[Time 2 1/2 Hours] **[Marks: 75]**

N.B. (1) Attempt all questions, all questions carry equal marks.
(2) Do not write any explanation for labelled diagram and schematic representation questions.

Q. 1. A. Answer the following (Attempt any two) **[10]**

a) Discuss the role of cell membrane in solute transport with respect to lipids, proteins and aquaporins.
b) With the help of a neat labeled diagram represent secondary active transport
c) Write a note on transport systems which do not involve energy expenditure.
d) Discuss steps involved in Histidine transport.

Q. 1. B. Do as directed (Attempt any five) **[05]**

a) Define liposomes.
b) Give significance of ABC transporter.
c) Name a non-carrier mediated transport system.
d) Explain binding proteins.
e) Define primary active transport.
f) Define mechanosensitive channels.
g) Define shock sensitive transport system.
h) Give an example of a solute transported by facilitated diffusion in *E coli.*
i) Give an example of a siderophore in *E coli.*
j) Name the binding protein of the maltose transport system.

Q. 2. A. Answer the following (Attempt any two) **[10]**

a) Write a short note on flavoproteins and Quinones
b) Discuss rotational catalysis as a mode of synthesizing ATP at the site of ATP synthase.
c) Differentiate between bacterial and mitochondrial ETC [5 points]
d) Discuss chemiosmotic hypothesis.

Q. 2. B. Do as directed (Attempt any five) **[05]**

a) Give an example of a reductase expressed under anaerobic respiration.
b) Define coupling site.
c) Which vitamin is a precursor for menaquinone.
d) Name the prosthetic group associated with complex II of mitochondrial ETC.
e) Name an inhibitor of ATPase.
f) Define redox potential.
g) Which metal ion other than Fe is present in cytochrome aa_3?
h) Name an organism that has bacteriorhodopsin in its membrane?
i) Give the significance of pmf.
j) What is the numerical value for P:O ratio of $NADH/NAD^+$.

Q. 3. A. Answer the following (Attempt any two) **[10]**

a) Using chemical structures and enzymes represent Glycolysis.
b) Schematically represent oxidative phase of HMP Pathway.
c) Discuss utilization of Starch.
d) Diagramatically represent Incomplete TCA.

Q. 3. B. Do as directed (Attempt any five) **[05]**

a) Name an enzyme cleaving Lactose into Glucose and Galactose.
b) Using word equation write the action of Isocitrate lyase..
c) Give chemical structure of D- Galactose.
d) Name an enzyme cleaving Sucrose into Glucose-1-phosphate and Fructose.
e) Name an enzyme requiring TPP as cofactor.
f) Name the end product of anaerobic metabolism of Glucose via ED Pathway.
g) Name a Cellulose degrading microorganism.
h) Name a coenzyme that functions as reducing power.
i) Give chemical structure of Succinic acid.
j) Name an organism producing Fructose-6-phosphate Phosphoketolase.

Q.4.A Answer the following. (Attempt any Two) **[10]**

a) Schematically represent mixed acid fermentation pathway.
b) Schematically represent amphibolic nature of EMP pathway
c) With the help of structures and enzymes show conversion of acetyl CoA to butyric acid.
d) Discuss the transfer of precursor molecules across cell membrane and their assembly to form peptidoglycan.

Q. 4. B. Do as directed (Attempt any five) **[05]**

a) Give an example of organism producing 2,3 butanediol.
b) Write word equation to show the reaction catalyzed by acetoacetate decarboxylase.
c) Name the enzyme which converts L-lactate to D-lactate.
d) Name any one anabolic precursor formed in the TCA cycle.
e) Name the enzyme which hydrolyses Fructose 1,6 bisphophate to Fructose 6 phosphate.
f) Give word equation for the reaction catalyzed by butanol dehydrogenase.
g) Give one example of bacteria carrying out alcohol fermentation.
h) Give one example of bacteria producing propionic acid.
i) Define pH 6 enzyme.
j) Explain Pasteur effect.

Q. 5. Answer the following (Attempt any three) **[15]**

a) Schematically represent the sugar-phosphotransferase system.
b) Write a short note on bioluminescence.
c) Using a balance sheet calculate the number of moles of ATP formed during anaerobic glycolysis of glucose.
d) Discuss Anaplerotic reactions.
e) Write a short note on glycogen biosynthesis
f) Explain Radiorespirometry to differentiate between EMP and ED Pathway.
