Name: Enrolment No:	

UPES

End Semester Examination, December 2024

Course: Cell Biology
Program: B. Tech (Biotechnology/ Biomedical Eng)
Course Code: HSMB 2038

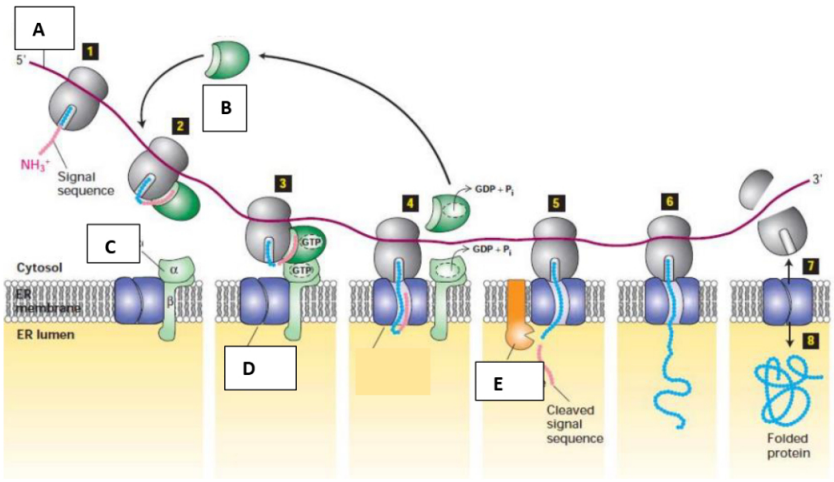
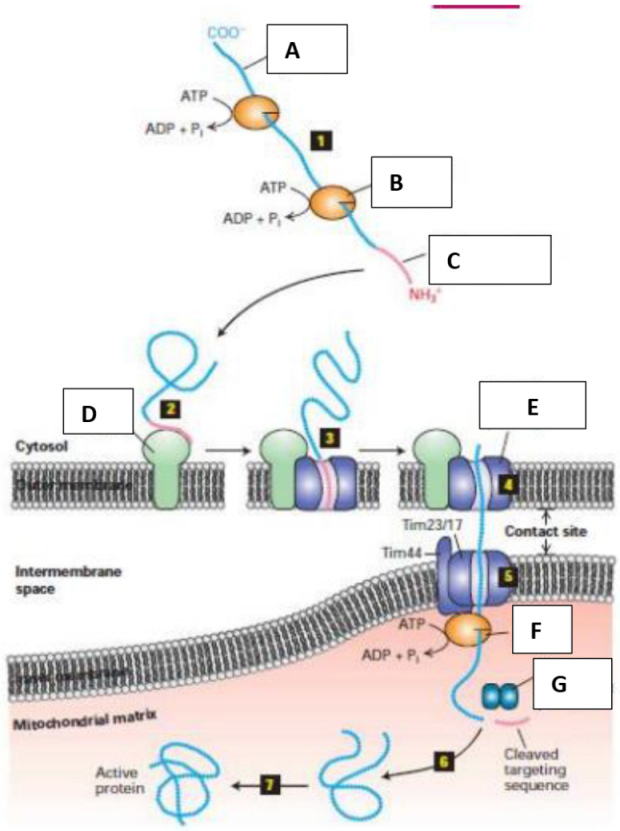
Semester: III
Time : 03 hrs.
Max. Marks: 100

Instructions: Answer all questions

Q.No	**Section A** MCQs/Short answer questions/True &False	(20x1.5= 30 Marks)	COs
Q	Statement of question (each question carries 1.5 marks)		CO
1	Who proposed the cell theory? a) Theodor Schwann, Watson and Robert Hooke b) Theodor Schwann, Matthias Schleiden and Robert Hooke c) Theodor Schwann, Matthias Schleiden and Rudolf Virchow d) Theodor Schwann, Rudolf Virchow and Robert Hooke	1.5	CO1
2	A cell organelle that is present in animal cells but not present in plant cells is? a) Cytoplasm b) Centrosome c) Mitochondrial d) Cytoplasm d) Golgi complex	1.5	CO1
3	Which of the following cells are found in the intestinal lining? a) RBCs b) Neurons c) Epithelial cells d) Hepatocytes	1.5	CO1
4	Which of the following is the process of synthesis of glucose? a) saccharification b) glycolysis c) gluconeogenesis d) neogenesis	1.5	CO2
5	Which of the following cells are pluripotent? a) embryonic stem cells b) nucleosomes c) hepatocytes d) neurons	1.5	CO1
6	Acids that lose a proton easily are weak acids. a) True b) False	1.5	CO3
7	What is the concentration of pure water? a) 55.51 M b) 25.51 M	1.5	CO2

	c) 55 M d) 25 M		
8	ATP and GTP are _____ a) cells b) receptors c) nucleotides d) nucleic acids	1.5	CO2
9	Amino acids used in the synthesis of proteins on a ribosome are _____ a) D-amino acids b) Mutated amino acids c) L-amino acids d) Fluorescing amino acids	1.5	CO3
10	In most animals, fats are stored in special cells called _____ a) telomeres b) granulocytes c) lymphoid cells d) adipocytes	1.5	CO3
11	Which types of bonds are found in sugars? a) amide b) acidic c) glycosidic d) non-covalent	1.5	CO2
12	Chaperones are the molecular protein which assists in proper protein folding or prevents them from aggregating. a) True b) False	1.5	CO3
13	Which of the following name is given to molecular chaperones? a) Allosteric protein b) Heat shock protein c) Denaturation protein d) Ribonuclease	1.5	CO2
14	Which of the following is not the part of Interphase in the cell cycle? a) S phase b) G1 phase c) G2 phase d) M phase	1.5	CO3
15	Name the cyclin which takes part in M phase? a) Cyclin E b) Cyclin A c) Cyclin D d) Cyclin B	1.5	CO4
16	Protein synthesis takes place in ____ a) G1 phase b) G2 phase c) G1 and G2 phases d) S phase	1.5	CO4
17	What is Ubiquitin? a) Protein kinase b) Protease c) Component of the electron transport system d) Protein that tags another protein for proteolysis	1.5	CO3

18	Passage of a cell through stages of cell cycle is controlled by a protein kinase that phosphorylates many different proteins at appropriate times. a) Cdk activating kinase b) Cyclin-dependent kinase c) Cyclins d) Tyrosine kinase	1.5	CO4
19	G-protein coupled receptors are referred to as seven-transmembrane receptors. a) True b) False	1.5	CO4
20	Which of the following is an extracellular messenger of apoptosis? a) serine b) tumor necrosis factor c) ribozyme d) translation inhibitor	1.5	CO4
	Section B	(4x5=20 Marks)	CO
Q	Statement of question (each question carries 5 marks)		
1.	a) Define hydrogen bonding. How is it different from a covalent bond? b) Compare van der Waals forces with covalent and ionic bonds in terms of strength.	2+3	CO1
2.	a) Define the fluid mosaic model of the cell membrane. Draw a well-labeled diagram for the same. b) Explain how small nonpolar molecules cross the lipid bilayer.	3+2	CO2
3.	a) What is the role of motor proteins like dynein and kinesin in the cytoskeleton? b) What is SRP? Name its two subunits and their respective function.	2+3	CO3
4.	Elaborate the mechanism of the sodium-potassium pump through a well-labeled diagram. Explain why is it called an electrogenic pump.	5	CO4
	Section C	(2x15=30 Marks)	
Q	Statement of question (Case studies: each question carries 15 marks)		CO
1.	About the diagram given below answer the following questions: a) Label A-E. b) Describe the structure and function of B in ER protein transport. c) Differentiate between co-translational and post-translational transport of proteins to the ER. d) What is the role of D in protein transport to the ER? e) Briefly discuss the steps from 1-8.	15 (5+3+2+2+3)	CO1

			
2.	In reference to the diagram given below, answer the following questions: a) Label A-G and briefly outline the steps 1-7. b) Why do mitochondria require imported proteins, and where are these proteins synthesized? c) What is the role of E and G in mitochondrial protein import? d) What is the role of B and F in mitochondrial protein import? 	15 (7+2+3+3)	CO3

	Section D	(2x10=20 Marks)	
Q	Statement of question (each question carries 10 marks)		CO
1.	a) Describe the stages of mitosis (interphase, prophase, metaphase, anaphase, telophase) and the key events occurring in each stage. b) Discuss the role of the Anaphase Promoting Complex (APC) in regulating the progression from metaphase to anaphase	6+4	CO4
2.	a) With the help of a well labelled diagram, explain how Rab GTPases control docking of vesicles on target membranes? b) What are GPCRs. Discuss the role of GPCRs and second messengers in signal transduction?	5+5	CO2