

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

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[115]

Sardar Patel University  
M. Sc. (III Semester) Examination  
Thursday, 13<sup>th</sup> April, 2017  
Time: 2.00 p.m. to 5.00 p.m.  
Biotechnology/Biochemistry  
PS03CBIT02/PS03CBIC02 – Immunology

Total marks: 70

- Q.1 Select the right/most appropriate answer for the following: (08 marks)
- A. The transfer of IgG from mother to fetus is a form of
- |                         |                     |
|-------------------------|---------------------|
| a. Active immunization  | c. Vaccination      |
| b. Passive immunization | d. All of the above |
- B. Which blood cell is useful for defense against parasitic infection?
- |              |               |
|--------------|---------------|
| a. Mast cell | c. Eosinophil |
| b. Basophil  | d. Neutrophil |
- C. In classical pathway complement activation is initiated involving
- |        |                 |
|--------|-----------------|
| a. IgG | c. IgD          |
| b. IgM | d. Both a and b |
- D. IgM is
- |                                                         |                                                     |
|---------------------------------------------------------|-----------------------------------------------------|
| a. First immunoglobulin produced in response to antigen | c. More efficient in complement activation than IgG |
| b. Pentameric in structure                              | d. All of the above                                 |
- E. Graft transferred between identical twins is example of
- |              |              |
|--------------|--------------|
| a. Autograft | c. Isograft  |
| b. Allograft | d. Xenograft |
- F.  $\beta$  2 microglobulin is an integral part of
- |                          |                         |
|--------------------------|-------------------------|
| a. IgM                   | c. MHC Class I molecule |
| b. MHC Class II molecule | d. TCR                  |
- G. Blood transfusion reaction is example of
- |                             |                              |
|-----------------------------|------------------------------|
| a. Type I hypersensitivity  | c. Type III hypersensitivity |
| b. Type II hypersensitivity | d. Type IV hypersensitivity  |
- H. Virus specific antigens may be processed as
- |                        |                      |
|------------------------|----------------------|
| a. Exogenous antigens  | c. Both A and B      |
| b. Endogenous antigens | d. None of the above |

Q.2 Answer/attempt **any seven** from the following: (14 marks)

- a) What are vaccines?
- b) Explain clonal selection theory.
- c) What are secondary lymphoid organs?
- d) What is the role of histamine in anaphylaxis?
- e) What are chemokines?
- f) What are integrins?
- g) What is the role of C1inh?
- h) Explain phagocytosis.
- i) What are TI antigens?

Q.3 A. Discuss thymus as primary lymphoid organ. (06 marks)  
B. Discuss classical pathway of complement activation. (06 marks)

**OR**

B. Explain the steps in development of inflammatory response. (06 marks)

Q.4 A. Discuss the structure and function of IgG. (06 marks)  
B. Discuss agglutination reactions. (06 marks)

**OR**

B. Explain mechanism of diversity generation for Ig molecules. (06 marks)

Q.5 A. Discuss structure and other features of MHC II molecules. (06 marks)  
B. Discuss process of B cell maturation. (06 marks)

**OR**

B. Discuss cytosolic pathway of antigen processing. (06 marks)

Q.6 A. Discuss organ specific autoimmune diseases. (06 marks)  
B. Explain mechanisms for generation of immune tolerance. (06 marks)

**OR**

B. Explain steps involved in allograft rejection. (06 marks)

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[116/126/A61]

SARDAR PATEL UNIVERSITY  
M. Sc. THIRD SEMESTER EXAMINATION

Date: 11-04-2017

PS03C MIC/BIT 01: MICROBIAL BIOTECHNOLOGY

TIME: 2.00 TO 5.00 P.M.

MAX.MARKS: 70

**Q-1** Select most appropriate answer from the given choices. 08

- 1 Which of the following is an inducer for biosynthesis of ergot alkaloids?  
a) Glycine      b) Tryptophan      c) Mevalonic acid      d) Paspalic acid
- 2 Which of the following is not a lactic acid bacteria?  
a) *Lactococcus lactis*      c) *Leuconostoc dextranicum*  
b) *Bifidobacterium bifidum*      d) *Lactobacillus casei*
- 3 Introduction of 1, 2 double bond in hydrocortisone leads to the formation of .....  
a) Prednisone      b) Cortisone      c) Prednisolone      d) Compound F
- 4 Lysine is a member of ..... family.  
a) Pyruvate      b) Aspartate      c) Serine-glycine      d) None of the above
- 5 Which of the following is a branched polymer?  
a) Amylose      b) Cellulose      c) Amylopectin      d) Alginate
- 6 Overproduction of citric acid by *A. niger* requires deficiency of ..... in the media.  
a)  $Ca^{+2}$       b) Glucose      c)  $Mn^{+2}$       d) Mannitol
- 7 Streptomycin belongs to \_\_\_\_\_ type of antibiotic.  
a) Beta Lactum      b) Aminocyclitol      c) Polyene      d) None of the above
- 8 Which of these additive is used to enhance elasticity of wheat dough for bread making?  
a) Potassium bromate      b) Sodium propionate      c) Cysteine      d) None

**Q-2** Answer any seven short questions 14

- a) Explain the biological functions of microbial exopolysaccharides.
- b) Write the desirable characteristics of organism to be used as SCP.
- c) Explain the role of microbial protease in leather industry.
- d) Name the substrates used to synthesize steroid drugs.
- e) Neatly narrate structure of riboflavin.
- f) Explain the synergism between yoghurt starter cultures.
- g) Explain the mode of action of penicillin.
- h) What is instant active dry yeast?
- i) List the applications of L Glutamic acid.

Q-3A Explain in detail: Malting and mashing during beer making. 06

Q-3B Explain the physiological and biochemical aspects of L Glutamic acid production. 06

OR

Explain the structure, function, properties and biosynthesis of Vitamin B<sub>12</sub> 06

Q-4A	Explain in detail downstream processing in penicillin fermentation.	06
Q-4B	Explain the biosynthesis of streptomycin.	06
OR		
	Write a note on: Microbial amylases and their applications.	06
Q-5A	Describe the production and applications of mushrooms.	06
Q-5B	Explain the biochemistry of single cell oil production.	06
OR		
	Write a note on: Bioplastics.	06
Q-6A	Write in detail on biosynthesis of microbial exopolysaccharides.	06
Q-6B	Write in detail on properties, metabolism and functions of lactic starter cultures.	06
OR		
	Neatly narrate flow diagram for cheese making and explain the coagulation of milk during cheese making.	06

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M. Sc. THIRD SEMESTER  
MICROBIOLOGY/ BIOTECHNOLOGY EXAMINATION  
MONDAY, DATE: 17-04-2017  
PS03CMIC/BIT03 ENZYMOLOGY

**TIME: 2:00 to 5:00 pm**

**MAX. MARKS: 70**

- Q. 1 Choose the correct answer (08)
- Generally, this type of inhibitor is an analogue of substrate
    - competitive
    - noncompetitive
    - uncompetitive
    - mixed
  - Turnover number is
    - K<sub>m</sub>
    - K<sub>cat</sub>
    - K<sub>cat</sub>/K<sub>m</sub>
    - K<sub>s</sub>
  - The K<sub>cat</sub>/K<sub>m</sub> is the criterion for
    - turnover number
    - enzyme efficiency
    - inhibition
    - rate enhancement
  - Which of these is a secondary plot?
    - MM plot
    - LB plot
    - Dixon plot
    - all are primary plots
  - Abzymes are
    - catalytic antibodies
    - synthetic enzymes
    - allosteric enzymes
    - ribozymes
  - ATCase is an example of
    - Cooperativity
    - Sigmoidal kinetics
    - Oligomeric protein
    - all of these
  - The initial velocity V<sub>o</sub> is obtained by
    - LB plot
    - Dixon plot
    - Progress curve
    - Hill's plot
  - Under the effect of increasing temperature the rate of enzyme reaction
    - only increases
    - increases then decreases
    - only decreases
    - increases than remains constant

**Q-2 Attempt: (Any Seven)**

**[14]**

- a. Define unit and specific activity
  - b. Write Alberty's general rate equation
  - c. What are isozymes?
  - d. Draw LB plot
  - e. Draw Gibb's free energy profile for enzyme catalysed reaction
  - f. List six classes of enzyme classification by IUB
  - g. What is substrate inhibition?
  - h. What is pseudo single substrate reaction?
  - i. What is fold purification?
- Q. 3 a) Explain steps in enzyme purification using a flow chart (06)  
b) Write a note on: (any one) (06)  
    i) Affinity chromatography  
    ii) Test of homogeneity
- Q. 4 a) Explain various plots used to analyze substrate saturation data (06)  
b) Derive an equation for non-competitive inhibition (06)  
    OR  
b) Explain various types of two substrate reactions (06)
- Q. 5 a) Explain the mechanism of Lysozyme action (06)  
b) Explain the catalytic triad of Chymotrypsin (06)  
    OR  
b) Explain sigmoidal kinetics and cooperativity (06)
- Q. 6 a) Give an account on enzyme engineering with suitable examples (06)  
b) Write a note on: (any one) (06)  
    i) Ribozymes  
    ii) Methods used to follow enzyme reactions

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SARDARPATEL UNIVERSITY No. of Printed Pages : 2  
M.Sc (III Semester) Biotechnology Examination (CBCS)

Wednesday, 19<sup>th</sup> April, 2017

10:00 am to 1:00 pm

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

PS03EBIT01 – Human Physiology

TOTAL MARKS: 70

**Q.I** Choose the correct answer for the following and write in your answer sheet (*Only correct option against given question number needs to be written in provided answer book*) (08 Marks)

1. Red blood cells (RBCs)
  - (a) have nucleus
  - (b) can repair damage through new protoplasm
  - (c) are destroyed in spleen
  - (d) are permanent cells
2. In which of the following conditions erythropoietin level increases in the blood?
  - (a) In hypoxia situation
  - (b) In anemia
  - (c) When blood volume is low
  - (d) in all of the above conditions
3. pH of bile is
  - (a) below 7
  - (b) approximately 7
  - (c) above 7
  - (d) depends upon the type of food
4. Peristalsis helps in
  - (a) Absorption of minerals
  - (b) Action of pepsin
  - (c) passing food through oesophagus
  - (d) action of salivary amylase
5. Functions of stomach involves
  - (a) Action of bile
  - (b) Digestion of proteins
  - (c) action of pancreatic enzymes
  - (d) all of the above
6. Which structure of nephron reabsorbs the most substances?
  - (a) LOH
  - (b) PCT
  - (c) Collecting duct
  - (d) Ascending limb
7. Sympathetic stimulation during stress \_\_\_\_\_ salivation.
  - (a) increases
  - (b) decreases
  - (c) stops
  - (d) activates
8. Gaps in the myelin sheath are called \_\_\_\_\_.
  - (a) The synapse
  - (b) axon intersites
  - (c) nodes of ranvier
  - (d) interneuron space

**Q.II** Answer **any SEVEN** of the following questions briefly:

(14 marks)

1. Name major secretory cells in the stomach along with their secretion.
2. Differentiate between phagocytosis by neutrophils and phagocytosis by macrophages.
3. Differentiate between the two systems involved in control and regulation of most biological functions.
4. Name any four organ sites where erythropoiesis occur before or after the birth.
5. Why the length of the GI tract is longer in cadaver than in a living person?
6. What are the functions of the lamina propria?
7. What is peritoneum?
8. What are the functional differences between neurons and glial cells?
9. Which cells form myelin sheath on axons? How?

**Q.III.** Answer the following questions in detail.

(48 marks)

3. (a) Describe the shape, size, functions and life cycle of RBCs. (06)  
(b) Describe the molecular composition, structure and functions of Hemoglobin (06)  
OR  
(b) Explain how clotting of blood occurs. (06)
4. (a) How much saliva is secreted each day and how is secretion of saliva regulated? (06)  
(b) Explain the role of muscularis layers in digestion in stomach and in small intestine. (06)  
OR  
(b) Describe the absorption of carbohydrates and lipid monomers from small intestine into the blood. (06)
5. (a) Describe the reabsorption and secretion in the proximal convolute tubule. (06)  
(b) Describe the pressures that affect glomerular filtration. Calculate the NFP. (06)  
OR  
(b) What is countercurrent multiplication? How does it produce concentrated urine? (06)
6. (a) Explain the role of anterior pituitary and ovarian hormones during normal female reproductive cycle. (06)  
(b) Explain the major structures of the nervous system. Give a schematic diagram of organization of the nervous system. (06)  
OR  
(b) Explain the factors that affect the speed of propagation of impulses (06)

— x ————— x —

(2)



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SARDAR PATEL UNIVERSITY  
M Sc Third Semester Examination  
Date: 19-04-2017 Day: Wednesday  
Time: 02.00 PM To 05.00 PM  
Subject: BIOTECHNOLOGY  
Paper: PS03EBIT04 – Animal Biotechnology

Marks: 70

Q1. Select appropriate answer for the following.

(8M)

- (1) Trachea is lined with
  - (a) Simple squamous epithelia
  - (b) Pseudostratified ciliated epithelium
  - (c) Keratinized stratified epithelia
  - (d) Transitional epithelia
- (2) The cell population doubling time in a cell line can be checked at
  - (a) Seeding
  - (b) Lag phase
  - (c) Log phase
  - (d) Saturation phase
- (3) Cells can be separated by Centrifugal elutriator based on
  - (a) Cell density
  - (b) Cell size
  - (c) Cell surface charge
  - (d) Cell surface epitopes
- (4) The epithelial cell line from the colon is
  - (a) Vero
  - (b) 3T3
  - (c) Caco
  - (d) STO
- (5) The differentiation property of myeloid cells is
  - (a) Phagocytosis
  - (b) Propagation of action potential
  - (c) Release of surfactant
  - (d) Cornification
- (6) The predominant junction of epidermis is
  - (a) Gap junction
  - (b) Tight junction
  - (c) Desmosomes
  - (d) Adherent junction
- (7) The most appropriate enzymic marker for the characterization of enterocytes is
  - (a) Tyrosinase
  - (b) Angiotensin converting enzyme
  - (c) Nonspecific esterase
  - (d) Alkaline phosphatase
- (8) Angiogenin is a mitogen for
  - (a) Astroglia
  - (b) Erythroid cells
  - (c) Keratinocytes
  - (d) Endothelia

Q2. Answer briefly any Seven from the following.

14M

- (1) State various parameters that control differentiation.
- (2) Explain stem cell niche with appropriate examples.
- (3) How dilution cloning helps in achieving better cloning?
- (4) List out different cellular changes of mitotic cells.
- (5) Define de-differentiation and trans-differentiation with examples.
- (6) Name the hormones used in serum free media. Write their role in cell culture.
- (7) How feeder layer can be generated? Write the importance of use of feeder layer for cell culture.
- (8) What is IVF technique? Write its therapeutic significance
- (9) Explain different stages of subculture of a monolayer culture

(PTO)

- Q3. (a) Write a detailed note on  $\text{Ca}^{2+}$  dependent and  $\text{Ca}^{2+}$  independent cell adhesive molecules. (6M)
- (b) Describe in detail any three major instruments necessary for animal cell culture laboratory. (6M)
- OR
- (b) Write notes on (6M)
- (i) Study of apoptosis in cell lines
- (ii) Amniocenteses
- Q4. (a) Describe the development of primary culture from 10 day old chick embryo. (6M)
- (b) Write a note on use of cell lines for cyto-toxicity study. (6M)
- OR
- (b) Describe the characteristics and applications of embryonic stem cells. (6M)
- Q5. (a) Discuss the composition and importance of serum in animal cell culture media. (6M)
- (b) Describe the methods for isolation of clones from monolayer culture and suspension culture. (6M)
- OR
- (b) Describe complete culture protocol for human liver tissue. (6M)
- Q6. (a) Describe any two methods for characterization of cell line. (6M)
- (b) Write the major differences in the properties of normal cells and transformed cells. (6M)
- OR
- (b) Discuss histological organization and functions of any two tissues originating from mesenchymal tissue. (6M)
- \*\*\*\*\*