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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)
 Re-accredited with 'A++' Grade by NAAC. Recognised by UGC Under Section 12B
 Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination - November 2024
I Semester

Class : I UG / 2023 Batch
Major : Biochemistry and Biotechnology

Time : 3 Hours
Max. Marks : 100

23BBTC01 Cell Biology and Membrane Biology

Course Outcomes:

- CO1: Understand the structure and functions of cell organelles
 CO2: Establish the role of cell wall, cytoskeletal elements in cell locomotion, cell cycle and cell death.
 CO3: Know the structure of nerve cells, muscle cells and their role in neurotransmission, muscle contraction.
 CO4: Acquire knowledge on Biomembranes – structure and fluidity
 CO5: Recognize the mechanism of transport across membranes

Part A

10 x 1 = 10

Choose the Correct Answer

1. Protein synthesis in both prokaryotic and eukaryotic cells occurs in _____.
 a. ribosomes
 b. mitochondria
 c. golgi complex
 d. endoplasmic reticulum
 CO1K1
2. Energy production in eukaryotic cells occurs in _____.
 a. glyoxysomes
 b. peroxisomes
 c. mitochondria
 d. chloroplasts
 CO1K1
3. Synapse facilitates _____.
 a. transmission of signals between neurons
 b. maintaining resting potential
 c. generation of action potentials
 d. myelin sheath generation
 CO2K1
4. During muscle contraction, calcium binds with _____.
 a. Tpl
 b. TpT
 c. TpC
 d. Tropomyosin
 CO2K1
5. The cell motility and contractility is due to the _____.
 a. flagella
 b. intermediate filaments
 c. microtubule
 d. microfilaments
 CO3K1
6. Caspases exert their role by _____.
 a. promoting cell survival
 b. cleaving cellular proteins
 c. inducing DNA repair
 d. cell proliferation
 CO3K1
7. Floppase in biomembranes directs the _____.
 a. transportation of lipids into the cytoplasm
 b. transporting lipids from the inner to the outer leaflet of the membrane
 c. synthesis of membrane proteins
 d. degradation of membrane lipids
 CO4K1
8. Carbohydrates in biomembranes helps in _____.
 a. energy production
 b. structural support
 c. cell recognition and signalling
 d. protein synthesis
 CO4K1
9. The movement of molecules from an area of high to lower concentration through semi permeable membrane is _____.
 a. membrane transport
 b. cotransport
 c. osmosis
 d. diffusion
 CO5K1
10. The process of capturing a particle from outside of a cell by engulfing it is _____.
 a. exocytosis
 b. endocytosis
 c. cell shrinkage
 d. ionocytosis
 CO5K1

Part B
Answer ALL questions
Each answer should not exceed 400 words or two pages

5 x 6 = 30

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| 11.a. Explain the mechanism involved in the process of cellular digestion.
(or) | CO1K3 |
| 11.b. Interpret on viroids and prions. | CO1K3 |
| 12.a. Explain about the various phases of action potential.
(or) | CO2K3 |
| 12.b. Illustrate the sliding filament theory of skeletal muscle contraction. | CO2K4 |
| 13.a. Differentiate gap junctions from tight junctions.
(or) | CO3K2 |
| 13.b. How does apoptosis and necrosis differ from each other? | CO3K3 |
| 14.a. Highlight the characteristics of liposomes.
(or) | CO4K3 |
| 14.b. Examine the features of cytoskeleton interaction. | CO4K3 |
| 15.a. Explain about uniport, symport and antiport with examples.
(or) | CO5K3 |
| 15.b. Write an account on ionophores. | CO5K3 |

Part C
Answer ALL questions
Each answer should not exceed 800 words or four pages

5 x 12 = 60

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| 16.a. Sketch out in detail the compartmentalization of eukaryotic cells.
(or) | CO1K4 |
| 16.b. Discuss the structure and function of smooth and rough endoplasmic reticulum. | CO1K3 |
| 17.a. Elaborate about action of neurotransmitters.
(or) | CO2K3 |
| 17.b. With the structure of skeletal muscle, explain the action of contractile and regulatory proteins during muscle contraction. | CO2K4 |
| 18.a. Elaborate on the components of ECM.
(or) | CO3K3 |
| 18.b. Discuss in detail the characteristics and molecular basis of cancer. | CO3K3 |
| 19.a. Explain the function and composition of biomembranes.
(or) | CO4K3 |
| 19.b. Comment on membrane fluidity. Add a note on the factors affecting membrane fluidity. | CO4K4 |
| 20.a. Discuss the importance of ion channels.
(or) | CO5K3 |
| 20.b. Elaborate on various modes of membrane transport. | CO5K3 |
