Printed Page:- 03 **Subject Code:- ABT0305**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: III - THEORY EXAMINATION - 2023-2024
Subject: Biophysics

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Carbohydrates present on the plasma membrane (CO1) 1

(a) have structural role
(b) form channel
(c) act as carrier
(d) help in molecular recognization

1-b. Diffusion stops when the concentration gradient is zero that is state of equilibrium is reached. 1

(a) True
(b) False

1-c. The opening of right atrium into right ventricle is guarded by (CO2) 1

(a) mitral valve
(b) tricuspid valve
(c) bicuspid valve
(d) aortic semilunar valve

1-d. Excitable cells of the nervous system generate nervous impulses. 1

(a) True
(b) False

1-e. According to the fluid mosaic model of membrane structure, proteins of the membrane are mostly (CO3) 1

(a) spread in a continuous layer over the inner and outer surfaces of the membrane.
(b) confined to the hydrophobic core of the membrane.
(c) embedded in a lipid bilayer.
(d) randomly oriented in the membrane, with no fixed inside-outside polarity.

1-f. In sodium potassium pump two sodium ions exit the cell, while three potassium ions enter the cell. 1

(a) True
(b) False

1-g. Which of the following nitrogen bases has the highest number of nitrogen atoms (CO4) 1

(a) Adenine
(b) cytosine
(c) uracil
(d) thymine

1-h. Protein folding occurs in the_____. (CO4) 1

(a) cytosol
(b) mitochondria
(c) nucleus
(d) endoplasmic reticulum

1-i. The complex network of protein filaments that extends throughout the cytoplasm is called the_____ (CO5) 1

(a) Cytoskeleton
(b) ribosomes
(c) endoplasmic reticulum
(d) peroxisomes

1-j. Molecular motors are protein machines whose directed movement along cytoskeletal filaments is driven by ATP hydrolysis. 1

(a) True
(b) False

2. Attempt all parts:-

2.a. Give one example each of structural and storage polysaccharides? (CO1) 2

2.b. How can conduction problems in the heart be corrected? (CO2) 2

2.c. Where is voltage-gated channels most abundant in the human body? (CO3) 2

2.d. Write the function of DNA J and DNA K in *E.coli*? (CO4) 2

2.e. What are the other two names of sliding filament theory? (CO5) 2

SECTION-B 30

3. Answer any five of the following:-

3-a. What are the different types of aquaporins and where they are located in our 6

	body? (CO1)	
3-b.	Define polysaccharides? Differentiate between homopolysaccharide and heteropolysaccharide? (CO1)	6
3-c.	Explain in detail the electrical phenomenon in excitable cells? (CO2)	6
3-d.	What causes conduction delay? How do you fix electrical problems of the heart? (CO2)	6
3.e.	Write any six functions of membrane proteins? (CO3)	6
3.f.	What are heat-shock proteins? Discuss their types? (CO4)	6
3.g.	What is cell migration? Discuss its types? (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Active transport requires ATP whereas passive transport do not. Justify? (CO1)	10
4-b.	A man drinks a concentrated salt solution and vomits after some time. Why? (CO1)	10

5. Answer any one of the following:-

5-a.	Define synapse? Discuss its types in detail? (CO2)	10
5-b.	What is the first event of an action potential? Elaborate the different stages involved in action potential? (CO2)	10

6. Answer any one of the following:-

6-a.	Discuss in detail about the use of ion pumps and ion channels in biological system? (CO3)	10
6-b.	Define facilitated diffusion? Discuss its types? Differentiate between facilitated diffusion and active transport? (CO3)	10

7. Answer any one of the following:-

7-a.	Give a brief overview on protein primary and secondary structure? (CO4)	10
7-b.	Enumerate circular dichroism in detail? Also discuss their applications. (CO4)	10

8. Answer any one of the following:-

8-a.	Discuss in detail the mechanism of muscle contraction? (CO5)	10
8-b.	With the help of labelled diagram discuss the structure of sarcomere? (CO5)	10