BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – M.Sc.(BT)-2022/M.Sc.(BT)-2023
Course Name – Cell biology
Course Code - MBTC103
(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) Choose what is the primary function of the nuclear envelope surrounding the nucleus?

a) Regulation of ion transport
b) Protection of genetic material
c) Synthesis of ribosomes
d) Lipid storage

(ii) Select which organelle is involved in the detoxification of drugs and poisons and contains enzymes that neutralize harmful substances?

a) Peroxisomes
b) Lysosomes
c) Endoplasmic reticulum
d) Chloroplast

(iii) Cite how many filamentous structures together comprise the cytoskeleton?

a) 1
b) 2
c) 3
d) 4

(iv) Identify the incorrect statement about the terminologies related to protein sorting?

a) Subcellular localization is an integral part of protein functionality
b) Many proteins exhibit functions only after being transported to certain compartments of the cell
c) All the proteins exhibit functions after being transported to certain compartments of the cell
d) Protein sorting is also known as protein targeting

(v) State appropriately to fill the blank: Signal sequences have a _____ consensus but contain some specific features. They all have a _____ core region preceded by one or more positively charged residues.

a) weak, hydrophilic
b) weak, hydrophobic
c) strong, hydrophilic
d) strong, hydrophilic

(vi) Interpret which of the following occurs in meiosis but not in mitosis?

a) Attachment of spindle fibers to kinetochore
b) Replication of DNA prior to start of cell division
c) Separation of sister chromatids at anaphase
d) Pairing of homologous chromosomes at metaphase plate

(vii) Select how many amino acid residues are there in ubiquitin?

a) 72 b) 73
c) 74 d) 76

(viii) Infer which are the two subassemblies of 26S proteasome?

a) 20S core particle and 19S regulatory particle b) 20S regulatory particle and 19S core particle
c) 18S core particle and 19S regulatory particle d) 20S core particle and 18S regulatory particle

(ix) Recognise that secretory proteins are synthesized by _____

a) Ribosomes on the nuclear membrane b) Ribosomes on endoplasmic reticulum
c) Free ribosomes d) None of the mentioned

(x) Choose which signaling process results in an amplification of the initial signal, creating a larger response?

a) Signal amplification b) Signal transduction
c) Signal reception d) Signal termination

(xi) 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

(xii) Select what is the primary function of paracrine signaling?

a) Local communication between neighboring cells b) Long-distance communication within an organism
c) Communication between different species d) Intracellular communication

(xiii) Interpret the common component of fungal cell walls.

a) Pectin b) Lignin
c) Chitin d) Peptidoglycan

(xiv) State which of the following describes the "Flip-flop" mechanism in plasma membrane:

a) Passive transport b) Active transport
c) Lateral diffusion d) Transverse diffusion

(xv) Recognise that Mannans and Xylans are common constituents of cell wall of which of the following organism:

a) Algae b) Fungi
c) Cyanobacteria d) Archae

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the structure of chloroplast with illustration. (3)
3. Analyse why is meiosis referred to as reductional division, whereas mitosis is referred to as equational division? (3)
4. What is the primary structural component of plant cell walls, and how does it contribute to their rigidity? (3)
5. Define in brief the process of pinocytosis. (3)
6. Explain the role of signal molecules in cell signalling with suitable example. (3)

OR

Evaluate the significance of Cyclin dependent kinases in cell cycle regulation (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Evaluate how the cytoskeleton participate in intracellular transport, and what motor proteins are involved in this process? (5)

8. Analyse what do we mean by "capping" of actin filaments? (5)
9. Analyse the importance of different G protein coupled receptor with an example. (5)
10. Infer the necessity of different voltage gated channels on the cell membrane , with example. (5)
11. What do we mean by electrical properties of membrane? Define its function in the cell. (5)
12. Evaluate what is kinetochore complex and what is its role in transport of chromosomes? (5)

OR

Evaluate the structure of nucleolus in detail. (5)

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