

Roll No: _____

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MSc Biochemistry, Semester I Examination, 2023

Paper Code: MBC 102
Paper Title: Cell Biology

Time: 2½ h

Max Marks: 60

Note: This paper has 3 Sections, A, B, and C. Attempt all three sections. Section A: Answer all the questions; Section B: Answer any one; Section C: Answer all the questions, each question in this section has an internal choice

Course/Program Learning Outcomes (CLO/PLO) and Blooms Taxonomy Levels (BTL):

- CLO-1: Understand concepts
CLO-2: Systematically learn the processes
CLO-3: Gain knowledge of mechanism
CLO-4: Comprehend how things are integrated
CLO-5: Analyze and evaluate processes

SECTION A

Attempt All Questions

(1x12=12 Marks)

Q. No. 1	DO AS DIRECTED	BTL	CLO	PLO
(a)	NAME THE ENTITY OR THE TERM USED TO DESCRIBE THE FOLLOWING:			
(i)	In the evolutionary origin of life/cell, the term used for small liquid droplets of two immiscible liquid phases which aggregate and might have served as sites of early metabolic reactions	1	2	3
(ii)	Large compartments in a plant cell that can occupy up to 90% of cell volume, pushing the cytoplasm towards the cell periphery	3	2	3
(iii)	The process in lab by which ribosome can be isolated from the cell	4	5	2
(iv)	The process by which cells capture or encapsulate molecules or particles within them	1	4	3
(v)	Name the process which selectively targets dysfunctional organelles, intracellular microbes and pathogenic proteins in the cell	3	3	2

(b)	(vi) Which structure in cell is called its powerhouse	5	4	3
	MCQs (CHOOSE THE BEST OPTION)			
	(i) The proteins targeted to the peroxisome require a small sequence of amino acid comprising of, (A) DEL (B) DKL (C) SKL (D)KDEL	4	4	3
	(ii) The small protein in the endoplasmic reticulum which controls both the quality and quantity of the newly synthesized proteins in the cell, (A) PDI (B) PID (C) BiP (D) Hsp 70	2	2	3
	(iii) Caspase 8 is involved in, (A) Apoptosis (A) Intrinsic pathway of apoptosis (B) Extrinsic pathway of apoptosis (C) Cell death by a mechanism other than apoptosis	2	2	3
(c)	(iv) DNA replicates in the following phase of cell cycle, (A) G1 (B) G2 (C) S (D) M phase	5	4	3
	TRUE OR FALSE			
	(i) GPCR signaling requires Gi protein to initiate signaling	5	2	3
	(ii) Flow cytometry is routinely used to assess cell morphology	4	4	3

SECTION B

Attempt Any Two Questions

(2x12=24 Marks)

Q. No.	LONG ANSWER QUESTIONS	BTL	CLO	PLO
a)	Describe in details, the evolutionary origin of life/cell on Earth. What is abiogenesis? Which biochemical pathways might have originated/evolved first and why?	3	2	3

b)	Draw a neat and well labelled diagram of a prokaryotic cell. Compare the characteristic features that make a prokaryotic cell distinct when compared with an animal or a plant cell. Comment on the membrane compositions of an animal and a bacterial/prokaryotic cell.	5	3	2
c)	Give a detailed account of the Cytoskeleton, its composition, types, and functions of each type.	2	2	3
d)	What is signal transduction. Explain the signal transduction pathway that leads to the synthesis of cAMP as second messenger, and how does cAMP leads to the creation of a physiological response.	1	1	2

SECTION C

Attempt All Questions

(6x4=24 Marks)

Q. No. 3	WRITE SHORT NOTES	BTL	CLO	PLO
a)	Preparation of the cytosol from the cell OR Preparation of the peroxisome from the cell	4	5	3
b)	Tm and the membrane fluidity OR Receptor mediated endocytosis (Illustration only)	3	2	3
c)	Artificial membranes OR Synthesis and secretion of albumin by the liver cell	4	3	2
d)	NPC OR Distinguish between apoptosis and necrosis	2	2	3
e)	G proteins OR Role of cyclins in cell division	5	2	3
f)	RTK OR Mechanism of cancer development	2	2	3

END OF THE QUESTION PAPER