

**NOVA INSTITUTE OF MEDICAL SCIENCES &
RESEARCH CENTRE**



DEPARTMENT OF MICROBIOLOGY

QUESTION BANK

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

SECTION 1: GENERAL MICROBIOLOGY

CHAPTER 1: INTRODUCTION & HISTORY

SHORT ANSWER QUESTIONS

1. Who had proposed the 'Germ theory of disease'? Discuss the contributions made by him to the field of Microbiology.
2. Discuss Koch's postulates that give the criteria of a microorganism to be accepted as the causative agent of an infectious disease.
3. Who has introduced solid media for the culture of bacteria? Discuss the contributions made by him to the field of Microbiology.
4. Enumerate the list of bacteria that do not satisfy one or more criteria of Koch's postulates.
5. Who is known as 'father of chemotherapy'? List the contributions of this scientist to the field of Microbiology.
6. Name the vaccines developed by Louis Pasteur.
7. Contributions of Edward Jenner.

CHAPTER 2: MICROSCOPY

SHORT ANSWER QUESTIONS

1. Discuss the working principle and clinical applications of light microscope.
2. Discuss the working principle and clinical applications of dark field microscope.
3. Discuss the working principle and clinical applications of phase contrast microscope.
4. Discuss the working principle and clinical applications of fluorescence microscopy.
5. Discuss the working principle and clinical applications of electron microscope.

CHAPTER 3.2 : MORPHOLOGY AND PHYSIOLOGY OF BACTERIA

ESSAY QUESTIONS

1. Describe the morphology and functions of bacterial cell components and their applications.
2. Discuss the role of a bacterial cell wall structure in the diagnosis and antimicrobial treatment of a bacterial infection.

SHORT ANSWER QUESTIONS

1. Morphological classification of bacteria.
2. Bacterial anatomy
3. Differentiate the gram-positive and gram-negative bacterial cell walls with the help of a labelled diagram.

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4. What is the structure in a bacterial cell that is highly resistant to the resting stage, formed in unfavourable environmental conditions? Describe the morphology of this structure, types, and clinical importance.
5. Bacterial capsule.
6. What is the structure of the bacterial cell that helps in motility? Discuss its structure with a labelled diagram and clinical importance.
7. What is a bacterial growth curve? Discuss its relation with bacterial pathogenesis in a host.
8. Growth requirements of bacteria.
9. Autotrophs & Heterotrophs.
10. Multiplication of bacteria.
11. What are the various types of bacterial motility? Discuss its applications in bacterial identification.
12. L forms of bacteria.

CHAPTER 3.3: LABORATORY DIAGNOSIS OF BACTERIAL INFECTIONS

ESSAY QUESTIONS

1. Enumerate various clinical samples used for the laboratory diagnosis of infectious diseases. Describe collection and transportation procedures for each of them.
2. Following a penetrating trauma to his right thigh, a construction laborer developed discolored skin and foul-smelling discharge. A Gram-stained smear of the discharge revealed gram-positive bacilli. Describe the sample collection procedure and the general approach in the laboratory diagnosis of this clinical condition.
3. Discuss the various antimicrobial susceptibility testing methods.
4. Enumerate molecular methods used for the laboratory diagnosis of infectious diseases. Describe principles and clinical applications of each.

SHORT ANSWER QUESTIONS

1. What are the various culture media used for the primary processing of different types of clinical specimens?
2. Simple media.
3. Blood agar.
4. Mac conkey agar.
5. Robertson's cooked meat media.
6. What are selective culture media? Discuss their principle and uses with suitable examples.
7. What are enrichment media? Discuss their principle and uses with suitable examples.
8. Indicator media.
9. Differential media.
10. What are transport media? Discuss their principle and uses with suitable examples.
11. Anaerobic culture media.
12. Anaerobic culture methods.

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13. McIntosh Fildes's Anaerobic jar.
14. Streak culture.
15. Analyze the advantages and disadvantages of manual and automated blood culture methods.
16. Discuss the role of automation in diagnostic microbiology laboratory.
17. A suspected outbreak of infection has occurred in a ward. Describe how bacterial typing methods can be used in confirming and controlling such infections.
18. IMVIC reactions.
19. Antibiotic sensitivity testing.

CHAPTER 3.4: GENETICS OF BACTERIA

ESSAY QUESTION

1. Enumerate methods of horizontal gene transfer among bacteria. Describe the type of horizontal gene transfer mediated by the sex pilus.

SHORT ANSWER QUESTIONS

1. What is the mechanism of transferable drug resistance? Discuss its applications.
2. Mutation.
3. What is transformation? Discuss its applications.
4. Transduction.
5. Conjugation.
6. Transfer factor/ R factor
7. What are toxins coded by phage DNA? Describe the type of horizontal gene transfer involved in this.
8. What is a jumping gene? What is its clinical significance?
9. Plasmid/Episome.
10. Differentiate between bacterial resistance to antibacterials acquired due to mutation and conjugation.
11. Genetic engineering/ Gene transfer/ Recombinant DNA technology.

CHAPTER 3.5: ANTIMICROBIAL AGENTS& ANTIMICROBIAL RESISTANCE

ESSAY QUESTIONS

1. Classify cell wall acting antimicrobial agents with suitable examples.
2. Briefly describe various mechanisms of development of antimicrobial resistance in bacteria. Clinical implications of antimicrobial resistance in the treatment of infectious diseases.

SHORT ANSWER QUESTIONS

1. What are the various mechanisms of antibiotic resistance in bacteria?
2. Differences between mutational and transferable drug resistance.

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3. Describe intrinsic resistance in bacteria with examples.
4. What are the various beta-lactamase enzymes and their clinical applications?

CHAPTER 3.6: PATHOGENESIS OF BACTERIAL INFECTIONS

SHORT ANSWER QUESTIONS

1. What are the various mechanisms of microbial pathogenicity?
2. Bacterial virulence
3. Differentiate between endotoxins and exotoxins.
4. What are bacterial endotoxins? Discuss their properties and biological effects.

CHAPTER 4: GENERAL VIROLOGY

ESSAY QUESTION

1. Discuss in detail the various methods used for laboratory diagnosis of viral infections.

SHORT ANSWER QUESTIONS

1. General characters/properties of viruses.
2. Viral Multiplication.
3. Cultivation of viruses / Tissue culture / Cell cultures for growing viruses.
4. Methods of detecting viral growth in cell cultures.
5. Interferons—mechanism of action, types, and applications.
6. Inclusion bodies and their applications.
7. Viral vaccines.

CHAPTER 5: GENERAL PARASITOLOGY

SHORT ANSWER QUESTIONS

1. A 10-year-old boy reports a history of passing a worm in his stool 2 days ago. Describe the general approach to laboratory diagnosis of this condition.
2. Enumerate concentration methods used for parasites and describe briefly the principles and applications.
3. Briefly describe the role of peripheral blood smear examination for the diagnosis of parasitic infections.
4. Vectors in parasitology.
5. Draw two bile stained eggs.

CHAPTER 6: GENERAL MYCOLOGY

SHORT ANSWER QUESTIONS

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1. Classification of fungi of medical importance.
2. Discuss the laboratory diagnosis of fungal infections.

CHAPTER 7: NORMAL HUMAN FLORA

SHORT ANSWER QUESTIONS

1. What are the various beneficial and harmful effects of the normal flora?
2. Normal flora of Genito urinary tract.

CHAPTER 8: EPIDEMIOLOGY OF INFECTIOUS DISEASES

SHORT ANSWER QUESTIONS

1. What do you mean by carriers of infectious agents? Describe the various types of carriers.
2. Differentiate between droplet versus aerosol transmission with suitable examples.
3. Discuss the various modes of transmission of infections, with suitable examples.

SECTION 2: IMMUNOLOGY

CHAPTER 9: IMMUNITY (INNATE & ACQUIRED)

ESSAY QUESTIONS

1. Define and classify immunity. Describe the properties and mediators of the type of immunity that an individual possesses right from birth, due to his genetic or constitutional makeup.
2. Define and classify immunity. Describe components, mechanism and applications of the type of immunity that an individual acquires or adapts during the course of his life.

SHORT ANSWER QUESTIONS

1. What is the immunity called that indicates the overall immunity of a community towards a pathogen? Describe factors affecting this type of immunity. List the vaccinations, following which an individual effectively develops such type of immunity.
2. What is mucosal immunity and which antibody is responsible for mediating such immunity?
3. Differentiate active immunity from passive immunity.
4. Differentiate primary immune response from secondary immune response.
5. Differentiate naturally acquired active immunity and artificially acquired active immunity with examples.
6. Differentiate naturally acquired passive immunity and artificially acquired passive immunity with examples.

CHAPTER 10: ANTIGEN

SHORT ANSWER QUESTIONS

1. What are heterophile antigens? What are their diagnostic applications?
2. Define adjuvant. Discuss the mechanism of action, providing examples.
3. What are superantigens? Discuss their mechanism of action with examples.

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4. What is the difference between antigenicity and immunogenicity? Discuss the factors determining antigenicity.
5. Hapten.

CHAPTER 11: ANTIBODIES

ESSAY QUESTION

1. Define antibody. Describe the structure of an antibody with a neat and labelled diagram. Discuss the functions of various types of antibodies.

SHORT ANSWER QUESTIONS

1. Define monoclonal antibodies. Discuss the method employed for the production of monoclonal antibodies. Also discuss the diagnostic and clinical applications of monoclonal antibodies.
2. What are abnormal immunoglobulins? Discuss their pathogenesis and method of detection.
3. Discuss the characteristic features of IgG antibodies and their clinical and diagnostic applications.
4. Draw a diagram of IgG and label its parts.
5. Discuss the characteristic features of IgM antibodies and their clinical and diagnostic applications.
6. Discuss the characteristic features of IgA antibodies and their clinical and diagnostic applications.
7. IgE.

CHAPTER 12: ANTIGEN–ANTIBODY REACTIONS

ESSAY QUESTIONS

1. Enumerate the properties and types of antigen–antibody reactions. Discuss the principle, types, and diagnostic applications of enzyme-linked immunosorbent assay (ELISA).
2. Enumerate types of antigen–antibody reactions. Discuss the principle, types, and diagnostic applications of agglutination reaction.
3. A man has clinical and preliminary laboratory parameters suggesting infectious disease. The clinician decides to use antibody-based laboratory tests to confirm the same.(3+7)
 - a. Enumerate various methods by which antibodies can be detected.
 - b. Describe the principles of qualitative and quantitative methods of detection of various classes of antibodies using the agglutination method with suitable examples.

SHORT ANSWER QUESTIONS

1. Important characteristics of antigen-antibody reactions.
2. Precipitation reactions.
3. Coomb's test.
4. Complement fixation test.

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5. Neutralization test.
6. Enzyme-linked immunofluorescence assay — principle, advantages, disadvantages and diagnostic applications.
7. Indirect immunofluorescence assay — principle, advantages, disadvantages and diagnostic applications.
8. Immunochromatographic test — principle, advantages, disadvantages and diagnostic applications.
9. Chemiluminescence immunoassay (CLIA) — principle, advantages, disadvantages and diagnostic applications.
10. Name the test methods useful for the detection of an antigen or an antibody at the bedside in a short time (point of care tests). Discuss their principles and applications.

CHAPTER 13: COMPLEMENT SYSTEM

ESSAY QUESTION

1. Describe the general characteristic features of complement. Explain in detail about the classical complement pathway. List various effector functions of complement.

SHORT ANSWER QUESTIONS

1. Components of Complement.
2. Discuss the alternative complement pathway.
3. Discuss the various mechanisms of microbial evasion of the complement system.
4. List the various diseases associated with complement deficiency.
5. Discuss the various effector functions of complements.
6. Lectin pathway of complement activation.

CHAPTER 14: COMPONENTS OF IMMUNE SYSTEM- Organs, cells & products

SHORT ANSWER QUESTIONS

1. Major histocompatibility antigen.
2. Cytokines – properties, classification, biological actions.
3. Tumor Necrosis Factor (TNF).
4. Development of T cells.
5. T cells & its subsets.
6. Development of B cells.
7. Antigen-presenting cells.
8. Differences between naïve, effector and memory T lymphocytes.
9. Suppressor or Regulatory T cells (T reg).
10. Phagocytosis.

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CHAPTER 15: IMMUNE RESPONSES: CELL-MEDIATED AND HUMORAL IMMUNITY

ESSAY QUESTIONS

1. Discuss the sequential steps involved in the induction of cell-mediated immune response.
2. Discuss the sequential steps involved in the induction of antibody-mediated immune response.

SHORT ANSWER QUESTIONS

1. What are antigen presenting cells? Describe pathways for antigen presentation.
2. Discuss about antibody dependent cell mediated cytotoxicity (ADCC).
3. What are the various effector functions of cell-mediated immunity?
4. What are the various effector functions of humoral immunity?
5. Natural killer cells.

CHAPTER 16: HYPERSENSITIVITY

ESSAY QUESTIONS

1. Define and classify hypersensitivity reactions. Describe mechanism of type IV hypersensitivity reaction in diseases and lab diagnosis.
2. A 17-year student who has recently joined MBBS, has come back to the hostel after the first vacation. After entering her hostel room, she suddenly developed an episode of severe sneezing and dyspnea. She had to be admitted to the casualty and when asked, she told that she has faced similar episodes since her childhood. (1+5+4)
 - a. What type of immune reaction is this?
 - b. Discuss the pathogenesis.
 - c. Describe management of this condition.
3. A man was administered intravenous ceftriaxone as per the antibiotic susceptibility report to treat urinary tract infection caused by *Escherichia coli*. Within 10 minutes he developed itching on face and chest, sweating, dizziness and breathlessness. On examination he was hypotensive and rhonchi were heard all over the chest. (1+4+3+2)
 - a. What is the probable diagnosis?
 - b. Discuss the underlying mechanism of this condition.
 - c. Discuss the underlying principles of its treatment.
 - d. Is it possible to predict such events? Justify.
4. A man developed red rash with severe itching on the wrist one day after he started wearing a new wrist watch. Though he stopped wearing it, the lesion persisted for more than a week and also blisters formed in the affected area. (1+5+4)
 - a. What is the probable diagnosis?
 - b. Discuss the underlying mechanism of this condition.
 - c. Enumerate laboratory tests that use this mechanism for diagnosis of infectious diseases.

SHORT ANSWER QUESTIONS

1. Define and classify hypersensitivity. Differentiate the types briefly with examples.

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2. Discuss the mechanism involved in a person developing breathlessness and hypotension following a wasp sting.
3. Discuss the immunological mechanisms involved in erythroblastosis fetalis.
4. What is anaphylaxis? What are the causes that can lead to anaphylaxis? Discuss its underlying pathogenesis and methods of prevention.
5. Atopy.
6. PK reaction.
7. Discuss the pathogenesis underlying the hypersensitivity reaction that occurs in contact dermatitis.
8. Discuss the pathogenesis underlying the immune complex-mediated hypersensitivity reaction.
9. Serum sickness.

CHAPTER 17: AUTOIMMUNITY

ESSAY QUESTION

1. Define autoimmunity. Classify various autoimmune diseases and briefly explain mechanisms involved in the development of autoimmunity with suitable examples.

SHORT ANSWER QUESTIONS

1. Discuss the mechanisms of autoimmunity.
2. Mechanisms of tolerance/ Immunological tolerance.
3. Describe the various methods for laboratory diagnosis of autoimmune diseases.
4. Describe the pathogenesis of post-vasectomy orchitis. List the other diseases with similar pathogenesis.
- 5.

CHAPTER 18: IMMUNODEFICIENCY DISEASES

SHORT ANSWER QUESTIONS

1. Classify Immunodeficiency disorders.
2. Severe combined immunodeficiencies (SCID).
3. Chronic granulomatous disease.
4. Wiskott–Aldrich syndrome.
5. Classify primary immunodeficiency diseases and name the common type of infections associated with them.

CHAPTER 19: TRANSPLANTATION IMMUNOLOGY

ESSAY QUESTIONS

1. A 55-year-old male patient with chronic kidney disease underwent a kidney transplantation donated by an unrelated donor. The patient developed a rejection reaction within 3 weeks. (2+5+3)
 - a. What is the immunological process of rejection?

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- b. Mention the pre-transplantation investigations to know the suitability of the transplant.
- c. How can this be prevented?
2. Classify transplantation based on the source of the graft. Summarize the events that happen at the tissue level if a graft is accepted in a sequential manner.

SHORT ANSWER QUESTIONS

1. Discuss about graft-versus-host reaction (GVHR).
2. Classify and differentiate tumor antigens. Enumerate their diagnostic applications.

CHAPTER 20: IMMUNOPROPHYLAXIS

SHORT ANSWER QUESTIONS

1. Describe briefly about the advantages and disadvantages of live vaccines and killed vaccines.
2. Discuss about the national immunization schedule in India for infants.
3. What is passive immunoprophylaxis and its clinical implications?
4. What is post-exposure immunoprophylaxis? Discuss its clinical implications.

SECTION 3: HOSPITAL INFECTION CONTROL

CHAPTER 21: HEALTHCARE-ASSOCIATED INFECTIONS (HAIs)

ESSAY QUESTIONS

1. Define healthcare-associated infections (HAIs). What are the risk factors, common etiological agents involved and their mode of transmission and source of infection? Discuss in detail about the measures followed for prevention of HAIs. (7+3)
2. What are the standard precautions? Discuss in detail about its various components. (2+8)
3. What are the transmission-based precautions? Discuss in detail about its various components. (2+8)

SHORT ANSWER QUESTIONS

1. Modes of transmission of healthcare-associated pathogens.
2. Hospital Infection Control Committee (HICC).
3. Hand hygiene.
4. Standard precautions.
5. Personal protective equipment (PPE).
6. Discuss about the type of transmission-based precaution applied while handling a case of pulmonary tuberculosis.

CHAPTER 22: MAJOR HEALTHCARE-ASSOCIATED INFECTIONS

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SHORT ANSWER QUESTIONS

1. Catheter-associated urinary tract infection (CAUTI).
2. Central line-associated bloodstream infection (CLABSI).
3. Ventilator-associated pneumonia (VAP).
4. Surgical site infection (SSI).
5. Care bundle approach for prevention of device-associated infections.

CHAPTER 23: STERILIZATION AND DISINFECTION

ESSAY QUESTIONS

1. Define sterilization and disinfection. Discuss the principle and uses of steam sterilizer in healthcare setting. (2+8)
2. What are chemical sterilants? Discuss their clinical applications in healthcare settings. (2+8)
3. What are the high-level disinfectants? Discuss their advantages, disadvantages and uses in healthcare setting. (2+4+4)

SHORT ANSWER QUESTIONS

1. Physical methods of sterilization.
2. Sterilization by Heat.
3. Hot air oven.
4. Moist heat.
5. Autoclave
6. Pasteurization.
7. Tyndallization.
8. What is Spaulding's classification of medical devices? What is its clinical application in healthcare settings?
9. Discuss the principle and uses of ethylene oxide (ETO) sterilizer in healthcare setting.
10. Discuss the principle and uses of plasma sterilizer in healthcare setting.
11. What is Central Sterile Services Department (CSSD)? Discuss its workflow and functions in healthcare settings.
12. Discuss the clinical applications of membrane filters in healthcare setting.
13. Radiation.
14. Discuss the uses of glutaraldehyde in healthcare setting. What are its advantages and disadvantages?
15. Fumigation.
16. Disinfection.
17. Gaseous disinfectants.
18. What are the applications of low-level disinfectants in healthcare setting?

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19. What are the applications of intermediate-level disinfectants in healthcare setting?
20. Mention four requirement of ideal chemical disinfectant.

CHAPTER 24: BIOMEDICAL WASTE MANAGEMENT

SHORT ANSWER QUESTIONS

1. What are the various methods available for disposal of biomedical waste?
2. Biomedical Waste Management.

CHAPTER 25: NEEDLE STICK INJURY / POST-EXPOSURE PROPHYLAXIS

SHORT ANSWER QUESTIONS

1. Sequential steps to be followed after a needle stick injury.
2. Describe post-exposure prophylaxis for sharp injury in a hospital.

CHAPTER 26: ANTIMICROBIAL STEWARDSHIP PROGRAM (ASP)

SHORT ANSWER QUESTIONS

1. What is antimicrobial stewardship program? Discuss the reasons why antimicrobial stewardship program is needed for a healthcare setting?
2. Discuss the forward and backward strategies of antimicrobial stewardship program.
3. What is escalation and de-escalation strategy of antibiotic therapy?
4. What is empirical antibiotic therapy and how is it different than targeted antibiotic therapy?

CHAPTER 27: ENVIRONMENTAL MICROBIOLOGY (BACTERIOLOGY OF WATER & AIR)

SHORT ANSWER QUESTIONS

1. What are the indicator organisms for fecal contamination of water and what are properties they should have?
2. What are the indications to perform water surveillance? What are the various methods for bacteriological examination of water? Discuss the principle and procedure of multiple tube methods.
3. What is Eijkman test? How it is performed?
4. Discuss the membrane filtration method for bacteriological examination of water.
5. What are the indications to perform air surveillance? What are the various methods available?
6. What is settle plate method? How it is performed? What are its advantages and disadvantages?
7. Discuss about the active monitoring of air quality by slit sampler method. What are its advantages and disadvantages?

SECTION 4: BLOODSTREAM & CARDIOVASCULAR SYSTEM INFECTIONS

CHAPTER 28: CARDIOVASCULAR INFECTIONS

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ESSAY QUESTIONS

1. A 75-year-old man was hospitalized with fever (101°F), severe back-pain and weakness in lower limbs. On examination, a few non-tender, small erythematous nodular lesions on the soles were seen. Echocardiogram showed valvular vegetations on mitral valve. He was diagnosed to have cardiac valve vegetations 3 years back. Laboratory tests showed CRP 2.5 mg/dL, ESR 66 mm/h, leukocytes $15.6 \times 10^9/L$ and creatinine 4.6 mg/dL. Two pairs of blood cultures were sent which subsequently were positive for viridans streptococci. The patient was immediately started on benzyl penicillin. (1+1+4+4)

- What is the probable clinical diagnosis?
- What are the typical etiological agents?
- Describe the diagnostic criteria used for this condition.
- How will you collect specimen for this clinical condition?

2. A 7-year-old female child presented to the cardiology OPD with swollen, red, and/or tender joints, which migrates from one joint to another (knees, ankles, hips, and elbows) over a period of hours. The child was having an abnormal gait. She also complained of painless, small, mobile lumps beneath the skin overlying bony prominences, particularly of the hands, feet, and elbows. On auscultation, a murmur was heard over the mitral valve area. ECG showed prolongation of the P-R interval. On inquiry, it was found that the child had an episode of sore throat 3 weeks back. (2+5+3)

- What is the probable clinical diagnosis and its etiological agent?
- Describe the diagnostic criteria used for this condition.
- How will you prevent the recurrence of such episodes?

SHORT NOTES

- Discuss the etiopathogenesis of infective endocarditis.
- Discuss the characteristic features and lab diagnosis of infections caused by viridans streptococci.
- Discuss the etiological agents, laboratory diagnosis and treatment of HACEK endocarditis.
- Discuss the agents involved in culture-negative endocarditis.

CHAPTER 29: BLOODSTREAM INFECTIONS

ESSAY QUESTIONS

1. A 28-year-old male is presented with elevated temperature of 102°F for >3 weeks. The patient has been hospitalized for the past seven days without a clear cause being identified. (2+2+6)

- What is your probable clinical diagnosis? Justify.
- List the various etiological agents.
- How will you approach laboratory diagnosis in such a case?

2. A 6-day-old girl weighing 2 kg at birth and born prematurely had fever, increased pulse rate, and low blood pressure. Serum procalcitonin levels were high. Blood culture yielded short, non-motile, Gram-negative bacilli that produced mucoid, pink colonies on MacConkey agar. (2+2+2+4)

- Identify the clinical condition and the organism isolated.

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- b. Name other potential causative agents.
- c. Describe risk factors for the development of this condition.
- d. Describe laboratory diagnosis.

SHORT NOTES

1. Discuss the etiopathogenesis of bloodstream infections.
2. What are the various methods for blood culture? Discuss their merits and demerits.
3. Compare laboratory diagnosis of septicemia using conventional and automated methods.
4. Describe the recommended method of collection of blood for blood culture.
5. Enumerate the etiology of fever of unknown origin.
6. Discuss the laboratory approach to diagnose fever of unknown origin.
7. Classify infectious causes of anemia with suitable examples.

CHAPTER 30: ENTERIC FEVER

ESSAY QUESTIONS

1. Meena, a young adult female, was admitted to the hospital with an intense headache and abdominal discomfort for the past 5 days. She had also developed a fever, which is of remittent type, with a gradual rise in a step ladder fashion. On examination, she was toxic with a temperature of 101°F, her tongue was coated, and mild splenomegaly was present. (1+2+4+3)
 - a. What is the most probable etiological diagnosis?
 - b. Describe the pathogenesis of this condition.
 - c. Mention sample collection and laboratory diagnosis in detail.
 - d. Add a note on treatment and vaccination available for this clinical condition.
2. Avinash, aged 28 years is presented with fever and abdominal pain since a week. On examination spleen and liver were found to be tender and enlarged. A serological test done showed the following results—TO:160, TH:20, AH:320 and BH:<20. (2+3+5)
 - a. What is the diagnosis and causative agent?
 - b. Describe the principle and interpretations of the test performed.
 - c. Describe other diagnostic tests that can be done to diagnose this condition during different periods of the condition.

SHORT NOTES

1. Kauffman white scheme for salmonella.
2. Discuss the strategies available for prevention of enteric fever.
3. Discuss the serological diagnosis of enteric fever.
4. Laboratory diagnosis of enteric fever in 1st week of infection.

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CHAPTER 31: RICKETTSIAL DISEASES

ESSAY QUESTIONS

1. Mr Saravanan, a 29-year-old military Jawan, was brought to the hospital in a state of altered sensorium, which he had developed a few hours ago. There was a history of high-grade fever and headache associated with vomiting for the past 2 days. On examination, he was febrile (102°F), and his blood pressure was 90/60 mm Hg. There were petechial rashes noted throughout his body except the palms and soles. On enquiry, he was found to have been exposed to body lice. Similar symptoms were also reported by a few members of his battalion. (1+4+5)

- What is the most probable diagnosis?
- List the other agents of the family to which the causative agent belongs, with their modes of transmission and the diseases they cause.
- How is this disease diagnosed in the laboratory?

2. An adult man presented with fever, headache, myalgia and rashes for 5 days. On examination a black eschar was seen on right upper arm, right axillary lymph nodes were enlarged and maculopapular rash were seen on the chest and back. He gave a history of participating in a trekking expedition in a hilly area with low lying trees and shrubs a week ago. (1+3+4+2)

- Identify the probable clinical condition.
- Describe etiopathogenesis of the condition.
- Describe laboratory diagnosis of this condition.
- Add a note on epidemiology of this disease.

SHORT NOTES

- Classify rickettsiae causing human infections and briefly describe laboratory diagnosis.
- Describe pathogenesis and laboratory diagnosis of scrub typhus.
- Describe principle, interpretations and limitations of Weil–Felix test.
- What is the etiological agent of Q fever? Discuss its mode of transmission, pathogenesis, laboratory diagnosis and treatment.

CHAPTER 32: MISCELLANEOUS BACTERIAL BLOODSTREAM INFECTIONS

ESSAY QUESTIONS

1. Kishan, a young farmer was complaining of fever, headache, and myalgia. Gradually, he developed yellow discoloration of skin and sclera. On examination, he had conjunctival suffusion and hepatosplenomegaly. His blood count showed neutrophilia with a thrombocytopenia. Liver function tests showed an elevated conjugated bilirubin with mild elevation of transaminases. He was also found to be oliguric and uremic. (2+3+3+2)

- What is the etiological agent and how is this disease transmitted?
- What is the typical clinical presentation and pathogenesis of this condition?
- How will you confirm the diagnosis?
- How will you manage this clinical condition?

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2. A lady working in paddy fields presented with fever with chills, headache, conjunctival suffusion, vomiting, abdominal pain, and myalgia. A few days after admission to hospital she developed jaundice and had decreased urine output. Her urine microscopy showed a spirally twisted organism. (1+4+5)

- Name the probable clinical condition.
- Describe etiopathogenesis and complications.
- Describe laboratory diagnosis.

SHORT NOTES

- Discuss the etiology, pathogenesis and laboratory diagnosis of relapsing fever.
- Serological diagnosis of brucellosis.
- Describe the pathogenesis and laboratory diagnosis of leptospirosis.

CHAPTER 33: HIV/AIDS

ESSAY QUESTIONS

1. A 25-year-old male with history of multiple sex partners is admitted with complaints of unexplained fever, progressive loss of weight, persistent diarrhea and generalized lymphadenopathy for the past 6 months. (1+4+5)

- What is the most probable diagnosis?
- Discuss the pathogenesis.
- Describe laboratory diagnosis of the above condition.

2. A commercial sex worker presents with intermittent fever, diarrhea and weight loss since one month. On examination she has oral thrush and enlarged lymph nodes in neck and axilla. (2+4+4)

- Diagnose the clinical condition and identify the most probable causative agent.
- Describe pathogenesis.
- Describe laboratory diagnosis of the underlying primary disease.

SHORT NOTES

- Discuss the WHO clinical stages of HIV/AIDS for adults.
- Describe the pathogenesis and laboratory diagnosis of HIV infection.
- Describe laboratory diagnosis and NACO strategies for diagnosis of HIV/AIDS.
- Describe laboratory diagnostic tests for detecting HIV/AIDS. Compare their advantages and limitations.

CHAPTER 34: VIRAL HEMORRHAGIC FEVERS

ESSAY QUESTION

1. Sunita, a 29-year-old female came to casualty with complaints of high-grade fever, severe joint pain, back pain and myalgia. Gradually, she developed petechial rashes over the body. On examination, she was found to have jaundice, hepatomegaly and a low platelet count (30,000/ μ L). A tourniquet test done over the cubital fossa

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demonstrated 25 petechial spots/square inch area. On inquiry, she said that she had gone for a camp a week back, where she was bitten by mosquitoes. (2+3+3+2)

- What is the clinical diagnosis and how is this disease transmitted?
- What is the pathogenesis of this clinical condition?
- What are the typical clinical stages and clinical presentations observed?
- How will you confirm the diagnosis?

SHORT NOTES

- Enumerate the etiological agents causing Viral Hemorrhagic Fevers (VHF). Discuss the pathogenesis, laboratory diagnosis of an arbovirus found in India that produces re-emerging disease characterized by acute fever with severe arthralgia.
- Discuss the pathogenesis and laboratory diagnosis of a viral hemorrhagic fever (VHF) that is named after a forest in Karnataka.

CHAPTER 35: MALARIA

ESSAY QUESTIONS

1. A 54-year-old male from Chhattisgarh presented with fever, chills and rigor for a duration of four days. The patient developed convulsions prior to admission. He was started on ceftriaxone by a private medical practitioner, but did not improve. On physical examination, muscle tone and tendon reflexes were reduced. Anemia and splenomegaly were present. The blood sample was collected for peripheral blood smear examination, which showed acroform, multiple ring forms, and crescent-shaped gametocytes inside RBCs. (1+3+2+4)

- What is the etiological agent based on history?
- Write briefly about the life cycle of the etiological agent.
- Describe the pathogenesis, clinical manifestations and complications produced.
- What are the various diagnostic modalities?

2. An 18-year-old female from Udupi, Karnataka, presented with high-grade fever which rises every third day with associated chills and rigor. Her blood sample was subjected to a rapid diagnostic test which revealed bands near pLDH line and control line, but no band near the HRP-II antigen line. (1+2+5+2)

- What is the probable etiological agent based on history?
- Describe a note on the epidemiology of this clinical condition.
- What are the various diagnostic modalities?
- How will you treat this condition?

SHORT NOTES

- Discuss the differentiating features that are useful for the speciation of the four *Plasmodium* species by peripheral blood smear examination.
- Discuss the epidemiology, clinical features and laboratory diagnosis of *Plasmodium knowlesi*.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

3. What are the complications seen in falciparum malaria. Discuss pathogenesis of black water fever.
4. Discuss the strategies of treatment of vivax and falciparum malaria in India as per the NVBDCP (National Vector Borne Disease Control Program) guideline.
5. Briefly discuss the drug resistance seen in falciparum malaria.
6. Discuss the differentiating features between babesiosis and malaria.

CHAPTER 36: VISCERAL LEISHMANIASIS AND TRYPANOSOMIASIS

ESSAY QUESTION

1. A 31-year-old man from Bihar presented with splenomegaly, anemia, and fever. The bone marrow aspirate collected was subjected to Giemsa staining which revealed amastigotes filled within a macrophage. (2+2+2+3+1)

- a. Identify the etiological agent and the clinical diagnosis.
- b. Write briefly about the life cycle of the etiological agent.
- c. Describe the pathogenesis and clinical manifestations produced.
- d. What are the various diagnostic modalities?
- e. How will you treat this condition?

SHORT NOTES

1. Describe the life cycle and laboratory diagnosis of visceral leishmaniasis.
2. Post-kala-azar dermal leishmaniasis—pathogenesis and laboratory diagnosis.
3. Describe the life cycle of leishmaniasis and the laboratory diagnosis of kala azar.
4. Describe the pathogenesis and laboratory diagnosis of Chagas' disease.

CHAPTER 37: LYMPHATIC FILARIASIS

ESSAY QUESTION

1. A 35-year-old female from a village of Bihar came to the hospital with a history of fever on and off for the past one year and recently developed unilateral swelling of the left lower limb. Her blood sample was sent for peripheral blood smear examination, which revealed microfilariae, 240 µm in length, with tail tips pointed free of nuclei. (1+3+4+2)

- a. What is the etiological diagnosis?
- b. Write briefly about the life cycle.
- c. Describe laboratory diagnosis.
- d. Outline the treatment of this clinical condition.

SHORT NOTES

1. Discuss the differentiating features of Bancroftian filariasis from those of Brugian filariasis.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

2. Describe the life cycle and clinical features of lymphatic filariasis.
3. Classify filarial worms based on their habitat and describe how diagnostic forms are differentiated.

CHAPTER 38: SYSTEMIC CANDIDIASIS AND SYSTEMIC MYCOSES

ESSAY QUESTION

1. A 29-year-old HIV-infected male presents to the clinic with history of high-grade fever and altered mental status. On examination, his blood pressure was found as 90/60 mm Hg, and respiratory rate was increased to 28 per minute. Blood cultures yielded creamy white colonies which on Gram stain revealed gram-positive oval budding yeast cells with pseudohyphae. (1+3+2+4)

- a. What is the clinical diagnosis and the likely etiological agent?
- b. Name the risk factors predisposing this clinical condition.
- c. What are the other clinical manifestations caused by this organism?
- d. Describe the laboratory diagnosis of this clinical condition in detail.

SHORT NOTES

1. Describe risk factors and laboratory diagnosis of systemic candidiasis.
2. Describe etiopathogenesis and general laboratory diagnosis of systemic fungal infections.
3. Describe pathogenesis, clinical features, and laboratory diagnosis of histoplasmosis.

SECTION 5: GASTROINTESTINAL INFECTIONS

CHAPTER 39: GASTROINTESTINAL INFECTIONS

ESSAY QUESTION

1. A 6-year-old boy developed severe watery diarrhea (12–15 times) since 2 days. On inquiry, it was found that two other members of same family and few children of the same locality also suffered from similar presentation last week. Stool specimen was collected and sent to the laboratory for the etiological diagnosis. (1+4+3+1)

- a. What is your probable clinical diagnosis?
- b. What are the etiological agents, pathogenesis and clinical manifestations?
- c. Describe the laboratory diagnosis in detail.
- d. What are the treatment modalities according to the etiological agents?

SHORT NOTES

1. What is traveler's diarrhea? Discuss its etiological agents, epidemiology and clinical presentation?
2. What is persistent and chronic diarrhea and list the etiological agents implicated?
3. Discuss the pathogenic mechanisms by which the enteric pathogens overcome host defenses.

CHAPTER 40: FOOD POISONING

ESSAY QUESTIONS

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

1. A group of patients presented to the emergency department with chief complaints of fever, vomiting and diarrhea. All of them had attended a birthday party some time back. **(1+3+4+2)**

- What is your probable clinical diagnosis?
- What are the etiological agents, pathogenesis and clinical manifestations?
- Describe the laboratory diagnosis.
- What are the general principles of treatment according to the etiological agents?

2. Enumerate the microbial agents of food poisoning and what are their common symptoms and common food sources. Discuss the laboratory diagnosis of a case of food poisoning.

SHORT NOTES

- Discuss the differences between diarrheal type and emetic type of food poisoning of *Bacillus cereus*.
- What is floppy child syndrome? Discuss its pathogenesis and management of this case.
- Classify organisms causing food poisoning. Describe general laboratory diagnostic approach in a case of food poisoning.

CHAPTER 41: GASTROINTESTINAL INFECTIONS DUE TO ENTEROBACTERIACEAE

ESSAY QUESTIONS

1. A lady aged 45 years presented with frequent passage of bloody mucopurulent stools. **(1+3+3+3)**

- Identify the probable causative agent(s).
- Describe laboratory diagnosis of this condition.
- Differentiate with dysentery caused by other common groups of organisms.

2. A group of adults from England on a trip to India developed diarrhea and vomiting. After laboratory investigations, the cause of diarrhea was identified as a cholera-like toxin produced by *Escherichia coli*. **(2+5+3)**

- Describe pathogenesis of diarrhea in these affected people.
- Describe other mechanisms by which *E. coli* can cause diarrhea.
- Describe laboratory diagnosis *E. coli* causing diarrhea, and its relevance to treatment.

SHORT NOTES

- Discuss the differences between nontyphoidal salmonellae and typhoidal salmonellae? Discuss the clinical manifestations produced by nontyphoidal salmonellae.
- Diarrheagenic *Escherichia coli*.
- Describe pathogenesis and laboratory diagnosis of bacillary dysentery.
- Differentiate bacillary and amoebic dysentery.
- Describe pathogenesis and laboratory diagnosis of non-typhoidal salmonellosis.
- Describe pathogenesis, clinical features, and laboratory diagnosis of intestinal infections caused by *Yersinia* species.

CHAPTER 42: CHOLERA, HALOPHILIC VIBRIOS

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

ESSAY QUESTIONS

1. Twelve people came to primary health center (PHC) after attending a village fair, with severe diarrhea, vomiting, and signs of dehydration. Stool sample was watery, and gram stain showed curved gram-negative bacilli. **(2+2+4+2)**
 - a. Identify the probable causative agent, and suggest another presumptive microscopic test that can be done at the PHC.
 - b. Suggest methods to transport the stool sample to the nearest microbiological lab, that is 30 km away for further microbiological investigations.
 - c. Describe microbiological investigations to confirm the diagnosis.
 - d. Outline the treatment.
2. Ten people came to the emergency department after attending a gathering, with severe diarrhea, vomiting, and signs of dehydration. They were passing watery stool, which showed bacilli with darting type of motility. **(3+4+3)**
 - a. Describe pathogenesis.
 - b. Describe the laboratory diagnosis of this condition.
 - c. Considering the possibility of an outbreak, as a medical officer in-charge of the area, describe what actions would you take.

SHORT NOTES

1. Prophylaxis against cholera.
2. Halophilic vibrios.
3. Laboratory diagnosis of cholera.

CHAPTER 43: MISCELLANEOUS BACTERIAL INFECTIONS

SHORT NOTES

1. Describe pathogenesis, clinical features, and laboratory diagnosis of *Helicobacter pylori* infection.
2. Describe pathogenesis, clinical features, and laboratory diagnosis of *Campylobacter jejuni* infection.
3. Describe pathogenesis and laboratory diagnosis of antibiotic associated diarrhea.
4. Describe pathogenesis, clinical features, and laboratory diagnosis of pseudomembranous colitis.

CHAPTER 44: VIRAL GASTROENTERITIS

SHORT NOTES

1. Enumerate the agents of viral gastroenteritis. Discuss the pathogenesis, clinical manifestations and laboratory diagnosis of rotavirus gastroenteritis.
2. Name viruses causing diarrhea. Describe their laboratory diagnosis.
3. Describe pathogenesis, laboratory diagnosis and prevention of Rotavirus diarrhea.

CHAPTER 45: INTESTINAL PROTOZOAN AND FUNGAL INFECTIONS

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

ESSAY QUESTIONS

1. A 17-year-old boy presented with bloody diarrhea with mucus and pus cells, colicky abdominal pain, fever, and prostration. Wet mount examination of the stool sample was performed which showed trophozoites of 5–20 µm, actively motile, with finger-like pseudopodia. **(1+3+4+2)**

- What is the etiological diagnosis?
- Describe the pathogenesis and clinical manifestations produced.
- What are the various diagnostic modalities?
- How will you treat this condition?

2. A 46-year-old female patient infected with HIV presented to the casualty with severe profuse diarrhea, with a frequency of 15 times a day for the past 10 days. She also complained of weight loss and abdominal pain. The stool microscopy revealed round sporulated oocysts (4–6 µm in size), containing four sporozoites. **(1+4+3+2)**

- Identify the etiological agent.
- Write briefly about the life cycle of the etiological agent.
- What are the various diagnostic modalities?
- How will you treat this clinical condition?

SHORT NOTES

- Discuss the differentiating features of bacillary dysentery and amoebic dysentery.
- Discuss the infections caused by Microsporidia species.
- Discuss the infections caused by *Cystoisospora belli*.
- Discuss the infections caused by *Cryptosporidium* species.
- What is the causative agent of ciliary dysentery? Discuss its pathogenesis and laboratory diagnosis.
- Describe etiopathogenesis and laboratory diagnosis of diarrhea caused by coccidian parasites.

CHAPTER 46: INTESTINAL HELMINTHIC INFECTIONS

ESSAY QUESTIONS

1. A 9-year-old child came to the pediatric OPD with history of passing segments of a worm. The stool examination revealed—brown, round to oval eggs, containing an embryo with three pairs of hooklets, surrounded by radially striated embryophore. **(2+4+4)**

- Identify the disease and the probable causative agent(s).
- Write briefly about the life cycle of the etiological agent(s).
- What are the various diagnostic modalities?

2. An 8-year-old girl came to the pediatric OPD for school health check-up. On examination, she had pallor. Peripheral blood smear revealed microcytic, hypochromic anemia. Stool microscopy (saline mount) showed round to oval non-bile-stained egg with segmented ovum (four blastomeres). **(1+4+3+2)**

- Identify the causative agent.
- Write briefly about the life cycle of the etiological agent.
- What are the various diagnostic modalities?
- What is deworming strategy?

3. Mother of a child aged 5 years brought whitish thin worms around 1 cm long from the child's undergarments. The child had perianal pruritus for one week. **(1+3+4+2)**

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

- Identify the causative agent.
- Describe life cycle and clinical features of this condition.
- Describe laboratory diagnosis.
- Suggest preventive measures.

SHORT NOTES

- What are soil-transmitted helminthic infections? Discuss the WHO's approach for the control of these infections in the World.
- Compare and contrast hook worm and *Strongyloides* infections.
- Describe life cycle, clinical features and laboratory diagnosis of ascariasis.
- Describe life cycle, clinical features and laboratory diagnosis of hook worm infection.
- Describe life cycle, clinical features and laboratory diagnosis of enterobiasis.
- Describe life cycle, clinical features and laboratory diagnosis of trichuriasis.

SECTION 6: HEPATOBILIARY SYSTEM INFECTIONS

CHAPTER 47: INFECTIVE SYNDROMES OF HEPATOBILIARY SYSTEM

SHORT NOTE

- What is spontaneous bacterial peritonitis? How is it different from secondary bacterial peritonitis?

SCENARIO-BASED SHORT NOTE

1. A 54-year-old man presents with fever and abdominal tenderness on right side. Ultrasonogram showed hepatomegaly with hypoechoic lesion in the right lobe of liver measuring 5 cm in diameter with homogeneous content. The provisional clinical diagnosis of pyogenic liver abscess is made. Discuss briefly the etiological agents, pathogenesis and laboratory diagnosis of this condition.

CHAPTER 48: VIRUSES OF HEPATOBILIARY SYSTEM

ESSAY QUESTION

- A 40-year-old male presented with history of loss of appetite, malaise and jaundice of 2 months duration. On examination, there was icterus, hepatomegaly and tenderness in the right hypochondriac region. He gave a history of blood transfusion in the past. Serological test was positive for HBsAg. **(1+5+4)**
 - What is the most probable etiological diagnosis?
 - Discuss laboratory diagnosis of this condition.
 - How will you prevent the transmission of this infection?

SHORT NOTES

- Describe pathogenesis, clinical features, and laboratory diagnosis of hepatitis B.
- Describe pathogenesis, clinical features, and laboratory diagnosis of hepatitis C.
- Describe pathogenesis, clinical features, and laboratory diagnosis of hepatitis E.
- Describe laboratory diagnosis and prevention of hepatitis B.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

5. Describe clinical features, laboratory diagnosis and prevention of feco-orally transmitted viral hepatitis.

CHAPTER 49: PARASITIC INFECTIONS OF HEPATOBILIARY SYSTEM

ESSAY QUESTIONS

1. A 42-year-old female patient was brought to the emergency department with complaints of a sudden episode of high-grade fever and acute pain in the right hypochondrium. She had a history of dysentery and jaundice for the last two months. Ultrasound scan of the abdomen revealed an enlarged liver with acute peritonitis. Pus aspirated from the liver was thick and chocolate brown in color. Microscopy of liver pus revealed necrotic hepatocytes without any pus cells. (2+4+4)

- a. Identify the clinical condition and the probable causative agent.
- b. Discuss the pathogenesis and complications seen in this condition.
- c. What are the various diagnostic modalities?

2. A 24-year-old woman presented with complaints of pain in the right hypochondrium. Ultrasonography revealed a single space-occupying cystic lesion in the right lobe of the liver. The cyst was removed surgically and subjected to histopathological examination, which revealed a three-layered cyst wall with attached brood capsules. (2+3+2+3)

- a. Identify the disease and the causative agent.
- b. Write briefly about the life cycle of the etiological agent.
- c. Discuss the pathogenesis and complications seen in this condition.
- d. What are the various diagnostic and treatment modalities?

SHORT NOTES

1. What is visceral larva migrans? Enumerate the agents causing this clinical condition.
2. Describe life cycle, clinical features, and laboratory diagnosis of hepatic amoebiasis.
3. Describe life cycle, clinical features, and laboratory diagnosis of hydatid cyst of liver.

SECTION 7: SKIN, SOFT TISSUE & MUSCULOSKELETAL INFECTIONS

CHAPTER 50: INFECTIVE SYNDROMES OF MUSCULOSKELETAL SYSTEM

SHORT NOTES

1. Discuss the various types of clinical manifestations of skin lesions.
2. In what ways are infections in the subcutaneous tissues usually manifested?

CHAPTER 51: STAPHYLOCOCCAL INFECTIONS

ESSAY QUESTIONS

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

1. A 55-year-old male was admitted to the hospital with complaints of severe pain in the lateral aspect of his left calf and small amount of pus discharge from the ingrown hair. On physical examination, the local area was found to be red, warm and tender. Pus was aspirated and was subjected to Gram stain (showed gram-positive cocci in clusters), culture on blood agar (showed golden yellow pigmented beta hemolytic colonies). (2+2+3+3)

- What is the clinical diagnosis and its causative organism?
- List the infections caused by this organism.
- List the virulence factors of this organism.
- Briefly discuss the laboratory diagnosis of this clinical condition.

2. A lady in her post-partum period presented with painful breast lesion on the left side and fever for 2 days. Upon examination, a small, tender lump was noted in her left breast, with pus discharge. Gram stain of the pus showed gram-positive cocci in clusters. (2+5+3)

- Name the clinical condition and identify the causative agent.
- Describe laboratory diagnostic tests to identify the organism to species level, and to differentiate it with closely related bacteria.
- Considering that the organism is resistant to cefoxitin, describe principles of appropriate treatment.

SHORT NOTES

- Describe the virulence factors of *Staphylococcus aureus*.
- Describe measures to prevent transmission of Methicillin-resistant *S. aureus* (MRSA).
- Describe pathogenesis, clinical features, and laboratory diagnosis of infections caused by coagulase-negative staphylococci.
- Describe pathogenesis and principles of treating infections caused by methicillin-resistant *S. aureus*.
- Coagulase test
- Toxic shock syndrome

CHAPTER 52: BETA-HEMOLYTIC STREPTOCOCCAL INFECTIONS

ESSAY QUESTION

1. Chinnu, a 3-year-old girl from Mangaluru presented with tender, bright red, subcutaneous swelling on malar area of the face with indurated peaud'orange texture of involved skin along with fever and chills. A clinical diagnosis of cellulitis was made. The culture of the aspirated pus revealed beta-hemolytic pin point colonies. (1+5+4)

- What is the most likely etiologic agent?
- Describe the virulence factors and the other clinical manifestations produced by the etiological agent?
- Briefly discuss the laboratory diagnosis and treatment of this clinical condition.

SHORT NOTE

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

1. Classification of Streptococci.
2. Discuss the etiopathogenesis of necrotizing fasciitis.
3. Discuss the suppurative infections caused by group A *Streptococcus*.
4. Discuss the virulence factors of *Streptococcus pyogenes*.
5. ASO (Anti- Streptolysin -O) Test.

CHAPTER 53: GAS GANGRENE AND INFECTIONS CAUSED BY ANAEROBES

ESSAY QUESTION

1. A 23-year-old male was admitted 5 days after a crush injury to his right leg following a road traffic accident. He had been treated by a local village quack. On examination, the wound which was bandaged with a soiled gauze, appeared to be heavily contaminated with soil, the local muscles appeared to have been crushed, there was edema and pain at the site and crepitus was felt on palpation. (2+4+4)

- a. What is the clinical condition? List the etiological agents responsible for this condition.
- b. Describe in detail the pathogenesis of this condition.
- c. Describe in detail the laboratory diagnosis of this condition.

SHORT NOTES

1. Discuss the clinical presentations of anaerobic infections.
2. Discuss the general laboratory diagnosis of anaerobic infections.
3. Naegler's reaction.
4. Discuss the pathogenesis and clinical manifestations of gas gangrene.
5. Laboratory diagnosis of gas gangrene.
6. List the various non-sporing anaerobes and discuss the infections produced by them.
7. Describe pathogenesis and laboratory diagnosis of infections caused by nonsporing anaerobes.

CHAPTER 54: LEPROSY

ESSAY QUESTION

1. A 37-year-old lady from a village presented with numerous hypopigmented skin lesions on her arms, cheeks, abdomen, back and legs for the last 5 years. Her eyebrows had started thinning and she had numbness in her forearm. Specimen collected from the skin lesion was subjected to microscopy which showed acid fast bacilli arranged in globi.

- a. What is the clinical diagnosis and its causative organism?
- b. Describe laboratory diagnosis of this condition.
- c. Outline the treatment.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

SHORT NOTES

1. Discuss the differentiating features between lepromatous and tuberculoid leprosy.
2. Discuss the differences between lepra reaction type I and lepra reaction type II.
3. Discuss the treatment strategy of leprosy.
4. Describe clinical classification of leprosy and expected results of common laboratory investigations in each.
5. Differentiate lepromatous and tuberculoid leprosy.

CHAPTER 55: MISCELLANEOUS BACTERIAL INFECTIONS OF SSTI

ESSAY QUESTION

1. A farmer presented to the outpatient department with history of papulovesicular lesion over the neck region, which later on developed into a coal black, necrotic wound for the past 3 to 4 days. Gram staining of biopsied lesion revealed gram-positive bacilli arranged in chains. (2+4+4)

- a. What is the clinical diagnosis and causative agent?
- b. Describe pathogenesis and clinical presentations of this infection.
- c. Describe the laboratory investigations to confirm the diagnosis.

SHORT NOTES

1. List the non-venereal treponematoses and their etiological agents. Discuss the epidemiology and clinical manifestations seen in yaws.
2. Discuss the cutaneous lesions produced by nontuberculous Mycobacteria (NTM).
3. Differentiate *Actinomyces* spp and *Nocardia* species.
4. Describe laboratory diagnosis of actinomycetoma.

CHAPTER 56: VIRAL EXANTHEMS AND OTHER CUTANEOUS VIRAL INFECTIONS

ESSAY QUESTIONS

1. A 7-year-old boy had developed multiple painful vesicles over the lips and buccal mucosa. His parents revealed that two children of his school had a similar presentation few days back. Scrapings taken from the lesion demonstrated presence of multinucleated giant cell (Tzanck cell).

- a. What is the most probable etiological diagnosis?
- b. List the other agents causing this type of infection.
- c. List the other infection produced by this etiological agent and its pathogenesis.
- d. How is this infection diagnosed in the laboratory?

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

2. An elderly diabetic man has had painful vesicular lesions on the left part of his chest for 4 days. On examination, the vesicles were found to be arranged horizontally, along the ribs. There were no similar lesions on the left part of the chest. (2+3+3+2)

- Identify the clinical condition and its causative agent.
- Describe the pathogenesis.
- Describe laboratory diagnosis of this condition.
- Suggest prophylactic measures.

3. A lady has fever and painful blisters on her lips for 3 days. She develops such painful blisters every time she gets fever. Scrapings taken from the lesion demonstrated presence of multinucleated giant cell (Tzanck cell). (2+3+3+2)

- Identify the clinical condition and its causative agent.
- Describe pathogenesis.
- Describe clinical presentations and complications of this organism.
- Describe laboratory diagnosis of this condition.

SHORT NOTES

- Describe pathogenesis and laboratory diagnosis of herpes labialis.
- Describe pathogenesis and laboratory diagnosis of shingles.
- Describe pathogenesis, clinical features and laboratory diagnosis of measles.
- Describe pathogenesis, clinical features and laboratory diagnosis of rubella.
- Describe clinical features, laboratory diagnosis, and prevention of measles.
- Describe clinical features, laboratory diagnosis, and prevention of rubella.
- Describe clinical features, laboratory diagnosis, and prevention of chickenpox.

CHAPTER 57: PARASITIC INFECTIONS OF SKIN, SOFT TISSUE AND MUSCULOSKELETAL SYSTEM

SHORT NOTES

- What are the agents causing old world cutaneous leishmaniasis (CL)? Discuss their clinical presentations and laboratory diagnosis.
- Discuss the pathogenicity, clinical features and laboratory diagnosis of trichinellosis.
- Discuss the pathogenicity, clinical features and laboratory diagnosis of dracunculiasis.
- Name organisms causing cutaneous larva migrans. Describe pathogenesis and treatment.

CHAPTER 58: FUNGAL INFECTIONS OF SKIN, SOFT TISSUE AND MUSCULOSKELETAL SYSTEM

ESSAY QUESTIONS

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

1. A 21-year-old male had developed characteristic well-demarcated annular or ring-shaped pruritic scaly skin lesions with central clearing and raised edges on his chest. Culture of the skin scraping done on Sabouraud dextrose agar produced colonies, which on LPCB mount showed microconidia and macroconidia. (2+3+5)

- What is the clinical diagnosis and what are the etiological agents?
- Describe the various clinical manifestations produced.
- Add a note on the laboratory diagnosis of this condition.

2. A farmer has slowly progressive painless swelling of left foot with multiple discharging sinuses. Some of the sinus openings are studded with black sand-like particles. X-ray shows erosion of underlying bones. (2+3+5)

- Describe pathogenesis of this clinical condition.
- Enumerate the possible causative agents and differences in their presenting features.
- Discuss the laboratory diagnosis of this condition.

SHORT NOTES

- List various types of subcutaneous fungal diseases. Describe the etiology, clinical manifestations and laboratory diagnosis of mycetoma.
- Name common organisms causing tinea corporis. Describe laboratory diagnosis.
- Discuss the pathogenesis and laboratory diagnosis of pulmonary penicilliosis.
- List the agents causing chromoblastomycosis. Discuss the clinical presentation and typical laboratory finding observed.
- What are risk factors, clinical presentation and laboratory diagnosis of mucocutaneous candidiasis?
- Classify dermatophytes and describe their differentiating features.
- Describe pathogenesis, clinical features and laboratory diagnosis of sporotrichosis.
- Etiopathogenesis and laboratory diagnosis of tinea versicolor.

SECTION 8: RESPIRATORY TRACT INFECTIONS

CHAPTER 59: INFECTIVE SYNDROMES OF LOWER RESPIRATORY TRACT INFECTIONS

ESSAY QUESTION

1. A 16-month-old boy was admitted with fever, lethargy, productive cough with purulent sputum and shortness of breath. On examination, dull note on percussion and consolidation on auscultation were noted. Sputum and blood specimens were obtained, and sent for bacteriological culture. (2+8)

- What is the clinical diagnosis and the etiological agents?
- Discuss the pathogenesis, clinical presentation, laboratory diagnosis and treatment of this clinical condition.

SHORT NOTES

- Describe approach to laboratory diagnosis of bacterial lower respiratory tract infections.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

2. Discuss about etiological agents, clinical presentations and management of a case of acute laryngotracheobronchitis.
3. What is Vincent's angina? Describe briefly the clinical presentation and laboratory diagnosis of this clinical condition.
4. List the common infectious etiological agents of pleural effusion. Write briefly about the clinical presentation and laboratory diagnosis of this clinical condition.

CHAPTER 60: BACTERIAL INFECTIONS OF UPPER RESPIRATORY TRACT

ESSAY QUESTIONS

1. A 6-year-old child with history of pain in the throat and fever for 2 days was brought to ear, nose, and throat (ENT) outpatient department (OPD). On examination, he was febrile and throat examination revealed patch over the tonsils. His throat swab was shown gram positive club-shaped bacilli. (2+2+4+2)

- a. What is the probable clinical diagnosis and probable etiological agent causing this clinical condition?
- b. Describe the pathogenesis of this condition.
- c. Describe methods to confirm the diagnosis in the laboratory.
- d. Outline the treatment.

2. A child aged 7 years with high-grade fever, toxic, pain in the throat, and inability to swallow was brought to the casualty. Upon examination, a white patch was found on the fauces, which began bleeding upon touch. No history of immunization is available. (1+1+2+4+2)

- a. What is the clinical diagnosis?
- b. Name the etiological agent causing this clinical condition.
- c. Write in detail pathogenesis
- d. Laboratory diagnosis of this condition.
- e. Describe prophylaxis of this condition.

SHORT NOTES

1. Discuss about the immunoprophylaxis of diphtheria.
2. Discuss about the clinical presentation and laboratory diagnosis of streptococcal sore throat.
3. Name organisms causing white patch on tonsils. Describe laboratory diagnosis of faucial diphtheria.

CHAPTER 61: BACTERIAL PNEUMONIA

ESSAY QUESTIONS

1. A man aged 24 years has fever, cough with purulent sputum and breathlessness since 5 days. On examination, the right lower lung areas have a dull note to percussion and bronchial breathing. Chest X-ray shows consolidation of the right lower lobe of the lung. (2+5+3)

- a. Enumerate organisms causing this type of presentation.
- b. Describe the approach to laboratory diagnosis of this condition.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

c. Discuss specific preventive measures available.

2. Alisha, a 4-year-old girl from Bhubaneswar, was brought to the emergency room by her parents due to an acute onset of fever, productive cough, and dyspnea for the past two days. Physical examination revealed a dull note on percussion. Direct examination of the sputum revealed plenty of pus cells and gram-positive, lanceolate-shaped diplococci surrounded by a halo. (2+4+2+2)

a. What is your clinical diagnosis of this condition and the most likely etiologic agent?

b. How will you confirm the etiological agent in the laboratory?

c. Describe the virulence factors and pathogenesis of the etiological agent.

d. Describe the treatment this clinical condition.

SHORT NOTES

1. Bile solubility test.
2. Quellung reaction.
3. Write briefly about vaccines available for prevention of invasive pneumococcal disease.
4. Write briefly on hypervirulent *Klebsiella pneumoniae*.

CHAPTER 62: BACTERIAL ATYPICAL PNEUMONIA

ESSAY QUESTION

1. A 42-year-old man presents with fever, dry cough, and breathlessness for 5 days. Chest X-ray showed thickened bronchial markings and streaks of interstitial infiltration. What is the probable diagnosis of this clinical condition? Describe the etiology and the approach to laboratory diagnosis of this condition. (1+2+7)

SHORT NOTES

1. Write briefly on the pathogenesis and laboratory diagnosis of *Mycoplasma pneumoniae*.
2. Write briefly on the pathogenesis and laboratory diagnosis of Legionnaires' disease.
3. Describe the pathogenesis, clinical features, and laboratory diagnosis of psittacosis.
4. Describe clinical features and laboratory diagnosis of respiratory infections caused by *Chlamydia* species.

CHAPTER 63: TUBERCULOSIS AND NONTUBERCULOUS MYCOBACTERIAL INFECTIONS

ESSAY QUESTIONS

1. Rajesh, a 28-year-old male, was admitted to the hospital with complaints of low-grade fever, loss of weight and appetite, and chronic cough with expectoration for the past 6 months. Sputum examination revealed long, slender, and beaded acid-fast bacilli. (1+3+4+2)

a. What is your provisional diagnosis?

b. Describe the pathogenesis of this condition.

c. Mention the laboratory diagnosis in detail.

d. Mention briefly about drug resistance that can occur in this etiological agent.

2. A man with a cough and expectoration was diagnosed as tuberculosis with sputum AFB grade 3+. After one month of an appropriate NTEP regimen, the grade remains 3+. (4+3+3)

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

- a. Summarize the current diagnostic strategy for tuberculosis under NTEP.
- b. Discuss possible causes for no response to the treatment in this case.
- c. Discuss the procedure to confirm this issue and resolve the same.

SHORT NOTES

1. Discuss briefly about BCG vaccine.
2. What is multidrug resistant tuberculosis? Discuss management of the same.
3. Describe briefly about the nontuberculous mycobacterial infections.
4. Write briefly on recent advances in diagnosis of tuberculosis.
5. Discuss on NTEP diagnostic algorithm for pulmonary tuberculosis.
6. Write briefly on the role of molecular techniques in diagnosis of various clinical forms of tuberculosis.
7. Discuss the role of sputum microscopy as a diagnostic and prognostic tool for tuberculosis under NTEP.
8. Discuss the methods available for diagnosis of latent tuberculosis.

CHAPTER 64: PERTUSSIS (WHOOPIING COUGH)

ESSAY QUESTION

1. A boy aged 2 years with poor immunization presented with severe bouts of cough followed by a noisy inspiration for 3 days. The boy had fever, a running nose, and malaise for a week before the cough began. Gram stain of the organism grown from a suitable sample showed short gram-negative bacilli arranged like a 'thumb print'. (2+3+3+2)

- a. Identify the clinical condition and the probable causative agent.
- b. Describe pathogenesis.
- c. Describe laboratory confirmation methods.
- d. Briefly describe prophylaxis.

SHORT NOTES

1. Describe the pathogenesis and laboratory diagnosis of pertussis.
2. Briefly describe about virulence factors of the etiological agent of whooping cough.
3. Discuss vaccination against pertussis.

CHAPTER 65: INFECTIONS DUE TO NON-FERMENTERS

SHORT NOTES

1. Discuss the role of medically important non-fermenters in healthcare associated infections.
2. Describe pathogenesis and laboratory diagnosis of infections caused by *Pseudomonas aeruginosa*.
3. Describe the pathogenesis, clinical features, and laboratory diagnosis of melioidosis.
4. Describe the pathogenesis and laboratory diagnosis of respiratory infections caused by *Acinetobacter baumannii*.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

CHAPTER 66: MYXOVIRUS INFECTIONS

ESSAY QUESTION

1. In early 2018, a 62-year-old debilitated man from Maharashtra presented with symptoms of a severe upper respiratory tract infection. He had a history of exposure to a patient having a similar condition. The nasopharyngeal swab collected was sent to the reference laboratory for real-time PCR, which revealed the causative agent as influenza A/H1N1. (1+5+2+2)

- What is the mechanism of emergence of this particular strain of the virus?
- Describe the pathogenesis, mode of transmission, and laboratory diagnosis of the causative agent.
- Add a note on the epidemiological impact of the recent 2018 epidemic in India produced by this causative agent.
- What are the preventive measures available for this condition?

SHORT NOTES

- Briefly discuss the clinical presentations and laboratory diagnosis of parainfluenza viruses.
- Discuss briefly on H1N1 2009 pandemic flu.
- Discuss on preventive measures used to control an outbreak of influenza.
- Discuss briefly on origin, epidemiology, and laboratory diagnosis of avian flu.
- Discuss briefly on Respiratory syncytial virus infection.
- Describe clinical features, laboratory diagnosis and prophylaxis of mumps.

CHAPTER 67: CORONAVIRUS INFECTIONS INCLUDING COVID-19

ESSAY QUESTION

1. A 65-year-old patient (without wearing any mask) with complaints of dry cough, sore throat and fever visited a hospital. The security guided him to go to the casualty. The resident doctor (without mask) took history, examined the patient. His throat swab was sent for COVID-19 testing which came positive. Subsequently the security and the resident doctor also turned positive for COVID-19. (2+4+4)

- Identify the infection control breaches.
- Discuss the laboratory diagnosis of this disease.
- Discuss the infection control measures to prevent the transmission.

SHORT NOTES

- Discuss briefly about pathogenesis of COVID-19 disease.
- Describe briefly epidemiology of COVID-19.
- Discuss in detail infection control measures to be adapted by healthcare workers, and general public for the prevention of COVID-19.
- Discuss the quarantine guideline adapted by WHO for the prevention of COVID-19.
- Discuss the vaccine available in India for the prevention of COVID-19.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

CHAPTER 68: MISCELLANEOUS VIRAL INFECTIONS

SHORT NOTES

1. Write briefly on clinical infections caused by adenovirus and their laboratory diagnosis.
2. Discuss the pathogenesis and laboratory diagnosis of rhinovirus infections.
3. Describe pathogenesis, clinical features and complications of infections caused by Epstein-Barr virus.
4. Describe clinical features and laboratory diagnosis of infectious mononucleosis.

CHAPTER 69: PARASITIC AND FUNGAL INFECTIONS OF RESPIRATORY TRACT

ESSAY QUESTIONS

1. A 40-year-old female with uncontrolled diabetes mellitus presented with eye pain, and extensive ulceration of the midface and bilateral loss of vision. Following surgical debridement tissue was sent for histopathological examination demonstrated broad aseptate hyphae. (2+4+2+2)

- a. What is the clinical diagnosis and the likely etiological agent based on the histopathological finding?
- b. Describe methods to confirm the diagnosis in the laboratory.
- c. Describe other clinical manifestations caused by this organism.
- d. Mention the treatment option for this clinical condition.

2. A 45-year-old man with a history of asthma presents with recurrent episodes of wheezing, shortness of breath, and cough productive of thick mucous plugs. His peripheral blood eosinophil count is elevated, and chest X-ray shows fleeting infiltrates. Appropriate lower respiratory sample showed hyaline septate hyphae with acute angle branching. (2+4+4)

- a. Identify the clinical condition and its etiology.
- b. Describe other clinical manifestations of the causative agent(s) and their pathogenesis.
- c. Describe laboratory diagnosis.

SHORT NOTES

1. Describe the clinical manifestations and laboratory diagnosis of *Pneumocystis pneumonia*.
2. Describe clinical manifestations and laboratory diagnosis of pulmonary aspergillosis.
3. Describe etiopathogenesis and laboratory diagnosis of tropical pulmonary eosinophilia.
4. Describe the pathogenesis, clinical features, and laboratory diagnosis of paragonimiasis.

SECTION 9: CENTRAL NERVOUS SYSTEM INFECTIONS

CHAPTER 70: INFECTIVE SYNDROMES OF CNS

SHORT NOTES

1. Define encephalitis. Briefly discuss etiological diagnosis of the same.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

2. Briefly discuss the etiological agents and pathogenesis of chronic meningitis.
3. List the etiological agents of brain abscess. Briefly discuss its pathogenesis and laboratory diagnosis.
4. Briefly discuss the etiological agents and pathogenesis of acute encephalitis syndrome.

CHAPTER 71: BACTERIAL MENINGITIS

ESSAY QUESTIONS

1. A 7-year-old girl was admitted to the hospital with complaints of high-grade fever, headache, vomiting, and neck rigidity. CSF sample was collected by lumbar puncture in a sterile container and sent to the laboratory for biochemical analysis, direct microscopic test, culture and sensitivity testing. CSF analysis showed increased protein, low sugar and neutrophilia. (1+4+5)
 - a. What is the probable clinical diagnosis?
 - b. Describe etiological agents, pathogenesis and clinical manifestations of this disease.
 - c. Describe the laboratory diagnosis.
2. Alisha, a 4-year-old girl from Bhubaneswar was brought to the emergency room by her parents due to an acute onset of fever, neck rigidity and altered sensorium for the past 2 days. Physical examination showed that when her neck was passively flexed, her legs also flexed (positive Brudzinski's sign). Direct examination of the CSF showed gram-positive, lanceolate-shaped diplococci surrounded by a clear halo. (2+5+3)
 - a. Identify the clinical diagnosis of this condition and the most likely etiologic agent.
 - b. How will you confirm the etiological diagnosis in the laboratory?
 - c. Suggest preventive measures.

SHORT NOTES

1. Write briefly about pathogenesis and laboratory diagnosis of listeriosis.
2. Write briefly about clinical manifestations and laboratory diagnosis of tubercular meningitis.
3. Describe the pathogenesis and laboratory diagnosis of neonatal meningitis.
4. Describe the prevention of meningitis.
5. Describe pathogenesis and laboratory diagnosis of meningitis caused by *Streptococcus agalactiae*.
6. Describe pathogenesis and laboratory diagnosis of meningococcal meningitis.
7. Describe pathogenesis and laboratory diagnosis of pneumococcal meningitis.
8. Describe laboratory diagnosis and prophylaxis of meningococcal meningitis.
9. Describe laboratory diagnosis and prophylaxis of pneumococcal meningitis.

CHAPTER 72: TETANUS

ESSAY QUESTIONS

1. 3-5 days following a bullet injury, a person developed trismus followed by muscle pain and stiffness, back pain, and difficulty in swallowing. Excised tissue bits from the necrotic depths of the wound revealed gram-positive bacilli with terminal and spherical spores. (1+3+2+4)

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

- a. What is the probable diagnosis of this clinical condition?
- b. Describe pathogenesis and clinical manifestations of this condition.
- c. Describe laboratory diagnosis of this clinical condition.
- d. Add a note on vaccination to prevent this condition.

SHORT NOTES

1. Write briefly on prevention of neonatal tetanus.
2. Describe pathogenesis and clinical features of tetanus.
3. Describe prophylaxis for tetanus.
4. Describe strategies to prevent tetanus in (a) a neonate, (b) after surgery.

CHAPTER 73: VIRAL MENINGITIS AND MYELITIS

ESSAY QUESTIONS

1. A 12-year-old girl was admitted to the hospital with complaints of high-grade fever, headache, vomiting, altered mental status, seizure and neck rigidity. Biochemical and cytological analysis of CSF sample revealed glucose level (40 mg/dl), CSF pressure (100 mm H₂O), protein (60 mg/dl) and cell count (25/μL), which is predominantly lymphocytic. No organism was detected in Gram staining and Indian ink staining of CSF. (3+5+2)
 - a. What is the probable clinical diagnosis and the probable etiological agent(s)?
 - b. Describe the laboratory diagnosis in detail.
 - c. What is the preferred treatment of choice in this case?
2. A 9-week-old baby named Sweetie was brought to the emergency room with weakness in her right leg. On examination, her right leg appeared flaccid, and no deep tendon reflex or Babinski reflex could be elicited, although sensation was intact. The tone, movement, sensation, and reflexes of her other limbs were normal. Her immunization records were up-to-date according to the National Immunization Schedule of India. CSF demonstrates elevated protein with normal glucose levels. Fecal sample was collected and then sent to the referral center where the poliovirus is identified as a vaccine strain (not the "wild-type" strain) of poliovirus type-1 was isolated. (1+4+5)
 - a. What is the probable diagnosis of this condition?
 - b. Add a note on the laboratory diagnosis.
 - c. Mention the types of vaccines available against this etiological agent and their features.

SHORT NOTES

1. Describe briefly about polio vaccines available for immunization as per the National Immunization Schedule of India.
2. Discuss about polio eradication strategy and tools in India.
3. Describe briefly about pathogenesis and laboratory diagnosis of Coxsackieviruses.
4. List the differences between oral and injectable polio vaccines and explain their role in National Immunization Schedule of India.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

5. Describe the pathogenesis, clinical features, and laboratory diagnosis of Coxsackie virus infections.

CHAPTER 74: VIRAL ENCEPHALITIS

ESSAY QUESTIONS

1. A 7-year-old boy presented with high-grade fever, vomiting, altered consciousness, seizures, personality change, aphasia, ataxia, and tremor for three days. Cerebrospinal fluid specimen collected by lumbar puncture was sent for laboratory confirmation. A viral etiology was suspected. (1+2+4+3)
 - a. What is the probable clinical diagnosis?
 - b. What are the probable agents that can cause this clinical condition?
 - c. Describe the pathogenesis and laboratory diagnosis of the one of the common etiological agent causing this clinical condition.
 - d. List the other clinical conditions caused by this organism.
2. Mr Michel, a 25-year-old Australian visited his local doctor complaining of difficulty in swallowing liquids, loss of appetite and restlessness. He had a travel history to India one month back and did mention being bitten by a street dog in Puducherry. (1+3+4+2)
 - a. What is the most probable etiological diagnosis?
 - b. Draw a labeled diagram of the morphology of the causative agent of this condition.
 - c. Discuss the laboratory diagnosis.
 - d. Name the vaccines available for human use.

SHORT NOTES

1. Describe briefly about various vaccines for Japanese B encephalitis.
2. What are prion diseases? Describe briefly various human prion diseases and their laboratory diagnosis.
- 3.
4. Describe in detail about post-exposure prophylaxis against rabies.
5. Describe prophylaxis of rabies.
6. Name the encephalitogenic arboviruses along with their vectors and discuss in detail about pathogenesis, clinical features and laboratory diagnosis of Japanese B encephalitis virus.

CHAPTER 75: PARASITIC AND FUNGAL INFECTIONS OF CNS

ESSAY QUESTIONS

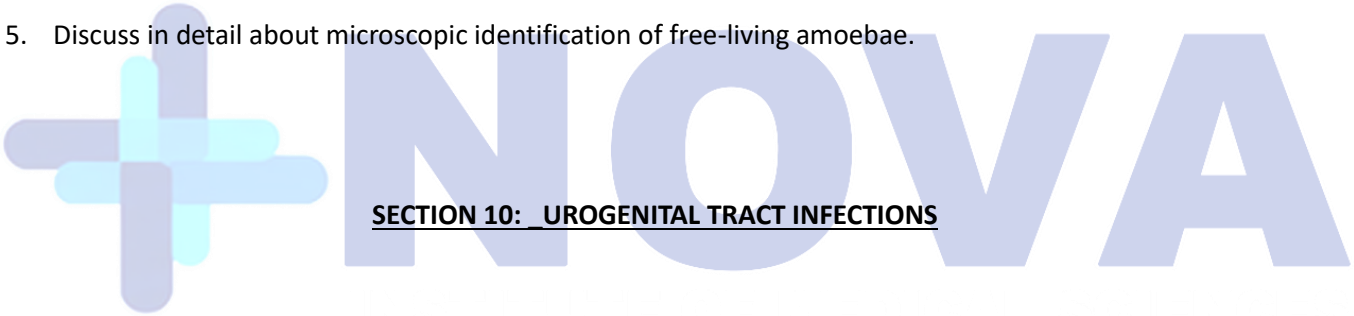
1. A 61-year-old person reactive for HIV presented with altered mental status, seizures, sensory abnormalities. The bone marrow aspirate collected was sent for Giemsa stain which revealed crescent shaped tachyzoites ($6 \times 2 \mu\text{m}$ in size). (2+3+3+2)
 - a. Identify the etiological agent and diagnose the clinical condition.
 - b. Write briefly about the life cycle of the etiological agent.
 - c. What are the various diagnostic modalities?

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

- d. How will you treat this condition?
2. A 32-year-old vegetarian female presented with recurrent episodes of seizure, headache vomiting and vertigo. MRI scan of brain showed cystic lesion in brain parenchyma, following which surgery was performed. The cysts were surgically removed which appeared yellowish white in color, measuring 0.5–1.5 cm size, slightly oval in shape, containing a bladder like sac with a white spot. (1+4+3+2)
- a. What is the etiological diagnosis?
- b. Write briefly about the life cycle of the etiological agent.
- c. What are the various diagnostic modalities?
- d. How will you treat this condition?

SHORT NOTES

1. Briefly discuss on approach to laboratory diagnosis of a clinically suspected case of cryptococcal meningitis.
2. Discuss briefly on pathogenesis, clinical presentation and management of a case of cerebral malaria.
3. Describe briefly the CNS infections caused by free living amoebae.
4. Discuss briefly pathogenesis and clinical manifestation of *Toxoplasma* encephalitis.
5. Discuss in detail about microscopic identification of free-living amoebae.



SECTION 10: UROGENITAL TRACT INFECTIONS

CHAPTER 76: INFECTIVE SYNDROMES OF UROGENITAL TRACT

ESSAY QUESTION

1. A 32-year-old female was admitted with dysuria (burning micturition) and increased frequency of micturition for the past 2 days. Culture of her urine specimen revealed lactose fermenting colonies on MacConkey agar. (2+4+4)
 - a. What is your clinical diagnosis and probable etiological agents?
 - b. What are the risk factors associated, pathogenesis and clinical manifestations of this disease?
 - c. Describe the laboratory diagnosis in detail.

SHORT NOTES

1. Describe briefly on significant bacteriuria.
2. Discuss briefly the differences between upper and lower urinary tract infections.
3. Describe briefly on asymptomatic bacteriuria.
4. Describe the laboratory diagnosis of bacterial urinary tract infection.

CHAPTER 77: INFECTIVE SYNDROMES OF GENITAL TRACT AND SEXUALLY-TRANSMITTED INFECTIONS

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

ESSAY QUESTIONS

1. A 27-year-old woman had developed mucopurulent discharge, followed by development of dysuria and urethral irritation. She had a history of multiple sexual partners. Microscopy of the urethral swab revealed sterile pyuria and presence of compact inclusion bodies when stained by Lugol's iodine. (1+4+5)
 - a. What is the most probable etiological diagnosis?
 - b. What are the other manifestations produced by the causative agent?
 - c. How is this infection diagnosed in the laboratory?
2. A 25-year-old heterosexual male with history of dysuria and noted some 'pus like' drainage in his underwear and at the tip of his penis. Gram staining of yellow urethral discharge revealed pus cells with gram-negative diplococci. What is the probable clinical diagnosis and what are the other infections produced? Discuss briefly the laboratory diagnosis and treatment. (1+4+5)
3. A 30-year-old lady presented with painless ulcerative lesion on external genitalia. On examination the ulcer had punched out edges, it was non-tender but indurated. History of similar genital lesion in her husband 2 weeks ago present. (6+4)
 - a. Choose appropriate tests to be done for confirming the diagnosis and for prognosis, with justification.
 - b. Describe the potential complications of this infection.
4. A 23-year-old male having a history of sexual exposure with a commercial sex worker is presented to a STD clinic with painless hard indurated genital ulcer and painless hard lymph node. What is the clinical diagnosis? What are the various clinical stages? Discuss the laboratory diagnosis. (1+4+5)

SHORT ANSWER QUESTIONS

1. Discuss clinical and laboratory approach to diagnose the etiological agents of vulvovaginitis.
2. Discuss briefly the approach for laboratory diagnosis of genital ulcerative lesions.
3. Lab diagnosis of Syphilis.
4. VDRL test.
5. Standard serological tests for Syphilis.
6. TPHA.
7. FTA- ABS test

SECTION 11: MISCELLANEOUS INFECTIVE SYNDROMES

CHAPTER 78: OCULAR AND ADNEXAL INFECTIONS

SHORT ANSWER QUESTIONS

1. Describe pathogenesis and laboratory diagnosis of ophthalmia neonatorum.
2. Describe pathogenesis and laboratory diagnosis of ocular fungal infections.
3. Discuss briefly on pathogenesis, laboratory diagnosis and treatment of *Acanthamoeba* keratitis.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

CHAPTER 79: CONGENITAL AND PERINATAL INFECTIONS

SHORT ANSWER QUESTIONS

1. Discuss briefly about clinical manifestations and laboratory diagnosis of congenital cytomegalovirus infection.
2. Discuss briefly about congenital varicella syndrome.
3. Discuss briefly about clinical manifestations and laboratory diagnosis neonatal herpes.
4. Discuss briefly about clinical manifestations and laboratory diagnosis of Zika virus disease.

CHAPTER 80: ORGANISMS WITH ONCOGENIC POTENTIAL

SHORT ANSWER QUESTIONS

1. Describe briefly mechanism of viral oncogenesis.
2. Describe briefly mechanism of oncogenesis of Epstein-Barr virus.
3. Discuss about human papillomavirus-associated malignancies.
4. Enumerate the organisms with oncogenic potential and describe briefly the mechanism of oncogenesis of any one with oncogenic potential.

CHAPTER 81: ZOONOSES

ESSAY QUESTIONS

1. A 7-year-old, girl from rural area presented with 2 days of fever and fatigue, followed by multiple episodes of vomiting. Four days before the onset of symptoms, her family picnicked at a nearby national forest campground, where she found dead rat and attempted to bury with a stick. On examination, she was febrile and had tense tender inguinal nodes. Fluid aspirated from inguinal nodes was subjected to microscopy and aerobic culture.
 - a. What is the probable clinical diagnosis?
 - b. Describe the etiopathogenesis and clinical manifestations of this condition.
 - c. Briefly describe the laboratory diagnosis of this infectious disease.
 - d. Discuss the preventive measures of this condition.

SHORT ANSWER QUESTIONS

1. Briefly describe pathogenesis and laboratory diagnosis of rat-bite fever.
2. Briefly describe pathogenesis and laboratory diagnosis of tularemia.
3. Describe pathogenesis of various agents causing bite wound infections.
4. Describe pathogenesis and laboratory diagnosis of bubonic plague.
5. Describe clinical features, complications and laboratory diagnosis of plague.

MICROBIOLOGY IMPORTANT QUESTIONS FOR KNRUHS

