BRAINWARE UNIVERSITY

Term End Examination 2022
Programme – M.Sc.(BT)-2022
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) Which among the following is incorrect about plastids?

a) These are the organelles present only in plant cell and bear color imparting pigments
b) Plastids are of three kinds, namely, leucoplasts, chromoplasts and chloroplasts
c) Chromoplasts contain carotenoid pigments and provide red to orange color to the flowers and fruits
d) Chloroplast is a single membrane bound organelles with stroma which contains a stack of thyllakoids called grana

(ii) Cytoskeletal filaments are polymers of _____

a) proteins
b) ribonucleic acids
c) deoxyribonucleic acids
d) carbohydrates

(iii) What is Ubiquitin?

a) Protein kinase
b) Protease
c) Component of the electron transport system
d) Protein that tags another protein for proteolysis

(iv) Which of the following is an 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) The 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) The signal sequences are typically _____ residues long, rich in _____ charged residues such as arginines as well as hydroxyl residues such as serines and threonines, but devoid of _____ charged residues.

a) 28 to 80, positively, negatively
b) 300 to 800, negatively, positively
c) 28 to 80, negatively, positively
d) 300 to 500, positively, negatively

(vii) Posttranslational modification of many eukaryotic proteins begins in the _____

a) Endoplasmic reticulum
b) Mitochondria
c) Chloroplasts
d) Nucleus

(viii) The antibiotic aided in elucidating the steps of protein glycosylation is _____

a) Streptomycin
b) Tunicamycin
c) Penicillin
d) Crocin

(ix) How many amino acid residues are there in ubiquitin?

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

(x) What 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

(xi) Which is the correct order of transport of protein in a secretory pathway?

a) Protein synthesized in the cytoplasm-SER lumen-RER lumen-cis Golgi-median Golgi-trans Golgi-vesicles-fusion of vesicles with plasma membrane-exocytosis
b) Protein synthesized in the cytoplasm-RER lumen-cis Golgi-median Golgi-trans Golgi-vesicles-fusion of vesicles with plasma membrane-exocytosis
c) Protein synthesized in the cytoplasm-vesicles -SER lumen-RER lumen-cis Golgi-median Golgi-trans Golgi-fusion of vesicles with plasma membrane-exocytosis
d) Protein synthesized in the cytoplasm- RER lumen-trans Golgi -median Golgi-cis Golgi -vesicles-fusion of vesicles with plasma membrane-exocytosis

(xii) Nuclear localization signal is rich in _____

a) Tryptophan and histidine
b) Serine and threonine
c) Glutamine and asparagine
d) Lysine and arginine

(xiii) In the plasma membrane, the best method to study the properties of integral membrane proteins is

a) atomic force microscopy
b) freeze-fracture analysis and electron microscopy
c) cryo-sectioning and electron microscopy
d) all of the above

(xiv) Which of these structures are visible under the microscope at the end of prophase?

a) Nucleolus
b) Endoplasmic reticulum
c) Golgi bodies
d) Asters

(xv) In which phase does the nuclear envelope disintegrate?

a) Telophase
b) Prophase
c) Metaphase
d) Anaphase

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Meiosis occurs in which tissues of animals and plants? (3)
3. If the average duplication time of E. Coli cells is 20 minutes, how long will it take two E. Coli cells to become 32 cells? (3)
4. Predict the basic component of a cell wall. (3)
5. What are the different types of membrane pumps? (3)
6. Discuss the fate of COPII coated vesicles. (3)

OR

What role does chromosomal replication play during interphase? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe the roles of "v-SNARES" and "t-SNARES" in setting the stage for membrane fusion in the delivery of a vesicle to its target compartment the secretory pathway. (5)
8. Explain the mechanism of clathrin coated vesicle formation (5)
9. Discuss the various types of coated vesicle found inside the cell. (5)
10. Explain the processing of N-linked oligosacharides in Golgi complex. (5)
11. Contrast the apparent roles of "COP- I vesicles" and "COP- II vesicles" in the early secretory pathway. (5)

OR

Explain quorum sensing. Explain its role in biofilm formation. (5)

12. Discuss the steps of COPII coated vesicle formation. (5)

OR

What is the origin of the name "MAP kinase"? Explain. (5)

****