

N.B. (1) Attempt all questions.(2) **Do not** write any explanation for labeled diagram and schematic representation questions.**Q. 1. A.** Answer the following (**Attempt any Two**)**10 marks**

1. Discuss the importance of leader peptide, docking proteins and peptidases to enable proteins to be exported from bacterial cells.
2. Give a diagram and write a note on the uptake of maltose.
3. Discuss the EII proteins of the PTS system.
4. Discuss the composition of membranes and its role in solute transport.

B. Do as directed (**Attempt any five**)**5 marks**

1. Name a solute transport mechanism which drives substrates against a concentration gradient using energy.
2. Give any one advantage of using proteoliposomes.
3. Define uniport.
4. Name the gradient used by lactose permease during the uptake of lactose.
5. Define channels.
6. Give one example of solute transported by passive diffusion.
7. Define shock sensitive transport system.
8. Name any one biological process involving membrane fusion.
9. Name a membrane complex consisting of four subunits involved in solute transport.
10. Name the cytoplasmic protein which accepts phosphate from PEP through the action of EI.

Q. 2. A. Answer the following (**Attempt any Two**)**10 marks**

1. What is the number of molecules of ATP formed when one $\text{NADH} + \text{H}^+$ is oxidised via respiratory ETC?
Also calculate the free energy released during electron transfer from $\text{NADH} + \text{H}^+$ to O_2 .
(E° for $\text{NAD}^+/\text{NADH} = -0.32 \text{ v}$; E° for $\text{O}_2/\text{H}_2\text{O} = +0.82 \text{ v}$
Faraday's constant = 23063 cal/v)
2. Draw a neat labelled diagram of bacterial ATP synthase.
3. Write a note on carriers transferring only electrons in the respiratory chain.
4. Discuss i) Oxalate formate exchange.
ii) End product efflux.

B. Do as directed (**Attempt any five**)**5 marks**

1. Define photophosphorylation.
2. Give any one example of ionophore.
3. Define luciferase.
4. Give one application of bioluminescence.
5. Give any one example of terminal oxidase.
6. Name the scientist who described rotational catalysis.
7. Name the subunit that forms the central shaft in the F_1 component of mitochondrial ATP synthase.
8. Define redox potential.
9. Name the mobile carrier of ETC receiving electrons from complex I and complex II.
10. Name the purple pigment containing Schiffs base which gets protonated.

[Turn over

Q.3. A. Answer the following (Attempt any Two) 10 marks

1. Discuss the use of radioisotopes to study biochemical pathways.
2. With chemical structures and enzymes show the conversion of 3-phosphoglyceraldehyde to pyruvate via EMP pathway.
3. Schematically represent incomplete TCA in anaerobic bacteria.
4. Discuss the significance of HMP pathway.

B. Do as directed (Attempt any five) 5 marks

1. Define sequential induction.
2. Give the structure of sedoheptulose-7-phosphate.
3. Name the enzyme of EMP absent in *Pseudomonas saccharophila*.
4. Name the enzyme catalysing the hydrolytic cleavage of lactose.
5. Define Anaplerotic reaction.
6. Name the biosynthetic precursor from TCA for the amino acids of aspartate family.
7. Name the enzyme that transfers glycoaldehyde group from a ketose to an aldose sugar.
8. Name the nucleotide bound to galactose during its epimerisation to glucose.
9. Using word equation write the reaction catalysed by isocitrate lyase.
10. Name any one metabolic probe used to study metabolism.

Q. 4. A. Answer the following (Attempt any Two) 10 marks

1. With chemical structure and enzymes show the synthesis of NAM.
2. Write a note on Gluconeogenesis.
3. Discuss mixed acid fermentation.
4. Schematically only represent *Bifidum* pathway from fructose-6-phosphate to lactate and acetate.

B. Do as directed (Attempt any five) 5 marks

1. Name the sugar nucleotide that donates glucose for glycogen synthesis.
2. Define transpeptidation.
3. Name the unique reaction first studied in *Clostridium pasteurianum* during butyrate fermentation.
4. With word equation show the reaction catalysed by α acetolactate synthase.
5. Name the glycogen branching enzyme.
6. Give one example of a bacterium performing alcoholic fermentation.
7. Give the products formed when pyruvate formate lyase acts on pyruvate.
8. Name any one amino acid at the third position of peptidoglycan.
9. Name the metabolic intermediate detected by VP test.
10. With word equation show the reaction catalysed by Methyl malonyl CoA transcarboxylase.

Q.5. Answer the following (Attempt any Three) 15 marks

1. Write a note on active transport.
2. Discuss organisation of electron carriers and generalised electron transport pathway in bacteria.
3. Discuss organisation and function of Complex III of mitochondrial ETC.
4. Write the five chemical equations showing the conversion of pyruvate to acetyl CoA.
5. Schematically explain acrylate pathway of propionic acid fermentation.
6. Diagrammatically only represent the role of Na K ATPase in transport.