Reg. No															

B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

18BTC102J - CELL BIOLOGY

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)
Answer **all** Questions

		Marks	BL	CO
1.	The number of chromatids at metaphase is (A) Two each in mitosis and meiosis (B) Two in mitosis and four in meiosis (C) Two in mitosis and one in meiosis (D) One in mitosis and two in meiosis	1	2	1
2.	In which of the following situations would cells die by necrosis and not apoptosis? (A) Removal of cells with damaged DNA that cannot be repaired (B) Removal of heart muscle cells damaged by O_2 depletion following cardiac infarction (C) Removal of virus infected cells (D) Removal of developing neurons that fail to make connections with other cells	1	2	1
3.	Which among the following was not used in Stanley Miller's original mixture? (A) H_2O (B) H_2 (C) PO_4 (D) N_2	1	1	1
4.	The most accepted theory of origin of life is (A) Oparin Haldane theory (B) Theory of abiogenesis (C) Theory of spontaneous generation (D) Special creation theory	1	1	1
5.	Cilia and flagella are made up of (A) Tubulin (B) Lamin (C) Desmin (D) Keratin	1	1	2
6.	Cell sap is a (A) Living content of the cell (B) Non-living content of the protoplasm (C) Living content of the cytoplasm (D) Non-living content of the vacuole	1	2	2
7.	Which of the organelle is involved in cell wall synthesis? (A) Chloroplast (B) Golgi apparatus (C) Mitochondria (D) Lysosome	1	1	2
8.	Difference in the pH between the mitochondrial matrix and intermembrane space (pH 7 and pH 8) generate a membrane potential of approximately (A) 0.14 V (B) 0.10 V (C) 0.11 V (D) 0.12 V	1	2	2
9.	Which of the following is a microtubule associated protein? (A) G protein (B) tau protein (C) tus protein (D) rho protein	1	1	3

10.	Which dementia is characterized by 'frontal lobe' symptoms and specific histology? (A) Parkinson's disease (B) Vascular dementia (C) Pick's disease (D) Frontal temporal dementia	1	2	3
11.	An enzyme acts by (A) Increasing the energy of activation (B) Reducing the energy of activation (C) Increasing the pH (D) Decreasing pH	1	2	3
12.	Which of the following receptors activates the pathway usually by forming molecular dimers that result in protein phosphorylation reactions upon binding of their specific ligand? (A) Receptor tyrosine kinase (B) Ligand-gated ion channels (C) Steroid hormone receptors (D) G protein coupled receptors	1	2	3
13.	A couple is told by their doctor that the reason why they cannot have children is that the sperm of the male lack motility because it does not have the structures responsible for propulsion. Which cellular structures are likely to be the underlying cause of this lack of motility? (A) Microtubules (B) Golgi apparatus (C) Endoplasmic reticulum (D) Vacuoles	1	2	4
14.	Which of the following is a microfilament inhibitor? (A) Colchicine (B) Cinchonine (C) Cytochalasin - B (D) Aspirin	1	1	4
15.	At physiological pH, increase in cholesterol level (A) Increases fluidity (B) No change in fluidity (C) Decreases fluidity (D) Alters pH	1	2	4
16.	Which organelle is involved in xenobiotic detoxification? (A) SER (B) RER (C) Golgi (D) Lysosome	1	1	4
17.	A cell divides every one minute. At this rate of division it can fill a 100 ml of beaker in one hour. How much time does it take to fill a 50 ml beaker? (A) 30 minutes (B) 60 minutes (C) 59 minutes (D) 15 minutes	1	2	5
18.	Which of the following are the basic pathological features of Alzheimer's disease? (A) Lewy body (B) Hirano bodies (C) Neurofibrillary tangles and senile plaques (D) Loss of acetyl choline esterases	1	2	5
19.	Which of the following conditions is associated with increased risk of breast cancer? (A) Papillomatosis (B) Atypical hyperplasia (C) Severe hyperplasia (D) Fibrocystic mastopathy	1	2	5
20.	Name the type of Dementia disease in which a neurodegenerative condition linked to abnormal structures in the brain? (A) Alzheimer's disease (B) Dementia with Lewy bodies (C) Parkinson's disease (D) Huntington's disease	1	2	5

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	What do you understand by endosymbiosis. Illustrate with an example.	4	2	1
22.	Explain the formation of lysosome.	4	1	2
23.	Highlight the role of exportins in nucleus with a suitable example.	4	2	3
24.	Tabulate any four differences between apoptosis and necrosis.	4	2	4

25.	What are cdks? Highlight their role in cell cycle.	4	2	5
26.	Explain SNARE hypothesis.	4	2	2
27.	Differentiate between plaque and tangle.	4	1	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) What do you mean by multicellular eukaryotes? Illustrate in depth the multicellular eukaryotes that are employed in scientific experiments.	12	2	1
	(OR)			
	(b) Which membrane separates the interior of the cell from the outside environment? Give a thorough description of that membrane's structural integrity.			
29.	(a) Which cell organelle is responsible for conversion of solar energy into chemical energy for growth? Clearly describe that cell organelle's structure, composition and purpose.	12	2	2
	(OR)			
	(b) Which molecules are the second major components of membranes? How those molecules that are expressed as second major component of a membrane are transported?			
30.	(a) What do you understand by the activation of tension-generating sites within muscle cells? How and which proteins are responsible for this activation of tension-generating sites within muscle cells?	12	2	3
	(OR)			
	(b) Which junctions allow the direct chemical communication between the adjacent cytoplasm(s) in animal? Give a detailed account on the signaling between the cells through those junctions.			
31.	(a) Which phenomenon includes a series of events that takes place in a cell as it grows and divides? Delineate the various stages of that phenomenon with particular emphasis on a process of cell duplication, in which one cell divides into two genetically identical daughter cells.	12	2	4
	(OR)			
	(b) Which process helps to eliminate unwanted cells during early development? Explain the intrinsic and extrinsic pathways of that process.			
32.	(a) Which cancer is the leading cause of cancer deaths worldwide irrespective of male and female? Write an essay on etiology, pathogenesis and treatment of that particular cancer.	12	2	5
	(OR)			
	(b) Which diseases occur when nerve cells in the brain or peripheral nervous system lose function over time and ultimately die? Give a detailed account on any one such diseases and its treatment.			

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