

# Question Paper

Exam Date & Time: 19-Apr-2024 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**SECOND PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - APRIL 2024**  
**SUBJECT: MICROBIOLOGY PAPER I**  
**(REPEATERS - CBME BATCH)**

**Marks: 80**

**Duration: 160 mins.**

**Answer all the questions.**

**Draw neat labeled diagram wherever necessary.**

1. A 62-year-old man was diagnosed with catheter associated urinary tract infection. *E. coli* with a count of  $10^4$  CFU/mL was cultured from the urine sample collected from this patient which was found to be resistant to third generation cephalosporins. The isolate was found to harbor extended spectrum beta lactamase enzyme. Molecular analysis of the strain confirmed the presence of a plasmid harboring this resistance determinant.
  - 1A) What is the likely mechanism for *E. coli* to acquire this plasmid determining drug resistance? (1)
  - 1B) Describe in detail the mechanism of this gene transfer process in bacteria. (6)
  - 1C) What other properties does bacteria acquire through this method of gene transfer? (1)
  - 1D) List the various mechanisms of antimicrobial resistance among bacteria. (2)
  
2. A 6-year-old girl was brought to pediatric OPD with a history of persistent fever of 3 weeks' duration. There was history of weight loss and left sided pain abdomen. On examination, splenomegaly and hepatomegaly were noted along with hyperpigmentation of skin over her hands and feet. Routine laboratory tests showed pancytopenia. A bone marrow biopsy was performed which revealed multiple spherical to ovoid structures resembling parasitic forms within the macrophages.
  - 2A) What is the likely diagnosis and the causative agent of this illness? (1)
  - 2B) Describe the various morphological forms of this organism and its life cycle. (3)
  - 2C) Explain the pathogenesis and laboratory diagnosis of this clinical condition. (5)
  - 2D) Name two other parasites which can cause anaemia. (1)
  
3. **Write short notes on:**
  - 3A) Different phases of bacterial growth curve and their significance. (4)
  - 3B) Role of normal microbial flora at various body sites in health and disease with examples. (4)
  - 3C) Detection of virus growth in cell culture. (4)
  - 3D) Principle and applications of agglutination reaction in the diagnosis of infectious diseases. (4)
  - 3E) Properties and functions of IgM and IgG. (4)
  - 3F) Passive immunization and its role in immunity against infections. (4)
  - 3G) Antibody dependent cell-mediated cytotoxicity. (4)

- 3H) Plan laboratory investigations for a patient with suspected infective endocarditis. (4)
- 3I) Sample collection process and laboratory tests in a six-year-old child with suspected Diphtheria. (4)
- 3J) Laboratory diagnosis in a patient with suspected COVID-19 disease and the safety precautions to be followed in the process of sample collection and transport to the lab. (4)
- 3K) List the common parasites that involve the lung at some stage of their development. (4)
- 3L) Mention the common etiological agents of atypical pneumonia and discuss the process of laboratory diagnosis in a patient with suspected Legionnaires' disease. (4)
- 3M) A 24-year-old nurse attending to a patient in the emergency ward gets a needle prick injury on her right index finger. Briefly discuss the measures taken to prevent blood borne infections following this incident. (4)
- 3N) Laboratory diagnosis of infections with *Candida* spp. (4)
- 3O) Draw a neat, labelled diagram of Human Immunodeficiency Virus and mention the important structural antigens useful in the diagnosis of infections with HIV. (4)

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# Question Paper

Exam Date & Time: 22-Apr-2024 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**SECOND PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - APRIL 2024**  
**SUBJECT: MICROBIOLOGY - PAPER II**  
**(REPEATERS - CBME SCHEME)**

**Marks: 80**

**Duration: 160 mins.**

**Answer all the questions.**

**Essay Questions:**

1. A 27-year-old laborer presented with sudden onset of multiple episodes of watery diarrhea which was followed by vomiting of one-day duration. He complained of abdominal pain. On examination, he was dehydrated, afebrile and all systems were normal. The rice water stool microscopy demonstrated presence of bacilli with darting motility.
  - 1A) What is the clinical diagnosis and the causative organism? (1)
  - 1B) Explain the pathogenic mechanism of this clinical presentation. (3)
  - 1C) Describe the laboratory diagnosis of this condition. (3)
  - 1D) Discuss the public health importance and prevention of this disease condition. (3)
  
- 2A) Explain the statement "The incubation period in case of rabies depends on the anatomical site of injury or contact by the rabid animal". (2)
- 2B) Discuss the laboratory methods available for antemortem and postmortem diagnosis of rabies in humans. (3)
- 2C) Outline the wound management of bite due to rabid dog. (2)
- 2D) Describe the risk categorization and prophylaxis in case of Rabies. (3)
  
3. **Write short notes on:**
  - 3A) Discuss the pathogenesis of amoebic dysentery. (4)
  - 3B) Explain blood culture in the diagnosis of Enteric fever. (4)
  - 3C) Discuss the viral etiologies of diarrhea in children and the preventive measures. (4)
  - 3D) Explain the pathogenesis of tetanus. (4)
  - 3E) Outline a plan for the laboratory diagnosis of Eumycotic mycetoma. (4)
  - 3F) A 6-year-old child on admission to the onco-hematology general ward developed chicken pox.
    - i) What is the mode of spread of this infection and the measures to be taken to prevent the spread of this infection to the other children in the ward?
    - ii) Write a note on the vaccine available against this disease condition. (4)
  - 3G) Discuss the virulence factors of *Streptococcus pyogenes* responsible for skin and soft tissue infections. (4)
  - 3H) Name two slow viral diseases affecting humans and give the general characteristics of Prion diseases. (4)

- 3I). Gram's stain of CSF from a 2-year-old boy with suspected pyogenic meningitis showed many pus cells and lanceolate shaped Gram positive cocci in pairs. Discuss the pathogenesis of the condition caused by the bacteria seen in smear. (4)
- 3J) What are the different laboratory methods available to confirm the clinical diagnosis of neurocysticercosis? (4)
- 3K) List the advantages and disadvantages of Non treponemal tests in Syphilis diagnosis and management. (4)
- 3L) Enumerate the clinical samples required for the laboratory diagnosis of Gonorrhoea in male and female patients and describe the microscopic findings of these samples. (4)
- 3M) List one each parasitic and bacterial agent causing vaginitis. Write one important laboratory test for each of these agents to provide rapid result. (4)
- 3N) Explain the etiopathogenesis of Lymphogranuloma venereum. (4)
- 3O) Discuss scrub typhus: etiology, mode of transmission, pathognomonic skin lesion and one important lab test. (4)

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