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) Sodium thioglycollate is mainly used for growth of
(a) Aerobic bacteria (b) Anaerobic bacteria
(c) Fungi (d) None of these.

(ii) Oligodynamic action occur due to presence of
(a) Heavy metal (b) Halogen
(c) Alcohol (d) None of these.

(iii) Murein is present in
(a) Cyanobacteria (b) Archaebacteria
(c) Fungi (d) None of these.

(iv) Growth factors are required for
(a) Prototroph (b) Auxotroph
(c) Lithotroph (d) None of these.

(v) ED pathway occurs due to lack of
(a) Phosphofructokinase (b) Aldolase
(c) Triose phosphate isomerise (d) None of these.

(vi) Cell wall inhibitor antibiotic is
(a) Penicillin (b) Tetracycline
(c) Streptomycin (d) None of these.

(vii) Secondary metabolites are produced in
(a) Lag phase (b) Stationary phase
(c) Log phase (d) None of these.

(viii) Indole production occur due to presence of
(a) Tryptophanase (b) Aldolase
(c) Transferase (d) None of these.

(ix) Teichoic acid is present in
(a) Gram positive (b) Gram negative
(c) Acid fast Bacteria (d) Yeast.

(x) 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.

Group- B

2. (a) Examine the structure and functions of magnetosomes in bacteria. [(CO1)(Examine/IOCQ)]
(b) Give a comparative analysis of structural components of Gram positive and Gram negative cell wall. [(CO1)(Compare/HOCQ)]
(c) Illustrate your idea on the structure of Diatoms. [(CO1)(Illustrate/IOCQ)]
4 + 4 + 4 = 12

3. (a) Illustrate the structure of a hypha and label all it's parts. [(CO1)(Illustrate/IOCQ)]
(b) Describe with a diagram the structure of Bacteriophage. [(CO1)(Describe/HOCQ)]
(c) Explain the graphical representation of extracellular and intracellular plaque forming units with time. [(CO1)(Explain/HOCQ)]
4 + 4 + 4 = 12

Group – C

4. (a) Illustrate the ray diagram in an optical microscope. [(CO2)(Illustrate/HOCQ)]
(b) Distinguish complex and synthetic media. [(CO3)(Analyze/LOCQ)]
(c) Discuss the mode of action of phenol. [(CO3)(Discuss/IOCQ)]
5 + 5 + 2 = 12

5. (a) Discuss the mode of action of halogens. [(CO4)(Understand/LOCQ)]
(b) Discuss the cell membrane constituents of psychrophillic and thermophillic bacteria. [(CO3)(Discuss/HOCQ)]
(c) Define lithotrophs. [(CO3)(Remember/LOCQ)]
5 + 5 + 2 = 12

Group – D

6. (a) Discuss the functions of pentose phosphate pathway. [(CO4)(Discuss/IOCQ)]
(b) Distinguish assimilatory and dissimilatory nitrate reduction. [(CO5)(Remember/LOCQ)]
(c) Define Pasteur effect. [(CO4)(Analyze/IOCQ)]
4 + 5 + 3 = 12

7. (a) Illustrate the mechanism of nitrogen fixation? [(CO3)(Illustrate/HOCQ)]
(b) Discuss photosystem and photophosphorylation. [(CO3)(Discuss /LOCQ)]

(c) Why some bacteria follow ED pathway? Give example. [(CO3)(Analyze/IOCQ)]

4 + 4 + 4 = 12

Group – E

8. (a) Comment on dissimilatory sulphate reduction? [(CO4)(Comment/IOCQ)]
   (b) Mention any two bacterial exotoxins and their mode of action. [(CO3)(Understand/LOCQ)]
   (c) Define the indole production test? [(CO4)(Analyse/LOCQ)]

6 + 4 + 2 = 12

9. (a) Illustrate the process of nitrate incorporation in microbial cell? [(CO6)(Illustrate/IOCQ)]
   (b) Mention any two positive interactions present among soli microbes. [(CO6)(Understand/LOCQ)]
   (c) What are coliforms? [(CO5)(Analyse/IOCQ)]

5 + 5 + 2 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	33.33	39.58	27.08

Course Outcome (CO):

After the completion of the course students will be able to

1. Describe different cell structures with subcellular functional organelles.
2. Describe the working principles of different types of microscopes.
3. Isolate pure culture from different environmental sources.
4. Preserve and maintain pure culture.
5. Understand various microbial identification processes.
6. Apply their knowledge of microbes in different environmental aspects.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question