

- (viii) State that which molecular approach is commonly used to determine the evolutionary relationship between microorganisms?
- a) Gram staining
b) Polymerase chain reaction (PCR)
c) 16S rRNA sequencing
d) Capsule staining
- (ix) Name which group of microorganisms is primarily responsible for nitrogen fixation?
- a) Algae
b) Fungi
c) Cyanobacteria
d) Protozoa
- (x) State which cellular organelle is involved in photosynthesis in algae
- a) Chloroplast
b) Mitochondria
c) Ribosome
d) Nucleus

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Define a plasmid and outline its key characteristics. (3)
3. Classify bacteria according to their mode of nutrition. (3)
4. Explain the importance of differential media. Give examples. (3)
5. Determine the equation of generation time of bacterial growth. (3)
6. Differentiate natural and artificial competence in bacterial transformation. (3)

OR

Explain the two different states of episomes within bacterial. What is the significance of these states. (3)

Group-C

(Long Answer Type Questions)

5 x 3=15

7. Differentiate between F+ (donor) cells, F- (recipient) cells, and Hfr cells in bacterial conjugation. Explain the implications of the integration of the F-plasmid into the chromosomal DNA of Hfr cells. (5)
8. Describe the different types of bacteria based on their oxygen requirement. Provide examples of bacteria belonging to each category. (5)
9. Explain the biology of TMV, including its viral structure and the key proteins involved in its replication. (5)

OR

Illustrate and explain the key structural components of the SARS-CoV-2 virus, and how do they contribute to the virus's life cycle and infection of host cells. (5)

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