25BTU101/22BTU101N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - **BIOTECHNOLOGY**

CELL BIOLOGY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which process does NOT require energy? a) Passive transport b) Active transport c) Na^+/K^+ ATPase activity d) Ca^{2+} pumping	K1	CO1
	2	Ionophores help in transport by _____. a) Facilitating diffusion of ions b) Hydrolyzing ATP c) Pumping water d) Forming ribosomes	K2	CO1
2	3	The protein subunit of microtubules is _____. a) Actin b) Tubulin c) Myosin d) Keratin	K1	CO2
	4	Desmosomes link cells through _____. a) Microtubules b) Intermediate filaments c) Actin filaments d) Collagen fibers	K2	CO2
3	5	In mitochondria, the electron transport chain occurs in a) Matrix b) Outer membrane c) Inner membrane d) Cristae space	K1	CO3
	6	The dark reaction (Calvin cycle) fixes CO_2 into glucose. The first stable compound formed is _____. a) PGA (3-Phosphoglycerate) b) G3P c) RuBP d) ATP	K2	CO3
4	7	Which SNARE proteins mediate vesicle fusion with target membranes? a) v-SNARE and t-SNARE b) KDEL and SKL c) COPI and COPII d) Dynamin and Clathrin	K1	CO4
	8	Glycosylation of proteins in the ER involves addition of _____. a) Fatty acids b) Oligosaccharides c) Phosphate groups d) Sulfate groups	K2	CO4
5	9	Which type of molecules act as ligands in cell signaling? a) Proteins b) Peptides c) Steroids d) All of the above	K1	CO5
	10	Which is a well-known second messenger? a) ATP b) cAMP c) tRNA d) rRNA	K2	CO5

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SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Differentiate between active and passive transport with one example each.	K2	CO1
		(OR)		
	11.b.	Explain the role of the proton pump in transport processes.		
2	12.a.	Differentiate between microtubules and actin filaments.	K3	CO2
		(OR)		
	12.b.	Explain the role of cadherins in cell-cell adhesion.		
3	13.a.	Differentiate between light and dark reactions of photosynthesis.	K3	CO3
		(OR)		
	13.b.	Write short notes on nucleolus and its function.		
4	14.a.	Mention the role of peroxisomes in protein import.	K5	CO4
		(OR)		
	14.b.	Explain protein targeting to mitochondria in brief.		
5	15.a.	Discuss the role of growth factors in cell signaling.	K5	CO5
		(OR)		
	15.b.	Describe the MAP kinase cascade in detail.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe the structure of biological membranes and compare the major models proposed.	K4	CO1
2	17	Discuss the different types of anchoring junctions with suitable diagrams.	K4	CO2
3	18	Explain the structure of mitochondria and describe the electron transport chain.	K4	CO3
4	19	Discuss the structure and role of the Golgi apparatus in protein sorting and vesicular trafficking.	K5	CO4
5	20	Discuss the role of secondary messengers (cAMP and Ca^{2+}) in signaling pathways.	K5	CO5

Z-Z-Z END