

Sl. No. of Ques. Paper : 2035 **GC-3**
Unique Paper Code : 32491302
Name of Paper : Membrane Biology and Bioenergetics
Name of Course : B.Sc. (Hons.) Biochemistry (CBCS)
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. Question No. 1 is compulsory.
Log tables and/or scientific calculators may be provided.*

1(A) Explain briefly

- a. Accessory pigments funnel light energy to the reaction center.
- b. Anion transporter regulates blood pH
- c. Composition of a membrane reflects its functional specialization
- d. A reaction with a positive ΔE_0^1 can proceed in the forward direction
- e. Dinitrophenol acts as an uncoupler of oxidative phosphorylation.

(B) Name the following in one or two words

- a. A membrane protein having β -barrel structure
- b. Light dependent ion transporter in prokaryotes
- c. Mobile carrier of electrons in mitochondria
- d. A technique to detect lateral diffusion of lipids in membrane
- e. An inhibitor of adenine nucleotide translocase

(C) Give the contribution of the following scientists

- a. Paul Boyer
- b. Peter Mitchell
- c. John Walker
- d. Fritz Lippmann

(10, 5, 4)

2(A) What is membrane fluidity? What are the factors that affect membrane fluidity?

(B) Describe the architecture of RBC membrane. Why is it useful as a model membrane?

(C) How do liposomes serve as vehicles for drug delivery?

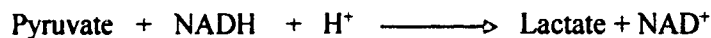
(5, 5, 4)

P.T.O.

- 3(A) Differentiate between
- (i) Carriers and channels
 - (ii) Active and passive transport
- (B) What is the role of Na/K pump in animal cells? Illustrate the mechanism of Na/K ATPase.
- (C) Explain the process of membrane fusion at synapses. (4, 6, 4)

- 4(A) What are caveolins? Give their significance.
- (B) How do you determine the topology of a membrane protein? Give two methods.
- (C) How does Halobacterium Halobium survive in very high salt concentration? (4, 6, 4)

- 5(A) The standard reduction potential of NAD^+/NADH and pyruvate/lactate redox pairs are -0.320 V and -0.185 V , respectively.
- (i) Which redox pair has the greater tendency to lose electrons?
 - (ii) Which is the stronger oxidizing agent? Explain
 - (iii) In which direction will the following reaction proceed under standard conditions?



- (iv) What is the standard free energy change for this reaction?
- (B) The cell has a variety of enzymes to protect from ROS-mediated damage. Explain
- (C) Diagrammatically show the different electron carriers in Complex I of the mitochondrial electron transport chain. (5, 5, 4)

- 6(A) Elaborate the mechanism of mitochondrial ATP synthesis.
- (B) Describe the process of cyclic photophosphorylation with help of a diagram.
- (C) Give a schematic presentation of electron flow in PSII. (5, 5, 4)

7. Write short notes on the following:

- a. Tight junctions
- b. MDR proteins
- c. Reaction center of purple photosynthetic bacteria
- d. Phycobilisomes

(3, 3, 4, 4)

8.(A) Differentiate between the following:

- (i) COP I and COP II mediated vesicular transport.
- (ii) Ligand gated and voltage gated ion channels

(B) Comment on the following:

- (i) Bioluminescence is reverse of photosynthesis
- (ii) PEP is a high energy molecule

(8, 6)

[$R=8.314\text{J/mol.K}$, $F=96,480\text{J/V.mol}$.]