Q. P. Code: 39234

[Time 2½ Hours] **[Marks: 75]**

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]**

a) Discuss methods that make use of whole cells to study solute transport.
b) Briefly discuss how permeases and binding proteins are both associated with transport but yet are different.
c) Write a short note on facilitated diffusion.
d) Discuss the role of outer membrane of Gram negative bacteria in solute transport.

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

a) Explain Secondary active transport.
b) Give an example of synthetic membrane structures used to study solute transport.
c) Define aquaporins.
d) Give significance of leader peptide.
e) Give an example of a siderophore.
f) Give one example of mechanosensitive channel in *E coli*.
g) Give significance of ABC transporter.
h) Define sphaeroplast.
i) Name the pore in the outer membrane of *E coli* through which maltose enters.
j) Explain shock sensitive transport system.

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

a) Write a note on electron carriers.
b) Discuss bacterial ATP synthase.
c) Diagramatically represent mitochondrial ETC.
d) Schematically explain the "aerobic" and "anaerobic" electron transport pathway found in bacteria.

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

a) Which protein subunit of F1 ATPase constitutes its shaft ?
b) How many coupling sites does a mitochondrial chain have
c) Name the mobile carrier in the lipid phase of the membrane
d) How many Hydrogen atoms do flavins carry in their reduced state?
e) What are bacterial enzyme complexes that reduce electron acceptors other than oxygen called?
f) How many protons are expelled out for every 2 electrons that travel from NADH to Oxygen?
g) Define pmf.
h) The Q cycle exists in complex I. State True or False
i) Name one inhibitor of ETC
j) What is the role of cytochrome c in the ETC.?

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

a) Using chemical structures and enzymes write oxidation of AcetylCoA to Fumarate via TCA cycle.
b) Schematically represent Homolactic Fermentation.
c) Discuss the action of various enzymes on Starch.
d) Write a short note on glyoxylate pathway.

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

a) Name the bond responsible for branching in Glycogen.
b) Give chemical structure of Sedoheptulose-7-phosphate.
c) State true or false: Glycogen Phosphorylase uses water molecule to degrade Glycogen.
d) Name the enzyme that acts on Cellulose.
e) Name an end product of oxidative branch of Incomplete TCA.
f) Define Invertase.
g) Using word equation write action of Fumarate reductase.
h) D-Xylulose is an epimer/isomer of D- Ribulose . (Choose the correct alternative.)
i) Name the technique measuring $^{14}CO_2$ during Catabolism of Glucose.
j) Define Pulse Labelling.

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

a) Schematically represent propionic acid fermentation by acrylate pathway
b) Schematically represent butyric acid fermentation pathway
c) Discuss mixed acid fermentation.
d) Write a short note on Gluconeogenesis.

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

a) Name the enzyme which catalyzes formation of acetaldehyde and CO_2 from pyruvate.
b) Name the enzyme which catalyzes formation of acetoin from α-acetolactate .
c) 'Production of n butanol and acetone by *Clostridium acetobutylicum* takes place below pH of 5.' State whether true or false.
d) Write one intermediate of EMP pathway that has an anabolic function.
e) State any one function of Glycogenin.
f) Name the enzyme which converts acetoacetate to acetone.
g) Name one bacterium which produces alcohol from glucose using ED pathway.
h) Give an example of precursor molecule used in peptidoglycan biosynthesis.
i) Name a bacterium which produces butyric acid.
j) State the function of undecaprenyl phosphate in peptidoglucan biosynthesis.

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

a) Schematically represent Histidine uptake model.
b) Differentiate between group translocation and passive diffusion (five valid points).
c) Discuss the mechanism which plays a role in the synthesis of ATP using a proton gradient.
d) Discuss Lactose metabolsim.
e) Explain Sequential Induction to understand Metabolic Pathway.
f) Write a note on Amphibolic role of TCA
