

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) Teichoic acid is present in
(a) Gram -positive bacteria (b) Gram -negative bacteria
(c) Mycobacteria (d) Yeast
- (ii) Coenocytic Hyphae have
(a) No septa (b) Septate with uninucleate cells
(c) Septate with multinucleate cells (d) None of these
- (iii) Phycobilins are pigments present in
(a) Bacteria (b) Virus
(c) Algae (d) Fungi
- (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) Sodium thioglycollate is mainly used for growth of
(a) Aerobic bacteria (b) Anaerobic bacteria
(c) Fungi (d) None of these
- (vi) Bromothymol blue is used for detection of
(a) Mixed acid fermentation (b) Amino acid production
(c) Citric acid utilization (d) None of these
- (vii) Primary metabolites are produced in
(a) Lag phase (b) Log phase
(c) Stationary phase (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) Incorporation of nitrogen occur by
 (a) Transmethylation (b) Transesterification
 (c) Transamination (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) Antibiotic production occur in _____ phase of bacterial growth.
- (xiv) The common example of differential media is _____.
- (xv) _____ arrangement of bacterial cells refer to the side by side lining of the cells like matchsticks.

Group - B

2. (a) Enumerate the different shapes and arrangements of bacterial cells. [[CO1](Enumerate/IOCQ)]
- (b) Describe with a diagram, the structure of a bacterial flagella. [[CO1](Analyse/HOCQ)]
- (c) Describe the structure of the cell wall of a Gram-positive bacteria. [[CO1](Analyse/IOCQ)]
- 4 + 4 + 4 = 12**
3. (a) Describe the different types of asexual spores in Fungi. Give diagrams. [[CO1](Remember/LOCQ)]
- (b) Explain the lytic cycle of a Bacteriophage. [[CO1](Analyse/HOCQ)]
- 6 + 6 = 12**

Group - C

4. (a) Why anaerobic bacteria cannot grow in presence of oxygen? [[CO3](Analyse/HOCQ)]
- (b) How does obligate aerobes differ from facultative aerobes? [[CO4](Remember/LOCQ)]
- (c) What is anaerobic chamber? [[CO4](Apply/IOCQ)]
- (d) Discuss the effect of temperature on bacterial growth. [[CO3](Analyse/HOCQ)]
- 3 + 3 + 2 + 4 = 12**
5. (a) Briefly describe the working principle of Electromagnetic lens in an Electron Microscope. [[CO2](Analyse/HOCQ)]
- (b) What are the advantages of electron microscopes over optical microscopes. [[CO2](Understand/LOCQ)]
- (c) Discuss the cell membrane constituents of psychrophilic and thermophilic bacteria. [[CO4](Apply/IOCQ)]
- 4 + 3 + 5 = 12**

Group - D

6. (a) What is Pasteur effect? [[CO4](Remember/LOCQ)]
 (b) What is acetelene reduction assay? [[CO3](Apply/IOCQ)]
 (c) Briefly discuss the function of idiolites. [[CO4](Apply/IOCQ)]
 (d) Define purple sulphur bacteria. [[CO4](Apply/IOCQ)]
 (e) Electron microscopes are operated in a low pressure or in vacuum –**Explain.** [[CO3](Apply/IOCQ)]
3 + 3 + 2 + 2 + 2 = 12
7. (a) Briefly discuss the phosphoketolase pathway. [[CO3](Analyse/HOCQ)]
 (b) Analyse the dissimilatory sulphate reduction. [[CO3](Apply/IOCQ)]
 (c) Give one example of homolactic acid fermentative bacteria. [[CO4](Apply/IOCQ)]
 (d) Mention one organism that participate in mixed acid fermentation. [[CO4](Apply/IOCQ)]
 (e) Define bacteriochlorophyll. [[CO3](Apply/IOCQ)]
 (f) Mention one organism participate in amino acid fermentation. [[CO3](Apply/IOCQ)]
4 + 3 + 1 + 1 + 2 + 1 = 12

Group - E

8. (a) Briefly discuss nitrification and denitrification process. [[CO3](Analyse/HOCQ)]
 (b) Analyse the negative interactions present in soil microbes. [[CO3](Analyse/HOCQ)]
 (c) Discuss briefly presumptive and confirm test for coliforms. [[CO3](Analyse/HOCQ)]
4 + 4 + 4 = 12
9. (a) Describe briefly methyl red test. [[CO5](Apply/IOCQ)]
 (b) Mention one bacteria participate in citrate utilization. [[CO5](Apply/IOCQ)]
 (c) Mention one bacterial neurotoxin and its mode of action. [[CO5](Apply/IOCQ)]
 (d) Comment on sulphate reduction. [[CO3](Analyse/HOCQ)]
 (e) Discuss the role of allopathic substances. [[CO5](Apply/IOCQ)]
2 + 1 + 3 + 3 + 3 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	15.63	42.71	41.66

