[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1835 **C** **Roll No.....**

Unique Paper Code : 253401

Name of the Paper : Microbial Physiology and Metabolism II

Name of the Course : B.Sc. (H) Microbiology Part II

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. **All** questions carry equal marks.

1. (a) Define multienzyme complex. Explain how an organism benefits from such an assembly citing a suitable example. (1+4=5)

   (b) How is synthesis of nitrogenase regulated in nitrogen fixing organisms ? Explain with the help of a suitable diagram. (6)

   (c) Give an example of each of the following **(any 4)** :

   (i) Cytochrome oxidase inhibitor

   (ii) Alcohol producing bacteria

   (iii) Prosthetic group

   (iv) Irreversible enzyme inhibitor

   (v) Phototrophic nitrogen fixing bacteria

   (vi) Coenzyme (1×4=4)

P.T.O.

2. (a) What are anaplerotic reactions? Write any two such enzymatic reactions. (1+3=4)

(b) Define the following terms giving examples **(any 4)** :

(i) Uncoupler

(ii) Apoenzyme

(iii) Lyases

(iv) Flavoproteins

(v) Redox potential

(vi) Isozymes (2×4=8)

(c) Comment on the multifunctional aspects of Oxidative Pentose Phosphate Pathway. (3)

3. Write short notes on the following **(any 3)**:

(i) Nitrogenase protection from oxygen toxicity

(ii) Glyoxylate cycle

(iii) Butyrate fermentation

(iv) Reversible enzyme inhibition

(v) ED pathway (5×3=15)

4. (a) Differentiate between assimilatory and dissimilatory nitrate reduction. (5)

(b) Mention the scientific contributions of the following scientists **(any 4)** :

(i) H. L. Kornberg

(ii) Koshland

(iii) Carnahan et al.

(iv) O. Warburg

(v) J. B. Sumner (2×4=8)

(c) Explain Harden and Young effect. (2)

5. (a) How does chemiosmotic hypothesis account for oxidative phosphorylation ? Provide any two experimental evidences in its favour. (6)

OR

Differentiate between mitochondrial and bacterial ETC.

(b) Write the Michelis Menten Equation for enzymatic reactions. What is Lineweaver Burke plot of enzyme activity ? Explain with the help of a suitable diagram. (1+2+2=5)

(c) Draw a diagram to show how enzymes catalyse reactions. What is Lock and Key hypothesis. Who proposed it ? What are its demerits ?

(1+1+1+1=4)

6. (a) Write the reactions catalysed by following enzymes (**any 5**) :

(i) Glutamate dehydrogenase

(ii) Pyruvate decarboxylase

(iii) Transaldolase

(iv) Citrate synthase

(v) Glyceraldehyde 3-phosphate dehydrogenase

(vi) 6-Phosphogluconate dehydrogenase

(vii) α-ketoglutarate dehydrogenase (1×5=5)

P.T.O.

(b) How is EMP pathway regulated in the cell ? (5)

OR

TCA cycle plays an important role in anabolism. Comment.

(c) Gluconeogenesis is the reversal of Glycolysis. Comment. (5)