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SARDAR PATEL UNIVERSITY

M. Sc. (I Semester) Examination (NC)

Tuesday, 10th April 2018

Time: 10.00 a.m to 1.00 p.m.

Paper: PS 01CBIC01 (Cell Biology and Genetics)

Total Marks: 70

Q1. Give the most correct answers for the following questions: (08 Marks)

1. What part of the membrane protein is within the membrane itself?
 - (a) hydrophilic region
 - (b) hydrophobic region
 - (c) N-terminal region
 - (d) C-terminal region
2. During which phase of meiosis synapses between homologous chromosomes, zygonema, begin?
 - (a) metaphase
 - (b) leptotene
 - (c) telophase
 - (d) zygotene
3. Which of the following proteins stops the mutated cell from dividing?
 - (a) p53
 - (b) CAK
 - (c) cdk
 - (d) Cyclin
4. Which of the following enzymes are involved in breaking down Cyclins
 - (a) Proteases
 - (b) Phosphatases
 - (c) Cyclases
 - (d) Cyclins are not degraded
5. Blood group as AB is a phenomenon of
 - (a) Co-dominance
 - (b) Complete dominance
 - (c) Incomplete dominance
 - (d) None of the above
6. Which of the following organisms are used as a model organism in cell biology and genetics studies?
 - (a) *Caenorhabditis elegans*
 - (b) *Schizosaccharomyces pombe*
 - (c) *Drosophila melanogaster*
 - (d) all of the above
7. During which of the following conditions cell cycle will be arrested?
 - (a) Presence of single break in DNA
 - (b) Presence of unphosphorylated, unstable p53
 - (c) Presence of active cyclin dependent kinases
 - (d) all of the above
8. If a group of normal people produces 318 normal and 104 albino offspring, what could be genotype of parents?
 - (a) AA x aa
 - (b) Aa x AA
 - (c) aa x aa
 - (d) Aa x Aa

(P.T.O.)

Q.2 Answer **any seven** of the following questions briefly:

(14 marks)

1. Which eukaryotic organelles are believed to have evolved through symbiotic relationships? Explain in brief.
2. What are the functions of lysosomes in cell?
3. Differentiate between endocytosis and phagocytosis.
4. In which phase of mitosis packaging of DNA into chromosomes occur? Explain the events of this phase.
5. Name all the five phases of prophase I of meiosis in order.
6. In what ways are the cells in G₀ and G₁ similar? How do they differ?
7. Explain the second law of Mendel.
8. Which cell organelle can store water, sugars, ions and pigments?
9. Which organelle is involved in autophagy?

Q.3 (a) Differentiate between plant cells and animal cells.

(06)

- (b) Explain the uniport, symport and antiport mechanisms for transport of substances across the plasma membrane. (06)

OR

- (b) Compare a prokaryotic and eukaryotic cell on the basis of structural, functional and metabolic differences. (06)

Q.4 (a) Explain the structure of chloroplast and narrate the sites of light and dark reactions and ATP synthesis. (06)

- (b) Explain the composition and organization of cytoskeletal elements. (06)

OR

- (b) Explain the processing of proteins from RER to Golgi apparatus. (06)

Q.5 (a) Explain the role and importance of cell cycle check points in cell cycle. (06)

- (b) Differentiate between (06)

- i) Necrosis and Apoptosis
- ii) Mitosis and meiosis

OR

- (b) Explain the roles of cyclin, CAK, Wee 1 and Cdc 25 in activation of MPF activity in *S. pombe* cells. (06)

Q.6 (a) Give examples and explain the concept of multiple allelism. (06)

- (b) Who rediscovered Mendel's laws? Explain the deviations from the Mendel's findings found after rediscovery of Mendel's laws. (06)

OR

- (b) Define/explain the following terms: (06)

- i) dihybrid ratio
- ii) isoallele
- iii) co-dominance

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