

COURSE CODE (CREDITS): 20MS1BT114 (2)

MAX. MARKS: 25

COURSE NAME: MICROBIOLOGY

COURSE INSTRUCTORS: Dr. Rahul Shrivastava

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory. (b) Marks are indicated against each question in square brackets. (c) Calculators are NOT allowed, all steps of the numerical to be done in the answer sheet only.

Q1. A complex nutrient rich medium has 20 cells / mL at the start of incubation, with a 30 min generation time, how many cells would there be in 1 liter of the culture after: [1 + 1.5 + 1.5 = 4]

i) 2 hour

ii) 4 hour if lag phase is of 1 hour

iii) After 4 hour if lag phase is of 1 hour, and two of the initial 20 cells were dead at zero time.

Q2. Analyze the given statement to evaluate whether the statement is **right OR wrong**. Give justification / reason for your answer: [2 X 4 = 8]

- a. Pasteurization is used extensively in the beverage industry as it kills 100% of the microorganisms.
- b. Acidic food is more prone to be spoiled by fungi, than bacteria.
- c. Mid-log phase cultures are usually used for testing of antimicrobial (chemical / physical) agents.
- d. Lag phase culture is characterized by no bacterial multiplication as the cells have no metabolic activity during the phase.

Q3. Draw labeled diagrams of Gram-negative and Gram-positive and cell walls. Give important differences between Gram-negative and Gram-positive bacteria. [4]

Q4. Differentiate between an obligate and a facultative aerobe. Name the enzymes most likely to be present in an obligate aerobe and function of the enzymes. [3]

Q5. Elaborate the physical and chemical microbial control methods, along with their mechanism of action used to maintain aseptic conditions inside a Laminar Air Floor (LAF) and a Culture Room for prevention of contamination of the cultures. [6]