

## SARDAR PATEL UNIVERSITY

M.Sc [Biochemistry] I<sup>st</sup> semester Examination

Tuesday, 19-03-2019, 10:00 a.m. to 1:00 p.m.

Subject: PS 01 CBIC 01/PS01 CBIC 21, Cell Biology &amp; Genetics

Max Marks : 70

(08 marks)

Q.1 Choose the most correct answer and write in the answer sheet.

1. What is the function of Glogi Complex?
  - (a) Processing of nascent proteins
  - (b) Glycosylation of proteins
  - (c) Secretion of newly synthesized proteins
  - (d) all of the above
2. In which stage of mitosis do all chromosomes align in one plane?
  - (a) Anaphase
  - (b) Telophase
  - (c) prophase
  - (d) metaphase
3. Which one of the following organelle is involved in metabolism of drugs?
  - (a) a nucleus
  - (b) The endoplasmic reticulum
  - (c) a mitochondrion
  - (d) a chloroplast
4. Glucose -6 -phosphatase is present only in one of the following organelle and acts as a marker enzyme for confirmation of its isolation
  - (a) lysosome
  - (b) mitochondrion
  - (c) Endoplasmic reticulum
  - (d) Golgi apparatus
5. In which of the following cellular site, synthesis of nucleotides and fatty acids take place?
  - (a) cytoplasm
  - (b) mitochondrion
  - (c) Endoplasmic reticulum
  - (d) Golgi apparatus
6. MPF is a protein kinase, requiring a mitotic cyclin and it
  - (a) inhibits mitosis
  - (b) promotes mitosis
  - (c) slows mitosis
  - (d) none of the above
7. 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
8. 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

Q.II Answer the following questions in short. (Any seven).

(14 marks).

- 1) Differentiate between euchromatin and heterochromatin.
- 2) What are the sizes of eukaryotic and prokaryotic cells? Give examples.
- 3) What are cell junctions? Give examples along with their functions.
- 4) What is the function of nucleolus?
- 5) Explain the role and availability of cyclins in cell cycle.
- 6) Which cell organelle can store water, sugars, ions and pigments?
- 7) What is cytokinesis? What happens in animal cells for cytokinesis?
- 8) Give example and explain the phenomenon of co-dominance.
- 9) Explain the phenomenon of epistasis.

**Q.III Answer the following questions:**

Q.3 (a) Giving an over view of structure of plasma membrane and briefly discuss the types of membrane proteins and their functions (06)

(b) Write an explanatory note on the size, structure, function and importance of Nucleus. (06)

**OR**

(b) Outline the main mechanisms by which material is transported across the cell membrane. (06)

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

(b) Giving a brief over view of ribosomes, present their structure based on asymmetrical model. (06)

**OR**

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

Q.5 (a) Explain the process of crossing over between two sister chromatids in meiosis (06)

(b) Name the phases of cell cycle in which following biochemical events occur (06)

- |                                      |  |
|--------------------------------------|--|
| i) Packaging of DNA into chromosomes | ii) replication of centrioles            |
| iii) biosynthesis of histones        | iv) dissolution of nuclear envelope      |
| v) replication of DNA                | vi) capturing of chromosomes by spindles |

**OR**

(b) Giving an overview of the composition and organization of cytoskeletal elements, discuss in brief their role in cell division, wall formation and transport. (06)

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

(b) What is linkage? Explain the phenomenon of linkage and crossing over using Morgan's experiment on drosophila white eyes and miniature wings genes. (06)

**OR**

(b) In fruit flies, the wild eye color (deep red) is dominant (R) over the white (r). If red eyed wild female fruitfly is crossed to a white eyed male, produces 60 red eyed & 63 white eyed offsprings. When this red eyed female fruitfly was crossed to a red male, it produced all red offsprings. What must be the genotype of the three parent flies? (06)

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(2)

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No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY**  
**M. Sc. (I Semester) Biochemistry (under CBCS) Examination**  
**Monday, 25<sup>th</sup> March 2019.**  
**Time: 10.00 am to 1.00 p.m.**  
**Paper: PS01CBIC23 (Cellular Metabolism)**

SEAT No. \_\_\_\_\_

**Total Marks: 70**

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

1. What could be the fate of glucose -6-phosphate in a liver cell?
  - (a) Glycolysis
  - (b) Glycogenesis
  - (c) Pentose phosphate pathway
  - (d) all of the above
2. Acetyl-coA can be produced in cell from
  - (a) Pyruvate
  - (b) carbon skeleton of amino acids
  - (c) Palmitoyl-coA
  - (d) All of the above
3. Glycolysis is inhibited by
  - (a) Excess of ATP
  - (b) Excess of citrate
  - (c) Lack of NAD<sup>+</sup>
  - (d) All of the above
4. Biosynthesis of ketone bodies is favoured in cells under \_\_\_\_\_ conditions.
  - (a) hypoglycemic
  - (b) diabetic
  - (c) starvation
  - (d) all of the above
5. Which of the following molecule gives maximum energy upon oxidation?
  - (a) Glucose
  - (b) Maltose
  - (c) Alanine
  - (d) Palmitoyl-coA
6. Glutamine is synthesized in the liver by the action of enzyme
  - (a) Transaminase
  - (b) Glutamine synthetase
  - (c)  $\alpha$ - ketoglutarate dehydrogenase
  - (d) none of the above
7. Citrate is broken down into cell cytosol to Acetyl-coA and oxaloacetate by
  - (a) Citrate hydratase
  - (b) Citrate is not broken down in cytosol
  - (c) Citrate lyase
  - (d) Citratase
8. The energy released by the breakage of thioester bond of succinyl-CoA in citric acid cycle is used to synthesize
  - (a) a phosphoanhydride bond in GTP
  - (b) a thioester bond in Acetyl-CoA
  - (c) an ester bond in fatty acyl-CoA
  - (d) the primary metabolite

**Q2. Answer any SEVEN of the following questions briefly: (7 X 2 = 14 Marks)**

- (i) Differentiate between the Hexokinase and Glucokinase.
- (ii) Which enzyme of glycolysis is halted for the want of NAD<sup>+</sup>? How NAD<sup>+</sup> is made available?
- (iii) What is the importance of PEP carboxykinase in metabolism?
- (iv) What are the intracellular sites of carbamoyl phosphate synthase 1 and 2 reaction?
- (v) Explain  $\omega$ -oxidation of fatty acids in ER. What are essential fatty acids? Give examples.
- (vi) Differentiate between free energy change and standard free energy change.
- (vii) An amino acid that yields acetoacetyl-CoA during catabolism is glucogenic or ketogenic?
- (viii) In which cells glucose -6- phosphatase enzyme is found? What is its subcellular location?
- (ix) Name the amino acid sequence of peptide ADQCTWYR

(1)

(P.T.O.)

(Contd.....2)

Q3. (a) Explain: Biological energy transformations obey the laws of thermodynamics. (6)

(b) Write a detailed note on the carriers involved in electron transport chain. (6)

OR

(b) List the tissue where Pentose Phosphate pathway is found active and explain the reactions and importance of this pathway. (6)

Q 4. (a) What are ketone bodies? Under which physiological conditions are they produced? (6)

(b) Explain the oxidation of Myristoyl-coA and calculate the energy production by  $\beta$  - oxidation. (6)

OR

(b) Explain the pathway of  $\omega$  - oxidation of fatty acids. (6)

Q 5. (a) Give any two examples and explain transamination reactions. (6)

(b) Explain how urea cycle is regulated. (6)

OR

(b) Explain the linkage between urea cycle and TCA cycle. (6)

Q .6 (a) Explain the pathway of purine degradation. (6)

(b) Write a detailed note on regulation of purine biosynthesis. (6)

OR

(b) What is salvage pathway? Give the salvage pathway for pyrimidine biosynthesis. (6)

— X —  
(2)