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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

Colombatore - 641 043, Tamil Nadu, India

Bachelor's Degree Arrear Examination – May 2025

I Semester

Batch : 2023/2024

Time : 3 Hours

Major : Biochemistry and Biotechnology

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. _____ proposed the Cell Theory CO1K1
 - a) Robert Hooke
 - b) Schleiden and Schwann
 - c) Watson and Crick
 - d) Gregor Mendel

2. The powerhouse of the cell is _____ CO1K3
 - a) Nucleus
 - b) Golgi apparatus
 - c) Mitochondria
 - d) Ribosome

3. _____ of the following is NOT a neurotransmitter. CO2 K1
 - a) Acetylcholine
 - b) Dopamine
 - c) Glucose
 - d) Serotonin

4. The sliding filament model is related to _____ CO2K2
 - a) Muscle contraction
 - b) Nerve impulse transmission
 - c) Cell division
 - d) Cell apoptosis

5. The cell wall of Gram-positive bacteria is primarily composed of _____ CO3K2
 - a) Cellulose
 - b) Peptidoglycan
 - c) Chitin
 - d) Glycoproteins

6. Microtubules are composed of _____ CO3K3
 - a. Actin
 - b) Tubulin
 - c) Myosin
 - d) Keratin

7. The function of Flippase in biomembranes is _____ CO4K2
 - a) Lipid transport
 - b) Protein folding
 - c) Cell signaling
 - d) ATP synthesis

8. The Fluid Mosaic Model of the membrane was proposed by _____ CO4K1
 - a) Danielli and Davson
 - b) Robertson
 - c) Singer and Nicolson
 - d) Langmuir

9. Facilitated diffusion differs from simple diffusion in that _____ CO5K4
 - a) It requires ATP
 - b) It involves transport proteins
 - c) It moves molecules against the concentration gradient
 - d) It is only observed in bacteria

10. F-type ATPases are found in _____ CO5 K3
 - a) Mitochondria and chloroplasts
 - b) Plasma membrane
 - c) Cytoplasm
 - d) Endoplasmic reticulum

Part B

Answer All Questions

5 X 6 = 30

Each answers should not exceed 400 words or two pages

11. a) Compare and contrast prokaryotic and eukaryotic cells.
(or) CO1K2
11. b) Describe the structure and function of the nucleus. CO1K3
12. a) Write a note on the structure and function of a multipolar neuron.
(or) CO2K2
12. b) Elaborate the molecular mechanism of muscle contraction with the sliding Filament model. CO2K2
13. a) Explain the different types of cytoskeletal components in a eukaryotic cell.
(or) CO3K1
13. b) Describe the process of mitosis with neat diagrams. CO3K2
14. a) Give an account on membrane functions.
(or) CO4K2
14. b) Write a short note on membrane fluidity and factors affecting it. CO4K1
15. a) Explain the role of ion channels in membrane transport.
(or) CO5K2
15. b) Describe the mechanisms of endocytosis and exocytosis. CO5K3

Part C

Answer All Questions

5 X 12 = 60

Each answers should not exceed 800 words or four pages

16. a) Describe the structure, functions, and biogenesis of mitochondria and chloroplasts.
(or) CO1K3
16. b) Explain the structure and functions of the Golgi complex and endoplasmic reticulum. CO1K2
17. a) Discuss in detail the different types of muscle cells and their structure.
(or) CO2K3
17. b) Describe the process of nerve impulse transmission across a synapse. CO2K4
18. a) Explain the different stages of the cell cycle and its regulation. CO3K2
(or)
18. b) Describe the various cancer types and salient features of transformed cell. CO3K4
19. a) Give a detailed account on composition of biomembranes.
(or) CO4K4
19. b) Write a detailed note on techniques to study membrane dynamics. CO4K2
20. a) Elaborate on simple and facilitated diffusion. CO5K1
(or)
20. b) Explain the structure and functions of voltage-gated and ligand-gated ion channels. CO5K4