KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

Level : B.Sc./B.Tech.
Year : II
Time : 2 hrs. 30 mins.

11 FEB 2025

Course : BIOL 207
Semester : II
F.M. : 55

SECTION "B"
[7 Q. × 5 = 35 marks]

Attempt *ALL* questions.

1. A 25-year-old male has contracted chickenpox after visiting his younger cousin, who had visible lesions. The patient recovers within two weeks. Upon recovery, his doctor explains that he is unlikely to get chickenpox again in the future because his immune system has developed immunity against the virus. [5Q × 1 = 5]
   a. What type of immunity has the patient acquired after recovering from chickenpox?
   b. Which specific cells in the immune system are responsible for "remembering" the chickenpox virus for future protection?
   c. What component of the chickenpox virus triggers the immune system to produce antibodies?
   d. Why doesn't this patient need to take chickenpox antibodies artificially after recovery?
   e. If a newborn baby acquires immunity to chickenpox through breast milk, what type of immunity is this called?

2. A food processing company is trying to ensure the safety of its canned food products. The company uses pasteurization for milk products and autoclaving for canned vegetables. They conduct regular microbial tests to ensure the absence of harmful pathogens. However, an inspection revealed that some canned foods were contaminated with spore-forming bacteria, despite the autoclaving process. [5Q × 1 = 5]
   a. What is the primary goal of pasteurization in milk processing?
   b. Why might spore-forming bacteria survive the autoclaving process in canned foods?
   c. What is the name of the microbial control method that involves high-pressure steam to sterilize equipment and canned foods?
   d. Which type of bacteria is most likely responsible for contamination in canned food due to spore survival?
   e. What additional steps can the company take to ensure the effectiveness of their autoclaving process?

3. On the basis of cell wall composition, discuss gram positive and gram negative bacteria.

4. Describe the different phases of the bacterial growth curve. Explain in brief about the factors affecting microbial growth.

5. Discuss different types of antibodies in brief.

6. What is transduction? Discuss about two different types of transductions. [5]

P.T.O.

7. Bacteriophages may use two different cycles to infect their bacterial hosts. Explain.

OR

What were the conclusions of Pastuer's Experiment? Explain in brief about the characteristics of fungi. [3+2]

SECTION "E"

8. Give **TWO** differences between [5 Q × 2 = 10 marks]
   a. Mesophiles and Thermophiles
   b. Prokaryotes and Eukaryotes
   c. Active Immunity and Passive Immunity
   d. Refrigeration and Freezing
   e. Autotrophic bacteria and Heterotrophic bacteria

9. Explain **WHY/HOW** [5 Q × 2 = 10 marks]
   a. 70% ethanol used as disinfectant instead of 100% ethanol.
   b. Innate defense mechanism is also referred to as nonspecific defense mechanism.
   c. Transfer of antibodies from mother to infant in milk by nursing is an example of passive immunity.
   d. Purple Sulphur Bacteria are considered as photoautotrophs.
   e. *Bacillus mycoides* is an example of saprophytic bacteria.