



**BBA-003-1134001** Seat No. \_\_\_\_\_

**M. Sc. (Sem. IV) (CBCS) (W.E.F. 2016) Examination**

**July - 2021**

**BT-418 Biotechnology**

*(Molecular Phylogeny & Extremophiles)*

*(New Course)*

**Faculty Code : 003**

**Subject Code : 1134001**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : **70**

- 1** Answer the following questions. **14**
- (a) Define: C-value
  - (b) Why 16S rRNA is widely used for analysing bacterial diversity?
  - (c) Enlist names of 4 molecular chronometers.
  - (d) Define: Xerophiles. Enlist the habitats for xerophiles.
  - (e) Define: Phylogenetic rooted tree and Phylogenetic un-rooted tree
  - (f) State the temperature range of Hyperthermophilies and salt concentration range of Hyperhalophiles.
  - (g) State the function of Bacteriorhodopsin in archaea.
- 2** Answer the following questions. **14**
- (a) Enlist similarities between archaea and eukaryotes.
  - (b) Smallest sized living cell belongs to which phylum of archaea. State the basic characteristic of that phylum.

- (c) Enlist basic differences between archaea and prokaryotes.
  - (d) Enlist the type of extremophiles besides thermophiles and halophiles.
  - (e) State the importance of branch point and branch length in phylogenetic tree.
  - (f) Provide evidences indicating the presence of uncultivable microorganisms in environment.
  - (g) State the role of SDS and absolute ethanol in isolation of nucleic acid.
- 3** Answer the following questions. **14**
- (a) Enlist and discuss basic molecular characteristics used for microbial classification.
  - (b) State the ideal characteristic of molecular chronometer and discuss in brief with suitable example.
- 4** Answer the following questions. **14**
- (a) Discuss: Majority of microbes are not being cultivated in lab conditions.
  - (b) Write a detail note on ARDRA as one of the technique to study non-cultivable microbial diversity.
- 5** Answer the following questions. **14**
- (a) Enlist phylum of archaea. Discuss any two in brief.
  - (b) Write a detail note on cell wall and cell membrane of archaea.
- 6** Answer the following questions. **14**
- (a) Why protein from halophiles remains stable under extreme halophilic conditions?
  - (b) Discuss the pattern of gene expression in hyperthermophilic bacteria.

- 7** Answer the following questions. **14**
- (a) Write a detailed note on biotechnological significance of hyper extremophiles.
  - (b) How hyper extremophiles can be employed for obtaining commercial benefits.
- 8** Answer the following questions. **14**
- (a) Discuss the paradox generated due to C-value.
  - (b) Discuss about biotechnological significance of non-cultivable microbes.
- 9** Answer the following questions. **14**
- (a) Discuss in detail: Methanogenesis.
  - (b) Write a detailed note on hyperthermophiles in terms of its ecology, adaptation and application.
- 10** Answer the following questions. **14**
- (a) Write a brief note on acidophiles and alkaliphiles in terms of their niches and adaptations.
  - (b) Discuss DGGE and T-RFLP as tool for studying metagenomic DNA.
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