

**MICROBIOLOGY  
(BIOT 2104)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Lichen is a symbiotic association between  
(a) fungi and bacteria (b) fungi and algae  
(c) algae and bacteria (d) none of these.
- (ii) Heterocyst mainly protects the enzyme  
(a) Nitrogenase (b) Catalase  
(c) Peroxidase (d) None of these.
- (iii) <sup>60</sup>Co is the main source of  
(a) X-ray (b) UV-ray  
(c) Gamma ray (d) none of these.
- (iv) The refractive Index of immersion oil used in microscopy to achieve higher resolution is  
(a) same as that of a glass  
(b) less than that of a glass  
(c) same as that of the air  
(d) less than that of the air.
- (v) Which of the following viruses carries out reverse transcription?  
(a) Bacteriophage Lambda  
(b) Human Immunodeficiency Virus  
(c) Herpes Virus  
(d) All of these.
- (vi) Microbes that cannot grow without growth factors is known as  
(a) Prototroph (b) Auxotroph  
(c) Autotroph (d) Lithotroph.

- (vii) Palisade arrangement of bacteria refers to  
(a) cells occurring singly or in pairs  
(b) cells forming chain  
(c) cells lining side by side like matchstick  
(d) cells forming groups of four cells.
- (viii) Thioglycolate is used for growth of microbes  
(a) in presence of oxygen (b) in absence of oxygen  
(c) both in presence and absence of oxygen (d) none of these.
- (ix) Cord factor is present in  
(a) Gram positive (b) Gram negative  
(c) Acid fast Bacteria (d) Yeast.
- (x) High respiratory rate protects nitrogenase in  
(a) E. coli (b) Lactobacillus sp.  
(c) Clostridium sp. (d) Azotobacter sp.

**Group - B**

2. (a) Describe with a diagram the structure of a Bacteriophage.  
(b) Write any two applications of bacteria in food production.  
(c) What do you mean by protoplasts and spheroplasts. **4 + 4 + 4 = 12**
3. (a) Describe the different asexual reproductive processes of Fungi.  
(b) Name the different pigments found in algae.  
(c) Write notes on Archae bacteria and its phylogenetic position. **6 + 2 + 4 = 12**

**Group - C**

4. (a) What are the advantages of Electron microscope over Optical microscope.  
(b) Why anaerobic bacteria cannot grow in presence of oxygen?  
(c) How does an obligate aerobe differ from a facultative aerobe? **5 + 3 + 4 = 12**
5. (a) Explain why blood agar media is a differential media?  
(b) Classify bacteria on the basis of growth factor requirement  
(c) Why psychrophilic bacteria can tolerate very low temperature?

(d) Briefly describe tyndallisation process.

**3 + 2 + 4 + 3 = 12**

**Group - D**

6. (a) Differentiate exponential and stationary phase of bacterial growth.

(b) Briefly explain anoxygenic photosynthesis.

(c) What is alcohol fermentation?

**4 + 5 + 3 = 12**

7. (a) Write down the mechanism of nitrogen fixation.

(b) Why some bacteria follow phosphoketolase pathway?

(c) Give example of one purple non sulfur and one green sulfur bacteria.

**6 + 4 + 2 = 12**

**Group - E**

8. (a) Name two different air borne viral diseases and write their causative agents.

(b) What is commensalism and how does it differ from cometabolism?

(c) What is enterotoxin and what is its mode of action. Name one bacteria that produce enterotoxin.

(d) What is citrate utilisation test?

**2 + 4 + 4 + 2 = 12**

9. (a) What is rhizosphere and why it is important?

(b) Phosphate mobilizing bacteria acts as biofertilizer-explain.

(c) What is presumptive test?

**4 + 5 + 3 = 12**