BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – M.Sc.(BT)-2024
Course Name – Cell Biology
Course Code - MBT10105
(Semester I)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select among the options that Posttranslational modification of many eukaryotic proteins begins in the _____
   a) Endoplasmic reticulum b) Mitochondria
   c) Chloroplasts d) Nucleus

(ii) Interpret that coated pits are coated on their cytosolic side with a lattice of _____
   a) Clathrin b) Lipoprotein
   c) Glycoprotein d) Transferrin

(iii) State the orientation of carbohydrates in the plasma membrane,
   a) always faces outwards, towards extracellular space b) directed to all sides in the membrane randomly
   c) always faces to the lumen of cells d) always faces inward to the nonpolar portion of the membrane

(iv) Describe the composition of plasma membrane
   a) A protein, a lipid and a cellulose layer b) Bimolecular lipid layer surrounded by protein layers
   c) A protein layer between two lipid layers d) A lipid layer between two protein layers

(v) Interpret which among the following is incorrect about vacuoles?
   a) Vacuoles are fluid filled membrane bound sacs b) They consist of water and sap consisting of minerals, sugars, amino acids and proteins etc.
   c) The function of vacuoles differs from one organism to other d) Vacuoles in plants are not membrane bound and therefore they occupy most of the cell

(vi) Infer which among the following is incorrect about cytoskeleton, cilia and flagella?

a) Cytoskeleton is the network of minute proteinaceous structure in the cytoplasm and which mainly contains microfilaments and micro tubules
b) Microtubules are composed of protein actin and microtubules are composed of protein tubulin
c) Cilia is present in large numbers of the body and only one or two flagella are present in an organism
d) Both flagella and cilia help in movement of the organism

(vii) Interpret that paracrine messenger molecules are usually _____
a) large
b) stable
c) unstable
d) amphoteric

(viii) State that endocrine messengers are also called _____
a) hormones
b) receptors
c) antibody
d) antigen

(ix) State the functional nature of Ubiquitin?
a) Protein kinase
b) Protease
c) Component of the electron transport system
d) Protein that tags another protein for proteolysis

(x) Choose that Which phase of the cell cycle corresponds to the DNA duplication phase ?
a) S
b) G1
c) M
d) G2

(xi) Choose what is is cell communication?
a) Intracellular processes
b) Communication between organisms
c) Communication within a cell
d) A type of genetic material

(xii) Choose which type of cell signaling involves the release of signaling molecules into the bloodstream for distant target cells?
a) Autocrine signaling
b) Paracrine signaling
c) Endocrine signaling
d) Intracellular signaling

(xiii) Select which type of cell receptor is embedded in the cell membrane and responds to hydrophilic signaling molecules?
a) Intracellular receptors
b) G-protein coupled receptors
c) Tyrosine kinase receptors
d) Ion channel receptors

(xiv) Select what is the primary function of quorum sensing in bacteria?
a) Cellular respiration
b) Communication within bacterial populations
c) DNA replication
d) Photosynthesis

(xv) Predict the protein which is most abundant in muscles.
a) Actin
b) Myosin
c) Haemoglobin
d) Keratin

Group-B

(Short Answer Type Questions) 3 x 5=15

2. List and label the different parts of the nucleus with illustration. Enumerate nuclear envelop components in brief. (3)
3. Explain the basic structure of the cytoskeleton and its three major components. (3)
4. Analyse the mechanisms involved in lysosomal action on different cellular molecules. (3)
5. Summarize the functions of rough endoplasmic reticulum within a cell. (3)
6. Analyse the origin of the name "MAP kinase" with explanation. (3)

OR

Inspect the location, structure and function of the CGN and the TGN in relation to the rest of the components of the Golgi apparatus. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. Explain the fate of COPII coated vesicles with illustration. (5)
8. Relate how calmodulin is involved in activating contraction in myosin II-based systems in non-muscle cells (5)
9. Evaluate the process of protein movement through Nuclear pore complex. (5)
10. Analyse the importance of different G protein coupled receptor with an example. (5)
11. Analyse the role of the cis face and the trans face of the Golgi apparatus, and what are their respective functions? (5)
12. Evaluate what is kinetochore complex and what is its role in transport of chromosomes? (5)

OR

Evaluate the role of mannose - 6 phosphate tagging into a protein. Explain how this is related to lysosomal targets. (5)

****