

This question paper contains 3 printed pages]

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S. No. of Question Paper : 987

Unique Paper Code : 253303

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Name of the Paper : Microbial Physiology and Metabolism-I (MIHT-305)

Name of the Course : B.Sc. (Hons.) Microbiology

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *Five* questions in all.

All questions carry equal marks.

1. (a) Define the following terms giving examples (any *five*) : 5×2=10

(i) C-heterotrophs

(ii) Exponential phase

(iii) Iron oxidizers

(iv) Barophiles

(v) Carboxysomes

(vi) Transporters.

(b) Name various methods of carbon dioxide fixation in phototrophic bacteria. Explain any *one* of the methods. 2,3

P.T.O.

2. (a) Why cannot anaerobes survive in the presence of oxygen ? 4
- (b) Give an example for each of the following : 5×1=5
- (i) Obligate chemolithotroph
 - (ii) Halophiles
 - (iii) Radiation resistant microbe
 - (iv) Chemoorganotrophs
 - (v) Electrogenic transport.
- (c) Differentiate between the following (any two) : 2×3=6
- (i) Primary active and secondary active transport
 - (ii) Chemostat and turbidostat
 - (iii) Oxygenic and anoxygenic photosynthesis.
3. (a) Write the contribution/s of the following scientists (any two) : 2×1.5=3
- (i) Barker
 - (ii) Walter Stoeckenius
 - (iii) Robin Hill.
- (b) Write short notes on the following (any three) : 3×4=12
- (i) Adaptations in psychrophiles
 - (ii) Light reaction in purple bacteria
 - (iii) Action spectrum
 - (iv) Hydrogen oxidizers
 - (v) Osmoprotectant.

4. (a) What is diauxic growth curve? Who coined the term? Explain the mechanism behind the process. 2,1,2
- (b) How are the following techniques utilized in the measurement of microbial growth (any two) : 2×2=4
- (i) Petroff Hausser Counting Chamber
- (ii) Coulter counter
- (iii) Flow cytometry.
- (c) 'Microbes face difficulty in iron transport.' How do they overcome this problem? 6
5. (a) What is group translocation? Explain the process and also write its significance. 2,2,1
- (b) What is specific growth rate and generation time? Derive a relationship between them. 2,4
- (c) Why are green bacteria able to grow under low light intensities? 4
6. (a) Classify the microorganisms based on their pH requirements. How does variation in pH affect microorganisms? 3,2
- (b) What is synchronous growth? Describe various methods of obtaining it. 2,3
- (c) What is "red drop"? Who discovered it? What was its main implication? 2,1,2