for fungus

#### **4.LABORATORY CONTROL OF ANTIMICROBIAL THERAPY**

##### **Topics for Short Answers**

1. Explain the different methods of antibiotic sensitivity testing in bacteria.

#### **5.IMMUNOPROPHYLAXIS**

##### **Topics for Short Answers**

1. Name two genetically engineered vaccines.
2. MMR vaccine

#### **6.HOSPITAL INFECTION**

##### **Topics for Short Answers**

1. Nosocomial infections
2. Control of hospital infection
3. Define hospital infection and name two organisms causing it.
4. Name two fungi which can cause hospital infections.

### **UNIT VI: Clinical Microbiology**

#### **LONG ESSAY AND SHORT ANSWER QUESTIONS**

##### **1. PROPERTIES OF MICROBIAL FLORA**

##### **Topics for Short Answers**

1. 'Hygiene' hypothesis
2. Immune stimulation
3. Carcinogens from normal flora
4. 'walf in sheep's clothing'
5. Pseudomembranous colitis

## **2. SOURCES AND TRANSMISSION OF INFECTION**

### **Topics for Short Answers**

1. Saprophyte
2. Commensalism
3. Vectors
4. Transmission of infection by inoculation
5. Carrier states in humans

## **3. COLLECTION AND TRANSPORT OF SPECIMENS FOR MICROBIOLOGICAL EXAMINATION**

### **Topics for Short Answers**

1. Collection of ova of *Enterobius vermicularis*
2. 'clean catch' urine collection technique
3. Collection of specimens from women with suspected genital infection due to *Neisseria gonorrhoeae*
4. Collection of blood samples for culture
5. Collection of specimens from the conjunctive, cornea and intraocular structures

## **4. DIAGNOSTIC METHODS IN CLINICAL MICROBIOLOGY**

### **Topics for Short Answers**

1. Light microscopy
2. Ziehl-Neelsen stain
3. CAMP test
4. Blood agar
5. Coagulase test

## **5. HOSPITAL-ACQUIRED INFECTIONS**

### **Topics for Short Answers**

1. Hospital-acquired urinary tract infection
2. Hospital-acquired bacteremia
3. Infections from environmental sources
4. Cross-infections
5. Standards of air quality in the operation theatre

## **6.RECENT ADVANCES IN DIAGNOSTIC TECHNIQUES IN CLINICAL MICROBIOLOGY**

### **Topics for Short Answers**

1. Radioimmunoassay
2. Flow cytometry
3. Real-time polymerase chain reaction
4. Radioallergosorbent test
5. Immunochromatographic assays for antigens

## **7.EMERGING INFECTIONS DISEASES**

### **Topics for Short Answers**

1. SARS-associated coronavirus
2. *Penicillium marneffe*
3. Beta lactamases
4. Vancomycin-resistant enterococci
5. Prevention of avian influenza.