

[80]

No. Of Printed Pages: 2

Sc

SARDAR PATEL UNIVERSITY
M Sc IV Semester Examination
Date: 07-04-2016 Day: Thursday
Time: 02.30 PM To 05.30 PM
Subject: BIOCHEMISTRY
Paper: PS04CBIC01 – Animal Biotechnology

Marks: 70

Q1. Select appropriate answer for the following.

(8M)

- (i) The signal for the differentiation of epidermal keratinocytes is received from
- (a) Lymphocytes (b) Fibroblast (c) Melanocytes (d) Neuronal cells
- (ii) Which of the following is **not** a DNA fluorochromes but is conventionally used for measuring DNA content?
- (a) Haematoxylin (b) Hoechst 33258 (c) Propidium iodide (d) DAPI
- (iii) Dilution cloning is based on the observation that the
- (a) Cells grow best in diluted medium
(b) Cells get diluted below certain density to form discrete colonies
(c) Cells get more oxygen in diluted medium
(d) Cells can be induced to proliferate to reach to confluence very fast
- (iv) The oldest and most commonly used cell line is
- (a) HeLa (b) Jurkat (c) Vero cells (d) F11 cells
- (v) Cells which have undergone transformation frequently become
- (a) Anchorage independent (b) Anchorage dependent
(c) Stable (d) Density dependent
- (vi) The most appropriate assay to measure irritability response in cultured cells is by
- (a) Measuring level of growth hormone (b) Using tetrazolium salt assay
(c) Monitoring cytokine level (d) Measuring membrane polarity
- (vii) The enzymatic marker for the characterization of endothelia is
- (a) Creatine kinase (b) Tyrosinase
(c) DOPA decarboxylase (d) Angiotensin converting enzyme
- (viii) The plating efficiency of cells can be checked during
- (a) Lag phase (b) Log phase
(c) Plateau phase (d) All the three growth phases

Q2. Answer briefly any Seven from the following.

14M

- (i) List out various microscopes required in cell culture laboratory. Write their principles.
- (ii) Name the cell properties undergoing change when a cell is transformed.
- (iii) Define transgenic animals. Give four examples of transgenic animals.
- (iv) Why cryopreservation is required for cultured cells? Name the cryoprotectants and write their role in cryopreservation .
- (v) How the replacement of serum can be substituted in serum free media?
- (vi) Write the organization and importance of focal adhesion for cultured cells.
- (vii) Name different growth factors involved in maintaining stem cells. Write their role.
- (viii) Explain the regulation of cell cycle when the cells are cultured in media with serum and without serum.
- (ix) Explain the relationship between cell concentration and cell density in sigmoid growth behavior of cultured cell.

Q3. (a) Write the composition of serum and discuss the advantages as well as disadvantages of using serum in animal cell culture media. (6M)

(b) Give the details of cell – cell adhesion as well as cell-matrix adhesion established in simple epithelia. (6M)

OR

(b) Which are the cells involved in synthesis and maintenance of extracellular matrix? Describe the culture protocol for these cells and write the major applications of these cell lines. (6M)

Q4. (a) Describe the development of primary cell line from human biopsy material. (6M)

(b) Give an account on different methods used for isolation of clones from monolayer culture as well as from suspension culture. (6M)

OR

(b) Discuss various methods employed to study apoptosis. (6M)

Q5. (a) Define embryonic stem cells and adult stem cells with examples; and describe their therapeutic applications. (6M)

(b) Why the characterization of cell line is necessary? Name different techniques used for characterization and describe any two of these techniques in detail. (6M)

OR

(b) Which parameters control differentiation of cells in cell lines? Discuss in detail. (6M)

Q6. (a) Write a note on different types of assays used for cytotoxicity testing of drugs employing cell lines. (6M)

(b) Describe the cell purification techniques based on following principles. (6M)

- (i) Cell size and sedimentation velocity
- (ii) Fluorescence activated cell sorting

OR

(b) Write the organizations of microfilaments as well as microfilament associated motor protein and explain their role in cell migration during cell culture. (6M)

[78]

SARDAR PATEL UNIVERSITY
M.Sc. IVth semester Biochemistry Examination
Tuesday, 5th April, 2016
Time: 2.30 p.m. to 5.30 p.m.
PS 04 CBIC02 Nutritional and Clinical Biochemistry

Note: Numbers in parenthesis indicate marks

Max marks: 70
(08 marks)

Q.1 Choose the correct options for the following questions.

1. An adult in 24 hrs uses 800 litres of O₂ and gives out 560 liters of CO₂. What kind of physiological status of the person can be anticipated?
(a) Normal (b) Diabetic (c) Obese (d) None of the above
2. Which of the following lipoproteins has least amount of triacylglycerol (TG) levels
(a) LDL (b) IDL (c) VLDL (d) Chylomicron
3. Synthesis of TG and secretion of VLDL by the liver is affected by
(a) Well-fed state (b) High carbohydrate diet (c) High circulating FFA (d) All of the above
4. Alcoholism leads to fatty liver condition because
(a) Alcohol is converted into fat (b) Alcohol changes [NADH]/[NAD⁺] ratio
(c) Alcohol activates Fatty acid transport (d) None of the above
5. Plasma glucose concentration doesn't reduce further to 3.5 mM/L in prolonged starvation because
(a) Glycolysis is inhibited in the surrounding tissues (b) Glucose transport is inhibited
(c) Glycolysis is never inhibited (d) None of the above
6. Treatment of Gout with Allopurinol
(a) Causes accumulation of xanthine (b) Reduces uric acid levels
(c) Control urate nephropathy (d) All of the above
7. An acute form of childhood protein malnutrition characterized by edema, irritability, anorexia, ulcerating dermatoses and an enlarged liver is known as
(a) Kwashiorkor (b) Marasmus (c) Marasmic kwashiorkor (d) Kwashiorkoric marasmus
8. Familial juvenile hyperuricaemic nephropathy is caused by
(a) Mutations in the uromodulin gene (b) Hyper excretion of Xanthine
(c) Hyper excretion of uric acid (d) All of the above

Q.2 Answer any seven of the following questions in brief:

(14 marks)

1. Define reference man and reference woman.
2. What is glycemic index of sugar?
3. What is BMI? Write WHO classification of body weight based on BMI.
4. List four hypothesis explaining diabetes-specific complications.
5. What is the action of insulin on lipase?
6. What is the cause of hyperlipidaemia in diabetes mellitus?
7. List acute and chronic complications of diabetes mellitus.
8. Define digestibility coefficient. Write its formula.
9. Write the name of limiting amino acids in cereals and in legumes.

Q3 A. Define BMR and explain factors affecting it.

(06 marks)

B. What is the energy value of food? How can we determine it?

(06 marks)

OR

Q3 B. What will be the energy value of 2gm of wheat when combusted in bomb calorimeter, raised the temperature of 3kg of water from 23° C to 26° C. The water equivalent of calorimeter was about 500gm.

(06 marks)

Q4 A. Write the four major groups of lipoprotein and describe the metabolic fate of Chylomicrons and VLDL from blood.

(06 marks)

B. Briefly explain these terms:

(i) Digestibility coefficient (ii) Nitrogen balance (iii) Essential amino acids

(06 marks)

OR

Q4 B. Explain the metabolic adaptation in prolonged starvation.

(06 marks)

Q5 A Explain the adaptation of metabolism in excess carbohydrate diet.

(06 marks)

B. Explain the causes and mechanism of development of obesity.

(06 marks)

OR

B. Explain the effects of various hormones on lipase.

(06 marks)

Q6 A Explain protein-energy malnutrition.

(06 marks)

B Describe the factors regulating water in the body.

(06 marks)

OR

B Explain how abnormal activity of phosphoribosyl pyrophosphate (PRPP) synthetase leads to disorder of purine metabolism.

(06 marks)

SC

No. Of Printed Pages: 2

[69]
A

SARDAR PATEL UNIVERSITY

M. Sc. (IV Semester) Examination

Saturday, 2nd April, 2016

2.30 p.m. to 5.30 p.m.

Biochemistry - PS04EBIC01 – Microbial Physiology

Q.1 Select the right answer for the following questions: (08 marks)

1. Structural polymer of the fungal cell wall is
 - (a) Chitin
 - (b) Peptidoglycan
 - (c) Cellulose
 - (d) Glycoprotein
2. Movement toward chemical attractants and away from repellents is called
 - (a) gliding motility
 - (b) tumbling
 - (c) chemotaxis
 - (d) none of the above
3. How bacteria respond to high osmolality?
 - (a) Increase in K^+ ion influx
 - (b) Drop in turgor pressure
 - (c) Slow growth rate
 - (d) all of the above
4. β -lactamase degrades
 - (a) lactose
 - (b) galactose
 - (c) penicillin
 - (d) none of the above
5. Clavulanic acid is a
 - (a) β -lactamase inhibitor
 - (b) β -lactamase activator
 - (c) β -lactamase solubilizer
 - (d) none of the above
6. Complex communities of microorganisms attached to surfaces are known as:
 - (a) Biofilms
 - (b) Flagella
 - (c) Both of the above
 - (d) None of the above
7. Teichoic acids are found in
 - (a) *Bacillus subtilis*
 - (b) *Lactobacillus plantarum*
 - (c) *Staphylococcus aureus*
 - (d) All of the above
8. Which of the following enzyme is protecting the aerobic organisms from the toxicity of superoxide and hydrogen peroxide?
 - (a) Superoxide dismutase
 - (b) Catalase
 - (c) NADH oxidase
 - (d) Both (a) and (b)

Q.2 Answer any seven of the following questions in brief. (14)

1. What are mycotoxins? Give examples.
2. Define Bioluminescence and give examples of organisms giving bioluminescence.
3. Explain types and role of cyclins in yeast cell cycle regulation.
4. How the bacterial spores get resistance to ultra violet irradiation?
5. What are PGPR bacteria?
6. What is the function of siderophores in bacteria?
7. Which bacteria produces vacuolating cytotoxin A (Vac A) that causes ulcers in stomach?
8. What are the applications of microbial fuel cell?
9. Write general mechanism of microbial endotoxins.

Q.3 A: Explain the molecular mechanisms of chemotaxis. (06)

Q.3 B: What is the average size of bacteria? Explain the cell wall structures of bacteria. (06)

OR

Q.3 B: Narrate the pathway for peptidoglycan biosynthesis. (06)

Q.4 A: Explain biochemical reactions and significance of bacterial bioluminescence. (06)

Q.4 B: Explain the regulation of the oxidative stress response in bacterial cell. (06)

OR

Q.4 B: Explain the physiological and genetic aspects of bacterial sporulation. (06)

Q.5 A: How biofilms grow? Write the properties of biofilms. (06)

Q.5 B: Explain the possible routes of exposure and mechanism of action of botulinum toxin. (06)

OR

Q.5 B: Write the applications of siderophore in detail. (06)

Q.6 A: Enlist features of a microbial reserve compound. Discuss regulation and biosynthesis of PHA in bacteria. (06)

Q.6 B: List any six microbial toxins and give their toxic effects. (06)

OR

Q.6 B: What is Quorum sensing? Give examples and explain. (06)