Parvatibai Chowgule College of Arts and Science
Autonomous

B.Sc. Online Semester End Examination, January 2022

Semester: I
Subject: Zoology
Title: Cell and Molecular Biology (Core)
Duration: 2 Hours Max. Marks: 45

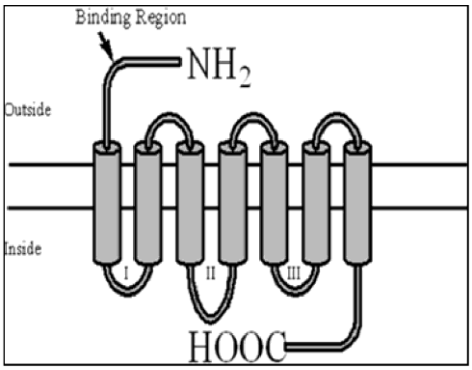
Instructions: *1. Figures to the right indicate full marks.*
2. Draw diagrams wherever necessary.
3. All main questions are compulsory

Q1) Answer <u>ANY THREE</u> of the following: (09)

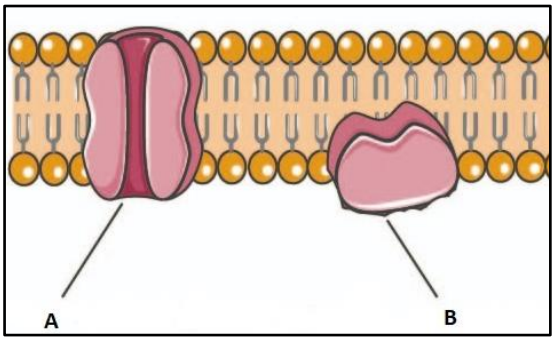
a) A cell organelle contains a biomolecular lipid layer, both surfaces of which are interrupted by protein molecules. Identify and explain the structure of the cell organelle mentioned above. Add a note on its functions.

b) When our fingers are submerged in water for a long time, they get wrinkly. Identify and explain the process that leads to the wrinkling of fingers.

c) Analyze and identify the receptor from the image given below. Explain its role in cell signaling.



d) Identify the cell organelle from the image given below. Differentiate between the structures A and B.

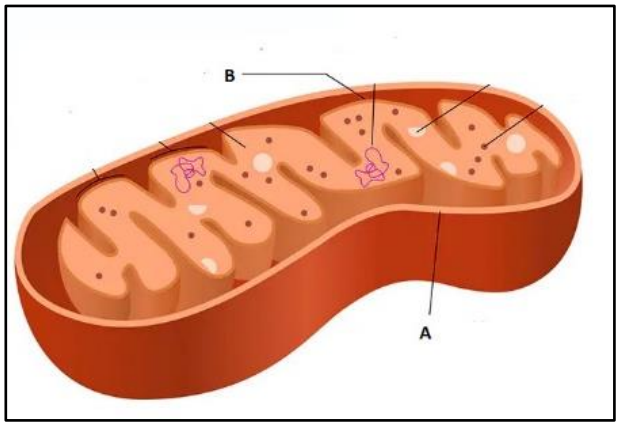


P.T.O

Q2) Answer <u>ANY TWO</u> of the following: **(12)**

a) In a cell X, potassium moves in and sodium moves out of the cell by using cellular energy, whereas in a cell Y, oxygen moves in and carbon moves out of the cell without the help of energy. Identify and give a comparative account on the types of transport seen in the cells, X and Y. With the help of a neat diagram, explain the significance of sodium-potassium pump.

b) Identify the cell organelle given below and write its functions. How do A and B differ from one another in terms of its structure and function? What will happen if A and B dysfunction?

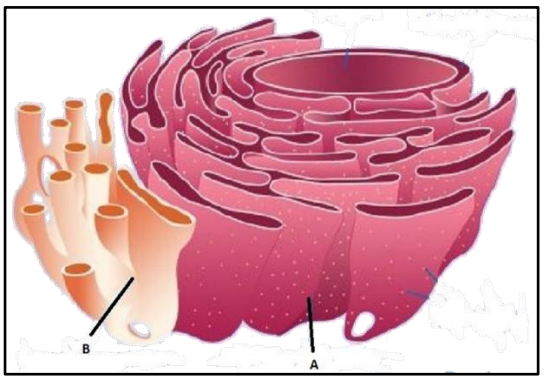


c) A cell technique 'X' is used to disaggregate a given tissue sample into a suspension of subcellular components. Identify the technique 'X' and explain the various steps to be followed if the sizes of the cell organelle are 0.2µm and 5.5µm respectively. How will the results differ in the absence of an ice-cold isotonic buffer solution?

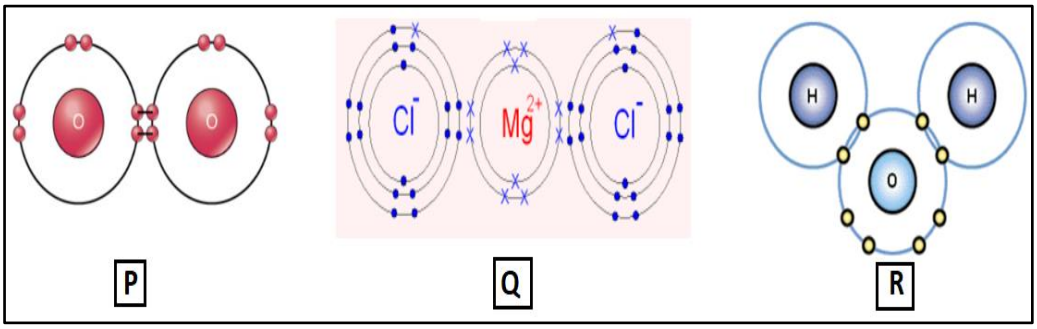
P.T.O

Q3) Answer <u>ANY TWO</u> of the questions given below: **(12)**

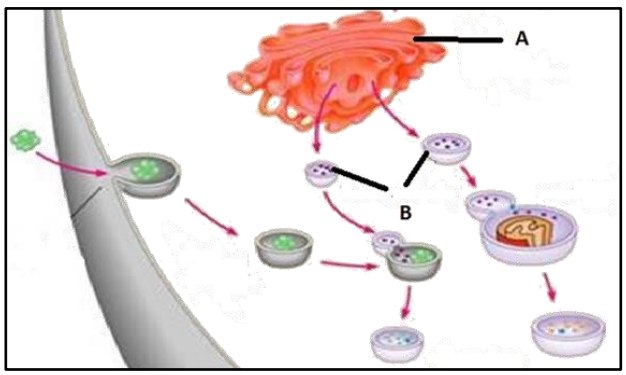
a) A and B are the subunits of the same cell organelle yet they differ in terms of its structure and functions. Justify. Identify the cell organelle and its subunits from the image given below. State the relationship between subunit A and golgi apparatus.



b) Analyse the images given below and identify the type of chemical bonds present in P, Q and R. Based on your understanding of chemical bonds, explain the type of bonds and interactions seen in these three molecules. Add a note on the significance of these bonds in a cell.



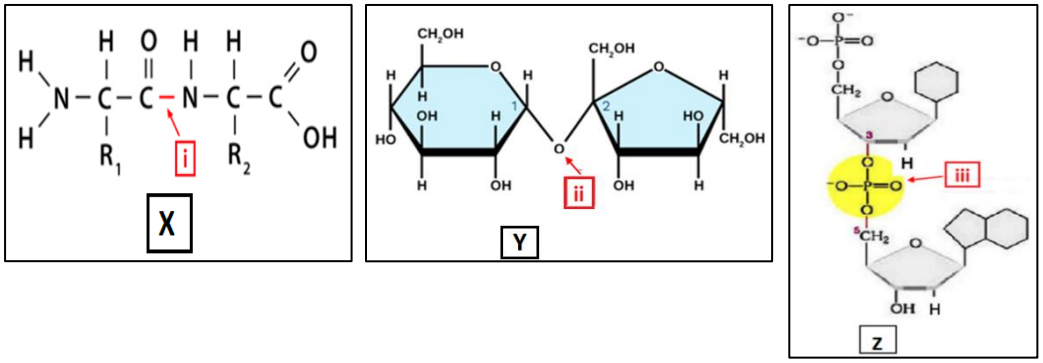
c) The image given below shows two cell organelles (A and B) found in a eukaryotic cell. Identify the cell organelles. Discuss the ultrastructure and function of 'A'. Explain how 'A' and 'B' function together. What will happen if 'B' dysfunctions?



P.T.O

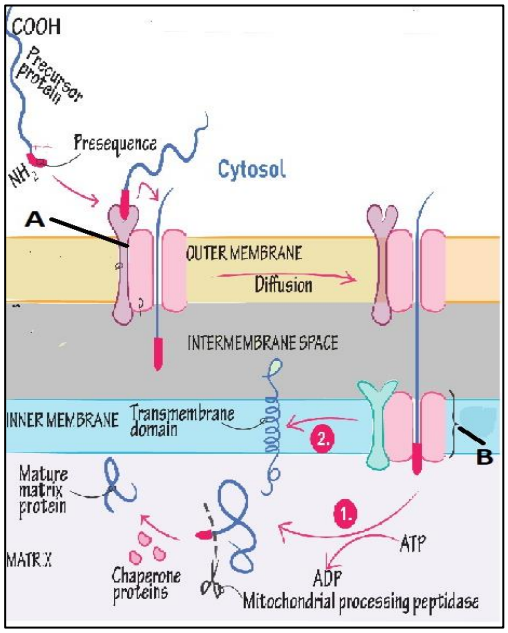
Q4) Answer <u>ANY ONE</u> of the questions given below: **(12)**

a) Identify and compare the three macromolecules given below with respect to their structures. Polymers are made up of single building blocks termed as monomers. How will this process occur in the macromolecules given below? Can these three polymers in turn give rise to their monomers? If yes, explain its mechanism. Add a note on the role of i, ii and iii with respect to biological molecules.



<u>OR</u>

b) Proteins synthesised in the cytosol of a cell can either be shipped to a non-endomembrane system or transported to the endoplasmic reticulum. Analyse the image given below and identify and explain the type of protein transport. Does the process mentioned above differ from co-translation translocation? If yes, justify. State the consequences on the process of protein transport if the complexes A and B labelled in the image dysfunction. Explain the role of heat shock proteins in this process.



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