

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS - 2022
M.Sc-III Semester (Microbiology)

COURSE CODE (CREDITS): 21MS1MB312 (3)

MAX. MARKS: 35

COURSE NAME: DIAGNOSTIC MICROBIOLOGY AND VACCINES

MAX. TIME: 2 Hours

COURSE INSTRUCTORS: Dr. Rahul Shrivastava

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. In an 'antibiotic susceptibility assay' against Ciprofloxacin; different strains of pathogenic bacteria showed varied levels of susceptibility. With reference to the table provided, answer the following: [2+2+1 = 5]

Bacterial Strain	Diameter of the zone of inhibition
A	10 cm
B	19 cm
C	2 cm
D	16cm

- Compare and arrange the order of susceptibility of strains A, B, C, and D against Ciprofloxacin providing suitable reason for your order.
- Elaborate the method employed.
- Illustrate application of the assay in diagnostics and therapeutics.

Q2. Design an ELISA based method for detection of a bacterial antigen. Discuss the steps you would follow using checker-board ELISA for standardization of the assay. [5]

Q3. You are working in a food industry and you want to increase the yield but you have two different strains and you want to prepare a hybrid cell: [1.5+1.5+2=5]

- Explain in detail which strain improvement technique you will use?
- What are the characteristics of an ideal strain?
- Which strain improvement technique is more efficient for genetic transfer? Justify your answer.

Q4. What are DNA Vaccines, how do they work? What are the advantages of a DNA vaccine over conventional vaccine? How does the preparation of DNA vaccine differ from conventional vaccines? [5]

Q5. Malaria is one of the oldest diseases known to mankind, yet no vaccine is available to tackle the disease. [2.5 X 3 = 7.5]

- Discuss the probable reasons why efforts towards vaccine development against malaria have largely been unsuccessful.
- Illustrate the life cycle of a malarial parasite.
- Suggest important stages of the above life cycle which may be targeted for vaccine intervention strategies and its significance.

Q6. A person is suffering from an infection with symptoms of 'hydrophobia' and 'hallucinations'. [2.5 X 3 = 7.5]

- Illustrate the transmission and pathogenesis of the infection.
- Why are both pre and post exposure vaccines recommended for such infections? Give details of such vaccines and their utility.
- Provide details on Nerve Tissue and Cell Culture methods for production of such vaccines.