



K. Sambal

Avinashilingam Institute for Home Science and Higher Education for Women
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)
Re-accredited with A++ Grade by NAAC, CGPA 3.65/4, Category I by UGC
Coimbatore - 641043, Tamil Nadu, India

Bachelor's Degree Examination - November 2025
I Semester

Class : I UG / 2024 Batch
Major : Biochemistry and Biotechnology

Time : 3 Hours
Max. Marks : 100

23BBTC01 Cell Biology and Membrane Biology

Course Outcomes:

At the end of the course students will be able to

1. Understand the structure and functions of cell organelles
2. Establish the role of cell wall, cytoskeletal elements in cell locomotion, cell cycle and cell death.
3. Know the structure of nerve cells, muscle cells and their role in neurotransmission, muscle contraction.
4. Acquire knowledge on Biomembranes – structure and fluidity
5. Recognize the mechanism of transport across membranes

Part A

10 x 1 = 10

Choose the Correct Answer

1. The absence of a protein coat in viroids makes them resistant to
a. Heat
b. UV radiation
c. Protein-targeting defenses
d. Nucleases
CO1 K1
2. If the Golgi apparatus is disrupted, which cellular function will be directly affected?
a. Glycosylation of proteins
b. ATP synthesis
c. Fatty acid β -oxidation
d. DNA replication
CO1 K2
3. In Alzheimer's disease, decreased activity of which neurotransmitter is most significant?
a. Glutamate
b. Serotonin
c. Dopamine
d. Acetylcholine
CO2 K1
4. Identify the band that remains unchanged during sarcomere contraction.
a. Z-line
b. I-band
c. A-band
d. H-zone
CO2 K2
5. Which cytoskeletal element provides the tensile strength to eukaryotic cells.
a. Microtubules
b. Intermediate filaments
c. Microfilaments
d. Actin filaments
CO3 K1
6. This property of malignant tumors distinguishes them from benign ones.
a. Ability to metastasize
b. Encapsulation
c. Slow growth
d. Lack of angiogenesis
CO3 K2
7. Freeze-fracture electron microscopy revealing proteins embedded within bilayer was proposed in which model?
a. Danielli-Davson
b. Robertson unit membrane
c. Lipid monolayer
d. Singer-Nicolson fluid mosaic
CO4 K1
8. A membrane loses fluidity due to high saturated lipid content. Give the function that is most likely impaired.
a. Ion exchange
b. ATP hydrolysis
c. Endocytosis
d. Enzyme synthesis
CO4 K2
9. Lipid-soluble drugs are absorbed through intestinal epithelium mainly by which transport?
a. Facilitated diffusion
b. Simple diffusion
c. Secondary active transport
d. Pinocytosis
CO5 K1
10. Which molecule acts as the chromophore in bacteriorhodopsin?
a. Retinal
b. Chlorophyll
c. FAD
d. NADPH
CO5 K2

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. Interpret the differences between plant and animal cell. CO1 K3
(or)
- 11.b. Explain the structure and functions of endoplasmic reticulum. CO1 K2
- 12.a. Discuss on the transmission of nerve impulse along an axon and across synapse. CO2 K2
(or)
- 12.b. Illustrate with neat diagram on the sliding filament model of skeletal muscle contraction. CO2 K4
- 13.a. Write a note on the structure and functions of microtubules and microfilaments. CO3 K2
(or)
- 13.b. Explain the Mechanism apoptosis and necrosis. CO3 K3
- 14.a. Describe the composition of various cellular and subcellular membrane and its functions. CO4 K4
(or)
- 14.b. Outline the factors affecting membrane fluidity and its significance. CO4 K4
- 15.a. Explain the role of glucose transporter and anion transporter across the cell membrane. CO5 K3
(or)
- 15.b. Summarize on ABC family of transporters and its significance. CO5 K5

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Compare and contrast the structure and functions of prokaryotic and eukaryotic cells. CO1 K3
(or)
- 16.b. Outline the structure, biogenesis and functions of nucleus and mitochondria. CO1 K4
- 17.a. Explain the types of neurons and structure of multipolar neurons. CO2 K3
(or)
- 17.b. Sketch the ultrastructure of skeletal muscle and discuss on the contractile and regulatory proteins of muscle. CO2 K3
- 18.a. Discuss the role of the cell junctions in the membrane and add a note on it types. CO3 K4
(or)
- 18.b. Explain the etiology of cancer salient features of a transformed cells and agents promoting carcinogenesis. CO3 K5
- 19.a. What are the various model systems to study membranes that area proposed. CO4 K4
(or)
- 19.b. How do use employ FRAP, TNBS and SPT to study membrane dynamics. CO4 K5
- 20.a. Write about the different classes of primary active transporters with suitable examples. CO5 K3
(or)
- 20.b. Explain how voltage-gated and ligand-gated ion channels regulate membrane transport. CO5 K4