

[31]

No. Of Printed Pages: 2

SARDAR PATEL UNIVERSITY

VALLABH VIDYANAGAR

M.Sc Biochemistry, I Semester

Friday, Date: 1 - 04 -2016

Time 10.30 a.m. to 1.30 p.m.

Subject /Course Code PS 01 CBIC 01

Subject/Course Title: Cell Biology & Genetics

Max Marks : 70

Q.1 Choose the most correct answer for following questions.

(08)

1. Which one of the following eukaryotic cell structures does not contain DNA?
(a) Nucleus (b) Mitochondria (c) Endoplasmic reticulum (d) Chloroplast
2. The major function of ribosome is to
(a) make amino acids (b) make proteins (c) breakdown proteins (d) make sugar
3. Which of the following is prokaryotic cell?
(a) *Caenorhabditis elegans* (c) *Saccharomyces cerevisiae*
(b) *Escherichia coli* (d) none of the above
4. Cell theory states that
(a) all living things are composed of cells and all cells arise from preexisting cells
(b) cells contain hereditary material which they pass to daughter cells
(c) The chemical composition of all cells is quite similar
(d) All of the above
5. If a group of normal people produces 312 normal and 103 albino offspring, what could be genotype of parents?
(a) AA x aa (b) Aa x AA (c) aa x aa (d) Aa x Aa
6. Which structure of a cell is responsible for moving of chromosomes during mitosis?
(a) Nucleolus (b) nuclear membrane (c) spindle (d) cytoplasm
7. During which phase of meiosis, do chromatids separate completely?
(a) Metaphase I (b) Anaphase I (c) Telophase II (d) Anaphase II
8. An allele is
(a) Another word for gene (c) a homozygous genotype
(b) A heterozygous genotype (d) one of several possible forms of gene

Q.2 Answer **ANY SEVEN** of the following questions.

(7 X 2 = 14)

1. Which cell organelle can store water, sugars, ions and pigments?
2. In prokaryotic cells, which do not contain cell membrane, how ATP is synthesized?
3. Differentiate between endocytosis and phagocytosis.
4. What happens in G1 phase of the cell cycle?
5. Differentiate between cytokinesis in plant cells and cytokinesis in animal cells.
6. What outcome would you expect from the cross between tall, round (TTRR) x short, wrinkled (ttrr)?
7. Define phenotype and genotype.
8. What is the second law of Mendel?
9. Give example and explain the phenomenon of co-dominance.

Q.3 (a) Compare the structure and organization of prokaryotic and eukaryotic cells. (06)

(b) Explain the structure of nucleus, nuclear envelope and nuclear pore. Also explain Nuclear transport. (06)

OR

(b) Discuss types of Membrane proteins and their functions. (06)

Q.4 (a) Draw a diagram and explain the structure, organization and function of chloroplast. (06)

(b) Explain the structure and functions of endoplasmic reticulum in organization of a cell. (06)

OR

(b) Explain the process of protein folding and processing from RER to Golgi apparatus. (06)

Q.5 (a) Explain in detail the activation of cyclin dependent kinase. Also give its function. (06)

(b) What is apoptosis? Describe the difference between necrosis and apoptosis. (06)

OR

(b) Explain the cell cycle check points that regulate the cell division. (06)

Q.6 (a) Describe the deviations from the Mendel's laws. (06)

(b) Suppose you observed a novel plant which bears a red color flower instead of normally observed purple color flower. If red-color-flower plant upon selfing produces seeds which upon sowing & growing gives 20 red-color-flower plants and 7 purple-color-flower plants, determine the genotype of the original plant you had observed. (06)

OR

(b) A man with Type O blood marries a woman with heterozygous Type A blood. What are the possible phenotypes of the children. (06)

[46]

No. Of Printed Pages: 2

SARDAR PATEL UNIVERSITY
M. Sc. (I Semester) (under CBCS) Examination
Wednesday, 6th April 2016
Time: 10.30 a.m to 1.30 p.m.
Paper: PS 01 C BIC03 (Cellular Metabolism)

Total Marks: 70

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

1. Phosphoglycerate kinase in glycolysis produces ATP via
(a) Oxidative phosphorylation (b) Oxidative decarboxylation
(c) Substrate level phosphorylation (d) Phosphorylation
2. Mitochondrial Oxidation and phosphorylation are
(a) Separate reactions (b) coupled reactions
(c) depends on cells' energetic status (d) none
3. In the reversible reaction $A \rightarrow B$, in which direction reaction will proceed if the concentration of A is increased?
(a) Depends on std. free energy (b) depends on free energy (c) forward (d) reverse
4. Glycolysis proceeds fastest in
(a) myocyte (b) a starved cell
(c) cardiac cells (d) cancerous cells
5. Reduction of $\frac{1}{2}$ O₂ molecule to H₂O by electrons transferred from complex I of ETC produces _____ ATP molecules
(a) 1 (b) 2
(c) 2.5 (d) 1.5
6. Biosynthesis of ketone bodies is favoured in cells under _____ conditions.
(a) hypoglycemic (b) diabetic (c) starvation (d) all of the above
7. Glutamine is synthesized in the liver by the action of enzyme
(a) Transaminase (b) α -ketoglutarate dehydrogenase
(c) Glutamine synthetase (d) none of the above
8. Citrate is broken down into cell cytosol to Acetyl-coA and oxaloacetate by
(a) Citrate hydratase (b) Citrate lyase
(c) Citrate is not broken down in cytosol (d) Citratase

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

(14)

1. Name the regulatory enzymes of glycolysis.
2. What is the importance of PEP carboxykinase in metabolism?
3. What are anaploretic reactions? Give examples.
4. Differentiate between PFK-1 and PFK-2.
5. What are essential fatty acids? Give examples.
6. Differentiate between Glycogen synthase and Glycogen phosphorylase
7. Differentiate between β -oxidation in mitochondrial matrix and β - oxidation in peroxisomes.
8. Why glutamate, and glutamine are found in higher concentration in blood compared to other amino acids?
9. Name the amino acid sequence of peptide ADPFQCTWYRG

Q.3 (a) Explain: Biological energy transformations obey the laws of thermodynamics. (06)

(b) Explain the different fates of pyruvate in the cell. Also explain the conditions during which these fates are preferred. (06)

OR

Q.3 (b) Explain the site, reactions and importance of pentose phosphate pathway (PPP). (06)

Q.4 (a) What are redox reactions? List various types of redox reactions occurring in a cell. (06)

(b) Explain the mechanism of action of ATP synthase in detail. (06)

OR

Q.4 (b) Explain the regulatory enzymes of TCA cycle. (06)

Q.5 (a) What are ketone bodies? Under which physiological conditions are they produced? (06)

(b) What is salvage pathway? Give the salvage pathway for pyrimidine biosynthesis. (06)

Q.5 (b) Explain the regulation of the urea cycle. (06)

Q.6 (a) Give examples and explain transamination reactions. (06)

(b) Explain the regulation of purine nucleotide biosynthesis. (06)

OR

Q.6 (b) Explain - intermediary metabolism. (06)