Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Cell Biology — **Semester: III**
Program: Integrated B.Sc. M.Sc. Allied Sciences — **Time: 03 hrs.**
Course Code: HSCC1014 — **Max. Marks: 100**

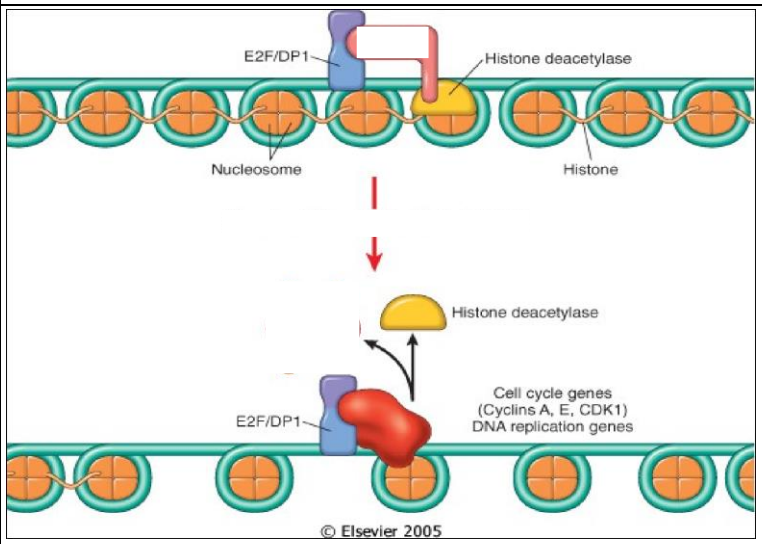
Instructions: Read question carefully.

SECTION A

S. No.	MCQ's /Fill in the blanks/ T&F (1.5 marks each)	**30 Marks**	**CO**
1	The Golgi complex is responsible for transporting, modifying, and packaging of____ A. DNA B. RNA C. Proteins and Lipids D. None of them	**1.5**	**CO2**
2	In which typical stage are Lampbrush chromosomes observed? A. Meiotic prophase B. Mitotic metaphase C. Mitotic prophase D. Mitotic anaphase	**1.5**	**CO3**
3	The longest stage in the cell cycle is_____ A. Interphase B. Anaphase C. Metaphase D. None of the above	**1.5**	**CO3**
4	Which of the following is also known as restriction point? A. G1 checkpoint B. G2 checkpoint C. M checkpoint D. None of these	**1.5**	**CO3**
5	The division of cytoplasm is known as____ A. Mitosis B. Synapsis C. Cytokinesis D. Karyokinesis	**1.5**	**CO3**
6	Which of the following is NOT a type of signaling molecule? A. Testosterone B. Insulin C. Thyroxin	**1.5**	**CO4**

	D. Adenylate cyclase		
7	Which of the following statements about G protein is false? A. They are involved in signal cascades. B. They bind to and are regulated by guanine nucleotides. C. They become activated when bound to GDP. D. They must be active before the cell can make needed cAMP.	**1.5**	**CO4**
8	Which of the following comes under the category of Cell surface receptor? A. Enzyme linked receptor B. Ion-channel linked receptor C. G protein linked receptor D. All of the above	**1.5**	**CO4**
9	The enzyme, converts PIP2 into inositol triphosphate (IP3) and diacylglycerol in cell signaling is known as_____. A. Phosphokinase C B. Phospholipase C C. Phosphodiesterase C D. Lipokinase	**1.5**	**CO4**
10	Secretory proteins are synthesized by_____. A. Free ribosomes B. Ribosomes on ER C. Ribosomes on Nuclear membrane D. All of the above	**1.5**	**CO5**
11	Signal sequences for ER is present in _____of nascent polypeptide.	**1.5**	**CO5**
12	Nuclear localization signal (NLS) sequence is rich in_____. A. Lysine, Arginine B. Glutamate and Asparagine C. Serine and Threonine D. Tryptophan and Histidine	**1.5**	**CO5**
13	Mitochondria was discovered by which of the following Scientist? A. G.E. Palade B. Altman C. Schultze D. Albert von Kolliker	**1.5**	**CO1**
14	Which of the following statements is true about the Nucleus? A. Nucleus is not present in prokaryotes. B. The chief components of the nucleus are Chromatin and Nucleolus. C. It contains DNA and other genetic materials. D. All of the above	**1.5**	**CO1**
15	Which of the following cell organelles is absent in plant cells but present in animal cells? A. Nucleus B. Centrosome C. Golgi bodies D. Plastids	**1.5**	**CO1**
16	Nuclear DNA replicates in the _____ phase.	**1.5**	**CO3**

	A. G2 Phase B. M Phase C. S Phase D. None of the above.		
17	In an animal cell, which among the following organelles has its own DNA? A. Chloroplast B. Chromoplast C. Leucoplast D. Mitochondria	**1.5**	**CO2**
18	Golgi apparatus or simply Golgi complex is involved in the formation of_____. A. Chromatin B. Lysosome and Peroxisomes C. DNA D. Ribosomes	**1.5**	**CO2**
19	Which of the following is true about Mitochondria? A. Mitochondria contains DNA. B. It is rod-shaped. C. Mitochondria helps to convert energy from food molecules into usable energy and stored as adenosine triphosphate molecules. D. All of these	**1.5**	**CO2**
20	Which of the following do transport vesicles deliver to the cell surface? A. Proteins B. Lipids C. Dynamin D. Both proteins and lipids	**1.5**	**CO6**
	SECTION B (5 marks each question)		
Q	Short Answer Type Question (5 marks each) Scan and Upload 4 questions 5 marks. Word limit (100-120)	**20 Marks**	**CO**
1	Name five inhibitors of ETC and their mode of action.	**5**	**CO2**
2	State how elevated concentrations of cAMP activates gene expression in eukaryotes?	**5**	**CO3**
3	State five molecular evidences those supports the “Hypothesis of Endosymbiosis”.	**5**	**CO1**
4	Sequence of a protein sample is given to you and asked you to identify a particular targeting peptide in that protein sequence. What will be your suggested experiment for that?	**5**	**CO6**
	SECTION C 30 marks		
Q	**Two case studies 15 marks each subsection**	**30 Marks**	**CO**
1	Case Study 1 (Word limit-250-300) **Q1:** Suppose you are observing a cell organelle under electron microscope and you observed a membranous complex of smooth, superposed flat saccules with vesicles detaching from the extremities. Identify the observed structure. Write its biological functions. (1+5)	**15 (6+4+5)**	**CO4**

	Q2: A patient comes into your clinic with unexplained paralysis in her limbs. She has no history of neuromuscular problems. After further questioning you find that that she had taken a drug "X." Explain the effect of a possible toxin in the drug on actin filaments that might be the cause of her paralysis. **Q3:** Write the functions of rough endoplasmic reticulum (RER).		
2	Case Study 2 (Word limit- 250-300) You are studying the transfer mechanisms of two kinds of proteins from the cytosol to the ER; (i) *secretory, lysosomal proteins* and (ii) *integral membrane proteins*. **Q1:** State the differences in the mechanism by which these proteins are translocated into ER lumen. **Q2:** In a cell-line culture, you added colchicine and observed under microscope that movement of the cell organelles were significantly reduced as compare to control. What could be the reason of the observation? **Q3:** Give two advantages that eukaryotic cells gain by having organelles. **Q4:** Similarities and differences between lysosomes and peroxisomes.	**15 (7+2+2+ 4)**	**CO5**
	SECTION- D 20 marks		
Q	Long Answer type Questions Scan and Upload (10 marks each) Word limit 200-250	**20 Marks**	**CO**
1	 **Q1:** Describe the process is shown in above figure? **Q2:** Name two similarities and two differences between the cellular processes of importing protein into the ER and importing protein to the nucleus.	**10 (6+4)**	**CO3**
2	**Q1: Match column 1 with column 2** **Column 1. Organelle Bank:** A. Mitochondria B. Endoplasmic reticulum C. Nucleus D. Lysosome	**10 (7+1+2)**	**CO2**

	E. Endosome F. Peroxisome G. Golgi apparatus **Column 2. Functions:** 1. Quality control of mRNA 2. Location of oxidative phosphorylation 3. Responsible for detoxifying organic molecules 4. Houses and protects genetic material 5. Responsible for modification and sorting of proteins and lipids 6. Location of ATP synthesis 7. Responsible for sorting endocytosed materials 8. Site of degradation and digestion 9. Location of lipid synthesis 10. Location of hormone synthesis (adrenal cells) **Q2:** You isolate two cells' mitochondria. You determine that the membranes differ in fluidity. Cell A's membrane is more fluid, while B's is less fluid. Which mitochondria will be better able to import proteins, and why?		