

MICROBIOLOGY
(BTC2104)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

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

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Murein is also known as
(a) Peptidoglycan (b) Lipopolysaccharides
(c) Lipoprotein (d) Heteropolysaccharides.
- (ii) Teichoic acid is present in
(a) Gram-positive bacteria (b) Gram-negative bacteria
(c) Mycobacteria (d) Yeast
- (iii) Which one among the following is a motile spore?
(a) Conidiospores (b) Zoospores
(c) Blastospores (d) Chlamydospores.
- (iv) The refractive index of immersion oil used in microscopy to achieve higher resolution is
(a) Same as that of a glass (b) Less as that of a glass
(c) Same as that of a air (d) Less as that of a air.
- (v) Cell wall inhibitor antibiotic is
(a) Penicillin (b) Sreptomycin
(c) Chloramphenicol (d) None of these
- (vi) Sodium thioglycollate is mainly used for growth of
(a) Aerobic bacteria (b) Anaerobic bacteria
(c) Fungi (d) None of these
- (vii) Methyl red indicator is used for detection of
(a) Mixed acid fermentation (b) Amino acid fermentation
(c) Lactic acid fermentation (d) None of these
- (viii) Stickland reaction is most common example of
(a) Amino acid fermentation (b) Lactic acid fermentation
(c) Propionic acid fermentation (d) None of these

- (ix) Indole production test is required the enzyme is
 (a) Catalase (b) Tryptophanase
 (c) Isomerase (d) None of these
- (x) Solubilization of phosphate occur due to production of
 (a) Organic acid (b) Inorganic acid
 (c) Carbohydrate (d) None of these.

Fill in the blanks with the correct word

- (xi) Heat resistance of endospore is due to presence of _____.
- (xii) Lithotrophs utilizes inorganic compounds as source of _____.
- (xiii) The cofactor is required for nitrogen fixation is _____.
- (xiv) _____ is a symbiotic association between a fungi and a plant.
- (xv) _____ arrangement of bacterial cells refer to the side by side lining of the cells like matchsticks.

Group - B

2. (a) Describe with a diagram, the structure of a bacterial flagella. *[[CO1](Analyse/HOCQ)]*
 (b) What do you mean by protoplasts? How can you prepare a protoplast? *[[CO1](Remember,Apply/LOCQ,IOCQ)]*
 (c) Write down the different types of pigments present in an algae. *[[CO1](Remember/LOCQ)]*
5 + (2 + 3) + 2 = 12
3. (a) Explain the lytic cycle of a Bacteriophage. *[[CO1](Analyse/HOCQ)]*
 (b) Briefly describe the reproduction of a Diatoms. *[[CO1](Analyse/IOCQ)]*
7 + 5 = 12

Group - C

4. (a) Briefly describe the working principle of Electromagnetic lens in an Electron Microscope. *[[CO2](Analyse/HOCQ)]*
 (b) Mention any one technique for pure culture isolation. *[[CO4](Remember/LOCQ)]*
 (c) How does obligate aerobes differ from facultative aerobes? *[[CO4](Remember/LOCQ)]*
 (d) What are photoautotrophs? *[[CO3](Apply/IOCQ)]*
4 + 3 + 3 + 2 = 12
5. (a) Mention any two antibiotics and their mode of action. *[[CO3](Analyse/HOCQ)]*
 (b) Explain the action of iodine. *[[CO4](Remember/LOCQ)]*
 (c) What are the advantages of electron microscopes over optical microscopes? *[[CO2](Understand/LOCQ)]*
 (d) Discuss the role of buffer on bacterial growth. *[[CO4](Apply/IOCQ)]*
4 + 3 + 3 + 2 = 12

Group - D

6. (a) Discuss briefly mixed acid fermentation. [[CO3](Analyse/HOCQ)]
 (b) What is acetylene reduction assay? [[CO3](Apply/IOCQ)]
 (c) Briefly discuss the function of idiolites. [[CO4](Apply/IOCQ)]
 (d) Define purple sulphur bacteria. [[CO4](Apply/IOCQ)]
 (e) Give one example of homolactic acid fermentative bacteria. [[CO4](Apply/IOCQ)]
4 + 3 + 2 + 2 + 1 = 12
7. (a) Analyse the mode of protection of nitrogenase in Rhizobium sp. [[CO3](Analyse/HOCQ)]
 (b) Briefly explain assimilatory nitrate reduction. [[CO4](Apply/IOCQ)]
 (c) Analyse the dissimilatory sulphate reduction. [[CO3](Apply/IOCQ)]
 (d) Electron microscopes are operated in a low pressure or in vacuum – Explain. [[CO3](Apply/IOCQ)]
4 + 3 + 3 + 2 = 12

Group - E

8. (a) Briefly discuss nitrification and denitrification process. [[CO3](Analyse/HOCQ)]
 (b) Mention different steps in S cycle. [[CO3](Analyse/HOCQ)]
 (c) Analyse the role of phosphate solubilising bacteria. [[CO4](Remember/LOCQ)]
 (d) Give one example of free living nitrogen fixing bacteria. [[CO6](Apply/IOCQ)]
4 + 4 + 3 + 1 = 12
9. (a) Analyse the negative interactions present in soil microbes. [[CO3](Analyse/HOCQ)]
 (b) Discuss the role of allopathic substances. [[CO5](Apply/IOCQ)]
 (c) Describe briefly methyl red test. [[CO5](Apply/IOCQ)]
 (d) Mention one bacterial neurotoxin and its mode of action. [[CO5](Apply/IOCQ)]
4 + 3 + 2 + 3 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	19.8	38.54	41.66

