

2022

MICROBIOLOGY — HONOURS

Paper : CC-2

(Bacteriology)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer **question no. 1** and **any three** questions from the rest.

1. Answer **any ten** questions :

2×10

- (a) What is moist heat sterilization?
- (b) Mention the names of two cryoprotecting agents.
- (c) 'Gram staining, is not possible for Mycobacteria.' — Justify the statement.
- (d) State two major differences between the genus *Bacillus* and *Escherichia*.
- (e) How does an oil immersion objective work?
- (f) What are the functions of the following enzymes?
 - (i) Catalase
 - (ii) Superoxide dismutase.
- (g) What is the function of primary stain in Gram staining?
- (h) How does halogens influence bacterial growth?
 - (i) How can a pure culture be obtained from a mixed bacterial population?
 - (j) State the importance of Cyanobacteria in agriculture.
- (k) How do phylogenetic tree contribute to draw a lineage of bacterial species?
 - (l) Why are bacterial cultures lyophilized?
- (m) Define Delta proteobacteria. Give an example.
- (n) Give two differences between Eubacterial and archaeobacterial cell wall.
- (o) What is/are the assumption(s) behind 'parsimony method'?

2. (a) Differentiate between archaeobacterial and eubacterial cell membrane.

(b) State two characteristic features of *Sulfolobus* sp.

(c) What are 'Firmicutes'?

(d) Schematically elucidate the steps in *Bacillus subtilis* sporulation.

3+2+2+3

Please Turn Over

3. (a) Diagrammatically represent the mechanism of image formation by bright field microscopy.
(b) What is 'Numerical aperture' of a microscope?
(c) How can protoplast be formed?
(d) What is the role of SASP in protecting *Bacillus subtilis* endospore against UV damage?
(e) What is 'Systematics'? How is it different from taxonomy? 2+2+2+2+2
4. (a) What do you mean by 'oligodynamic action of metals'?
(b) A test germicide has a phenol coefficient >1. What does it mean?
(c) State the role of quaternary ammonium compounds to control microbial growth.
(d) What is 'Tyndallization'? How does it differ from pasteurization? 2+2+2+(2+2)
5. (a) Differentiate between Enrichment medium and Enriched medium.
(b) How can anaerobic bacteria be cultured?
(c) 'Lysozyme cannot act on the cell wall of archaebacteria.' — Explain why.
(d) How does high pressure affect microbial growth?
(e) How do we calculate specific growth rate of bacteria? 2+2+2+2+2
6. Write short notes on : 2½×4
- (a) Chromatic aberrations
(b) Ribotyping
(c) Negative Staining
(d) Role of plasmid in antibiotic resistance.
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