

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

Q1. Water samples were collected from four places inside JUIT campus. Calculate the average number of bacteria present in the water from the following data obtained, if 100 $\mu$ l of sample was used each time for plating after dilution: [4]

Sample No.	Dilution Factor	No. of Colonies	Sample No.	Dilution Factor	No. of Colonies
Sample 1	-4	39, 46	Sample 3	-5	121, 220
Sample 2	-6	55, 68	Sample 4	-8	0, 2

Q2. Correct the following **wrong statements** and give reason for your answer. [ANY FOUR] [1.5 X 4 = 6]

- i. Broad spectrum antibiotics must always be preferred for treatment of any infection or disease.
- ii. Pasteurization is used extensively in the beverage industry as it kills 100% of the microorganisms.
- iii. Heat sensitive culture media and antibiotic solutions are sterilized by Autoclaving.
- iv. Silver chloride is used to kill algae in pools and fish tanks.
- v. Packaged spices, meat, microbiological plastic ware and medical supplies are sterilized by X-rays.

Q3. Differentiate between an obligate aerobe and an obligate anaerobe. Name the enzymes most likely to be present in an obligate aerobe, elaborating on requirement of the enzymes for the bacteria with suitable chemical reactions. [5]

Q4. Compare the 'Lytic' and 'Lysogenic' cycle of viral multiplication, and draw diagrams to support your explanation. [5]

Q5. Draw labeled diagrams of Gram-negative and Gram-positive and cell walls. Give important differences between Gram Positive and Gram Negative bacteria. [5]