Parvatibai Chowgule College of Arts and Science
Autonomous

B.Sc. Semester End Examination, January 2022

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

Instructions: 1. All questions are compulsory however internal choice is available.
2. Figures to the right indicate maximum marks.
3. Draw neatly labelled diagrams wherever necessary.

Q 1. Answer ANY THREE of the following: (09)

a. Describe the cell theory and explain the exceptions of cell theory.
b. Briefly discuss the functions of peroxisomes and glyoxysomes.
c. Briefly comment on the plasmids found in prokaryotic cells.
d. What is the importance of non-chromosomal DNA found in Mitochondria?

Q 2. Answer ANY TWO of the following: (12)

a. Sketch neatly labelled diagrams of and explain 6 differences between a plant and animal cell.
b. Describe the structure and function of the mitochondria.
c. Describe the 'Fluid mosaic model' of the plasma membrane. On the basis of this model explain different functions of the plasma membrane.

Q 3. Answer ANY TWO of the following: (12)

a. Describe the internal structure of a prokaryotic and eukaryotic flagellum.
b. Explain the role of various extracellular matrix proteins.
c. i. Discuss the effects of differences in the concentration of solutes on opposite sides of the plasma membrane of a cell.
ii. Explain 2 techniques that have enabled researchers to study membrane dynamics.

Q 4. Answer ANY ONE of the following: (12)

a. Organelles are specialized structures that perform various jobs inside cells.
i. Marilyn isolated an organelle by sucrose gradient centrifugation method and observed a small amount of green suspension collected as an interphase between the gradients under the microscope. Sketch and describe the structure and function of the organelle observed by her.
ii. Using a neatly labelled diagram describe the ultrastructure of the nucleus, elaborate its functions and also explain how a 2 m long DNA manages to fit within the nucleus which is barely 10 µm.

OR

b. i. Cellular division is an essential part of the cell cycle. When a cell divides it passes genetic information to daughter cells. The amount of genetic information passed on to daughter cells depends on the type of cell division. State and describe the type of cell division that skin cells employ for formation of the epidermal layer. Outline the different stages with the help of suitable diagrams. Also, mention its significance.
ii. With the help of suitable examples (any 3) discuss the role played by cell-adhesion molecules in transmembrane signalling.

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