

Sl. No. of Q.P. 2282

Unique Paper Code : 2491202
Name of the Paper : Cell Biology
Name of the Course : B.Sc. Biochemistry
Semester : II
Duration : 3 Hours
Maximum Marks : 75 Marks

F-4

Instructions to candidates

Attempt five questions in all. Question no 1 is compulsory.

Q1 A. Name/Identify the following:

- (i) A protein that crosslinks microfilaments in contractile bundles.
- (ii) ER retrieval sequence.
- (iii) An inner nuclear membrane protein.
- (iv) A syndrome caused by defect in import of peroxisomal proteins.
- (iv) An organelle involved in polysaccharide synthesis.

(1×5=5)

B. Comment on the following statements.

- (i) Secretory proteins are targeted to ER by signal sequence at their N terminal end.
- (ii) Live cell imaging is not possible with electron microscopy.
- (iii) Proteins are imported to mitochondria in partially unfolded form.
- (iv) Dynein is a motor protein associated with microtubules.

(2×4=8)

C. Explain the significance of following:

- (i) Matrix processing peptidase
- (ii) Restriction point
- (iii) Cofilin
- (iv) Expansins
- (v) TNF Receptor
- (vi) Fibronectin

(1×6=6)

Q2 A. Explain briefly/ Give reasons for (any three):

- (i) The duration of interphase varies considerably in different kinds of cells.
- (ii) Loss of function mutations in nexin protein affect the ciliary movement.
- (iii) Post-translational translocation into ER requires chaperones like BiP.
- (iv) Yeast provides a very crucial model for eukaryotic cell biology.

(2×3 = 6)

- B. Diagrammatically represent the key components of nuclear pore complex. (4)
- C. Explain the working principle of confocal microscopy. Give its advantage over conventional fluorescence microscopy. (4)

Q3 A. Explain the process of targeting of proteins to chloroplast stroma. (4)

B. Write the contribution of following scientists in cell biology: (1 X 3 = 3)

- (i) Gunter Blobel
- (ii) Antony Van Leeuwenhoek
- (ii) Albert Claude and Christian de Duve

C. Describe four salient features of a transformed cell. (4)

D. Discuss the process of treadmilling of microfilaments. (3)

Q4 Differentiate between:

- (i) Primary and Secondary cell wall
- (ii) Gap junctions and Plasmodesmata
- (iii) Adherence Junctions and Focal adhesions
- (iv) Desmosomes and Hemidesmosomes

(4 X 3.5 = 14)

Q5 Write short notes on the following:

- (i) Mechanism of fusion of a transport vesicle
- (ii) FACS
- (iii) Co-translational translocation of proteins into ER
- (iv) Role of integrins in cell-matrix interactions

(4 X 3.5 = 14)

Q6 A. Explain the assembly, intracellular organization and role of intermediate filaments in a cell. (5)

B. What are coat proteins? Explain the functions of three different types of coat proteins. (4)

C. Explain the structure of golgi. Illustrate the process of targeting of proteins to lysosomes from golgi. (5)

Q7 A. What do you understand by apoptosis? Briefly explain the process. How is it different from necrosis? (5)

B. Discuss the following techniques with suitable flowchart:

- (i) Electron Microscopy
- (ii) Differential Centrifugation

(3×2 = 6)

C. Explain the process of synthesis of phospholipids in smooth endoplasmic membrane.

(3)

Q8 A. In an animal cell cycle, identify the following:

- (i) The interval between mitosis and initiation of DNA replication.
- (ii) Phase of the cell cycle when radioactive thymidine can label the cells.
- (iii) Phase of the cell cycle where cells are metabolically active but do not proliferate unless called on to do so by appropriate extracellular signals.
- (iv) A checkpoint which makes sure equal division of chromosomes to daughter cells.

(1×4=4)

B. Presence of nucleus in eukaryotes allows unique regulatory mechanisms of gene expression. Justify the statement giving examples. (3)

C. Give evidences for the endosymbiotic theory or origin of chloroplast and mitochondria. (4)

D. Explain the role of tight junctions in polarized cells. (3)