Q. Code:601127

Reg. No. | | | | | | | | | | | | | |

B.E / B.TECH. DEGREE EXAMINATIONS, MAY 2023

Fourth Semester

BT18405 – CELL BIOLOGY

(Biotechnology)

(Regulation 2018 / Regulation 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

CO 1 Summarize the structure and function of the different cellular components.
CO 2 Compare and contrast the events of cell cycle and its regulation.
CO 3 Categorize different types of transport across the membrane depending on the thermodynamics of the system.
CO 4 Compare the different types of extracellular signals and receptors, and with their functional significance.
CO 5 Identification of cell organelles and the main cytoskeletal components using EM.

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define cell theory.	**1**	**1**
2.	Differences between the Cell organelles and Cell inclusions.	**1**	**2**
3.	Name atleast four components of extracellular matrix.	**2**	**2**
4.	What is Apoptosis? Give its importance.	**2**	**2**
5.	Why does generally very small, hydrophobic molecules cross the cell membrane by simple diffusion?	**3**	**2**
6.	Explain how facilitated diffusion assists in osmosis in cells.	**3**	**2**
7.	Why do ions have a difficult time getting through plasma membranes despite their small size?	**4**	**3**
8.	The same second messengers are used in many different cells, but the response to second messengers is different in each cell. How is this possible?	**4**	**2**
9.	State the principle of Confocal microscope.	**5**	**2**
10.	What are the general applications of microscopic techniques in cell biology.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Compare the structure of fully assembled microtubule, actin filament and intermediate element.	**(9)**	**1**	**3**
	(ii)	Why is a cell considered a unit of life? Briefly describe the contributions of Schleiden and Schwann in formulating the cell theory.	**(5)**	**1**	**3**
		(OR)			
(b)	**(i)**	What is treadmilling? Explain the role of GTP in microtubule polymerization.	**(9)**	**1**	**3**
	(ii)	Draw the diagram of a myofibril of muscle showing different regions.	**(5)**	**1**	**3**
12. (a)	**(i)**	Differentiate the somatic cell division and reduction division.	**(5)**	**2**	**3**

	(ii)	Give detail account on cell cycle and various phases?	(9)	2	3
		(OR)			
(b)	(i)	Differentiate between Meiosis I and meiosis II.	(5)	2	3
	(ii)	Illustrate the cell-cycle check point using a suitable diagram and include molecules that affect transitions from phase to phase.	(9)	2	3
13. (a)	(i)	Discriminate carrier proteins from channel proteins based on its function.	(5)	3	4
	(ii)	Discuss the facilitated transport mechanisms across cell membranes.	(9)	3	4
		(OR)			
(b)		Outline various transport across the plasma membrane and its relevance to the homeostasis of the cell.	(14)	3	4
14. (a)	(i)	Highlight the role of inositol -1,4,5 triphosphate in the Ca^{++} signaling pathway.	(5)	4	3
	(ii)	Describe in detail about the modulation of cytosolic Ca^{++} ions.	(9)	4	3
		(OR)			
(b)	(i)	Compare internal receptors with cell-surface receptors.	(5)	4	3
	(ii)	Classify the signaling types found in multicellular organisms with examples.	(9)	4	3
15. (a)	(i)	Identify a method for separating subcellular biomolecules in a centrifuge tube.	(5)	4	4
	(ii)	Analyze the strength and limitations of immunostaining analysis.	(9)	4	4
		(OR)			
(b)	(i)	Compare transmission and scanning electron microscopy based on Sample preparation, Electron path and obtained Image.	(5)	4	4
	(ii)	List the types of cell and tissue components that can be identified by immunostaining.	(9)	4	4

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

			Marks	CO	RBT LEVEL
16.	(i)	Comment on the statement – Telophase is reverse of prophase.	(5)	2	5
	(ii)	How do cytoplasmic structures predict the plane of cell division before the mitosis begins?	(5)	2	5

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