A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: R2C05

B.E./B.Tech. DEGREE EXAMINATION, NOV/DEC 2024

First Semester

Biotechnology

R21UBT205- CELL BIOLOGY

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. This tissue includes the blood tissue CO1 -U

   (a) Muscle tissue (b) Connective tissue (c) Epithelial tissue (d) Nervous tissue

2. The main difference between human cheek cells and onion peel cells is CO1 -U

   (a) Presence of cell wall in onion peel cells

   (b) Presence of mitochondria in onion peel cells

   (c) Absence of endoplasmic reticulumin cheek cells

   (d) Absence of the plasma membrane in cheek cells

3. In the plasma membrane, carbohydrates CO1 -U

   (a) always faces outwards, towards extracellular space

   (b) directed to all sides in the membrane randomly

   (c) always faces to the lumen of cells

   (d) always faces inward to the nonpolar portion of the membrane

4. Cell wall of fungi is made up of CO1 -U

   (a) lignin (b) qutin (c) chitin (d) cellulose

5. Chromatids coiling in the meiotic and mitotic division is ___ CO1 -U

(a) Plectonemic in both

(b) Paranemic in both

(c) Paranemic in mitosis and plectonemic in meiosis

(d) Plectonemic in mitosis and paranemic in meiosis

6. _____ is a form of cell division which results in the creation of gametes or sex cells. CO1 -U

(a) Mitosis (b) Miosis

(c) Meiosis (d) None of the above

7. Which of the following are the basic categories of chemical signaling found in multicellular organisms? CO1 -U

(a) Paracrine signaling (b) Autocrine signaling

(c) Endocrine signaling (d) All of the above

8. Which of the following signal molecules is not used for extracellular signaling? CO1 -U

(a) Autocrine (b) Endocrine

(c) Cyclic AMP (d) None of the above

9. Microfilaments are composed of a protein called CO1 -U

(a) Tubulin (b) Actin (c) Myosin (d) Chitin

10. A plant cell wall is mainly composed of CO1 -U

(a) Protein (b) Cellulose (c) Lipid (d) Starch

PART – B (5 x 2= 10 Marks)

11. Cells consist of many organelles, yet we do not call any of these organelles as structural and functional unit of living organisms. Generalize the reason. CO1 -U

12. Generalize active and passive transport. CO1 -U

13. Classify the stages of meiosis CO1-U

14. Discuss the term signal transduction CO1-U

15. Discuss various cell fractionation procedures CO1-U

PART – C (5 x 16= 80 Marks)

16.	(a)	Explain the arrangement of genetic material in Eukaryotes	CO1-U	(16)
		Or		
	(b)	Summarize chromatin organization in the nucleus of the cell	CO1-U	(16)
17.	(a)	Discriminate the gated and non-gated transport across the membranes	CO4- Ana	(16)
		Or		
	(b)	Deconstruct the mechanisms involved in water movement across the cell membrane	CO4- Ana	(16)
18.	(a)	How would you demonstrate the different types of necrosis, explain their biological importance, and compare and contrast necrosis with apoptosis in terms of mechanisms, outcomes and pathological relevance?	CO3-App	(16)
		Or		
	(b)	How would you construct a model to represent the different stages involved in cell cycle regulation, and demonstrate the role of key regulatory components like cyclins, CDKs, and checkpoints in maintaining cellular intergrity?	CO3-App	(16)
19.	(a)	How would you connect the signaling pathways mediated by receptor tyrosine kinase and cytokine receptor and illustrate their similarities and differences in cellular communication and response mechanisms.	CO5- Ana	(16)
		Or		
	(b)	How would you correlate the role of nitric oxide as a signaling molecule with the function of second messengers in the cell signaling pathways, and explain their combined impact on physiological processes?	CO5-Ana	(16)
20.	(a)	Suggest a technical method to arrange cells of same nature from a mixed group for utilizing in cell culture study, ensuring high purity and viability?	CO3-App	(16)
		Or		
	(b)	Illustrate the major application, limitation and modifications of confocal microscope in Biotechnological R&D applications.	CO3-App	(16)

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