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SEAT No. _____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
M. Sc. (I Semester) BIOCHEMISTRY (CBCS) Examination
Monday, 22nd October 2018
Time: 10.00 a.m. to 1.00 p.m.
Paper: PS01CBIC21 (Cell Biology and Genetics)

Total Marks: 70 (Seventy only)

N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.

(ii) Figures in the right indicate marks.

Q1. Choose the most appropriate answer for the following multiple choice questions: (8)

- (i) Oxidative metabolism is carried out _____ of mitochondria**
- (a) in the intermembrane space
 - (b) on the surface of the inner membrane
 - (c) in the inside of the outer membrane
 - (d) in the matrix
- (ii) Proteins synthesized by the rough ER are**
- (a) for internal storage
 - (b) to build more membranes in the cell
 - (c) to digest food in lysosomes
 - (d) exported from the cell
- (iii) Glycoproteins and glycolipids assembled in Golgi bodies are packaged for distribution in**
- (a) cisternae
 - (b) lysosomes
 - (c) peroxisomes
 - (d) liposomes
- (iv) Which of the following cytoskeleton filament is attached by adapter proteins to cell junctions?**
- (a) Microfilament
 - (b) intermediate filament
 - (c) Microtubules
 - (d) desmosomes
- (v) When fused with an S-phase cell, cells in which of the following phases of the cell cycle will initiate DNA replication prematurely?**
- (a) G1
 - (b) G2
 - (c) M
 - (d) all of the above
- (vi) Which of the following proteins can arrest cell cycle in G1 or G2 phases?**
- (a) ATM
 - (b) Tumor suppressor gene *CHK2*
 - (c) p53
 - (d) all of the above
- (vii) Linkage results in**
- (a) Formation of more dominant phenotype
 - (b) Formation of more parental phenotype
 - (c) Formation of more wild type phenotype
 - (d) Formation of more recombinant phenotype
- (viii) Which blood type would not be possible for children of a type AB mother and a type A Father?**
- (a) O
 - (b) A
 - (c) B
 - (d) AB

①

(P.T.O.)

Q2. Answer any SEVEN of the following questions briefly:

(7 x 2 = 14)

- (i) Explain how the inventions of Phase-Contrast microscope and Electron microscope have helped the development of Cell Biology.
- (ii) Differentiate between Pinocytosis and Phagocytosis.
- (iii) Briefly explain the endosymbiotic origin of eukaryotic cell organelles
- (iv) With the help of which proteins, sister chromatids formed by DNA replication in the S phase remain linked at the centromere?
- (v) Distinguish apoplast mode of transport from active transport
- (vi) How intermediate filaments in one cell are indirectly connected to intermediate filaments in a neighboring cell or to the extracellular matrix?
- (vii) Differentiate between necrosis and apoptosis.
- (viii) Explain the phenomenon of epistasis.
- (ix) Give the formula for calculating Recombination frequency.

Answer the following questions in detail:

Q3 (a) With suitable illustrations, discuss the types of membrane proteins and their functions. Also add notes on the main mechanisms by which material is transported across the cell membrane. (6)

(b) Presenting a very brief illustrative account of structure of nucleus, briefly discuss the molecular traffic through nuclear pore complexes (6)

OR

(b) Discuss that "different components of photosynthetic apparatus are localized in different areas of the grana and the stroma lamellae" and justify "chloroplasts are semi-autonomous organelles". (6)

Q4 (a) Write concise note on (i) Endomembrane system and (ii) Mechanism of vesicle transport and vesicle fusion (6)

(b) Discuss the types and the role of ER in Protein synthesis (6)

OR

(b) Present an over view of protein folding and exporting of proteins and lipids from ER to golgi and add a brief note on protein sorting and export from golgi to different cellular compartments (6)

Q5 (a) Explain the roles of microfilaments, intermediate filaments and microtubules in cytoskeleton. (6)

(b) How the protein kinase activity of the mitotic cyclin-CDK complex (MPF) is activated to control onset of mitosis? (6)

OR

(b) What are the various phases of cell cycle? Explain checkpoints in detail. (6)

Q6 (a) What is linkage? Explain the phenomenon of linkage and crossing over using Morgan's experiment on drosophila white eyes and miniature wings genes (6)

(b) Explain with suitable examples the deviations observed by other scientists against Mendel's observations. (6)

OR

(b) Explain the following terms:

- (i) Isoallele, (ii) Dihybrid Ratio, (iii) Co-Dominance. (6)