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 (2024 - 2025) 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. Most abundant lipid in plasma membrane is (CO1, K1) ) Cholesterol ) Sterol 20 **SECTION-A** 1. Attempt all parts:-1-a. 1 (a) (b) (c) Glycolipid Phospholipids (d) 1-b. Lipids that are found in biological membranes (CO1, K1) 1 are amphipathic (a) are commonly referred to as triacylglycerols (b) contain only unsaturated fatty acyl chains (c) are normally covalently associated with proteins (d) 1-c. What is the role of the sodium-potassium pump in maintaining the resting 1 membrane potential? (CO2, K1) (a) It pumps sodium out of the cell and potassium into the cell (b) It pumps sodium into the cell and potassium out of the cell (c) It pumps both sodium and potassium out of the cell (d) It pumps both sodium and potassium into the cell 1 1-d. What is the ionic hypothesis in the context of cell physiology? (CO2, K1)

- (a) A theory explaining the role of ions in cellular communication and signaling
- (b) A hypothesis proposing that cells are made up of only positively charged ions

	(c)	A theory describing the role of DNA in cellular processes	
	(d)	A hypothesis stating that cells primarily communicate through chemical messeng	ers
1-e.	A person having deficiency of rhodopsin should take: (CO3, K1)		1
	(a)	Tomatoes	
	(b)	Carrots	
	(c)	Radish	
	(d)	Guava	
1-f.	W	which of the following is true of integral membrane proteins? (CO3, K1)	1
	(a)	They are not mobile within the bilayer.	
	(b)	They are loosely bound to the surface of the bilayer.	
	(c)	They lack tertiary structure.	
	(d)	They are usually transmembrane proteins.	
1-g.	W	which of the following is not a characteristic of nucleotide bases? (CO4, K1)	1
	(a)	Planar	
	(b)	Heterocyclic	
	(c)	Aliphatic	
	(d)	Ubiquitous	
1-h.	Ν	ame the pyrimidine base which is found in RNA but not in DNA? (CO4, K1)	1
	(a)	Thymine	
	(b)	Uracil	
	(c)	Adenine	
	(d)	Guanine	
1-i.	T	he filaments associated with cilia and flagella are constituted by (CO5, K1)	1
	(a)	Microtubules	
	(b)	Microfilaments	
	(c)	Microfibrils	
	(d)	Microvilli	
1 <b>-</b> j.	W CO	Thich of the following sections of a sarcomere does not shorten during ontraction? (CO5, K1)	1
	(a)	A band	
	(b)	Distance between Z lines	
	(c)	I band	
	(d)	H zone	
2. Att	empt a	all parts:-	
2.a.	W	That are aquaporins? (CO1, K2)	2
2.b.	Н	ow do ions facilitate the flow of electric current? (CO2, K2)	2
2.c.	W (C	Vrite the name of any two disease that is caused due to mutations in rhodopsin? CO3, K2)	2

## Page 2 of 3

•

2.d.	What are dihedral angles? (CO4, K2)	2
2.e.	What is the key difference between dynein and kinesin protein? (CO5, K2)	2
<u>SECTIO</u>	<u>N-B</u>	30
3. Answe	r any <u>five</u> of the following:-	
3-а.	Define the term diffusion? Explain its different types? (CO1, K2)	6
3-b.	Explain the process of micelle formation in detail? (CO1, K2)	6
3-с.	Draw and describe the structure of neuron? (CO2, K2)	6
3-d.	What membrane bound protein is responsible for pumping Na+ and K+ into and out of the cells? Discuss about it in detail? (CO2, K2)	6
3.e.	Describe the structure of voltage gated ion channels? (CO3, K2)	6
3.f.	Discuss in detail how DNA is converted to RNA? (CO4, K2)	6
3.g.	Discuss in detail the theory behind muscle contraction? (CO5, K2)	6
<u>SECTIO</u>	<u>N-C</u>	50
4. Answe	r any <u>one</u> of the following:-	
4-a.	Define diffusion and describe the factors that affect the movement of materials across the cell membrane? (CO1, K2)	10
4-b.	Why are biomolecules called macromolecules? Why do we need biomolecules? How are biomolecules synthesized? (CO1, K2)	10
5. Answe	r any <u>one</u> of the following:-	
5-a.	What is conduction disorder? What causes electrical issues in the heart? What is an electrical problem in the heart? (CO2, K2)	10
5-b.	How many types of synapse are there? Which synapse is faster? What is the main purpose of synapse? What would happen if there were no synapses? (CO2, K2)	10
6. Answe	r any <u>one</u> of the following:-	
6-a.	What are receptors? Give a brief account of different types of receptors? (CO3, K3)	10
6-b.	How do substances travel in the cell? What is the main role of the cell membrane in the transport mechanism? What determines whether a transport process is active or passive? (CO3, K3)	10
7. Answe	r any <u>one</u> of the following:-	
7-a.	What are molecular chaperones? Discuss in detail about Hsp 70 and Hsp 60 family? (CO4, K3)	10
7-b.	What is circular dichroism? Discuss it in detail? Also write its advantages and disadvantages? (CO4, K3)	10
8. Answe	r any <u>one</u> of the following:-	
8-a.	Discuss in detail the structure of microtubule? Also draw the diagram? (CO5, K3)	10
8-b.	Briefly explain cell migration? What type of cells do migration? What occurs during cell migration? (CO5, K3)	10

•