

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

No. of Printed Pages : 02

[578A-24]

Sardar Patel University  
M. Sc. (III Semester) Examination  
Friday, 3rd November, 2017  
2.00 p. m. to 5.00 p. m.  
Biotechnology  
PS03CBIT02 – Immunology

Total marks: 70

- Q.1 Select the right/most appropriate answer for the following: (08 marks)
- A. The ROS are generated in the phagocytic cells by the enzyme complex
- |                    |                       |
|--------------------|-----------------------|
| a. NADPH reductase | c. NADPH hydrolase    |
| b. NADPH oxidase   | d. NADP dehydrogenase |
- B. The antigens present in blood are presented to B cells in
- |                |           |
|----------------|-----------|
| a. Lymph nodes | c. Spleen |
| b. Thymus      | d. MALT   |
- C. Anti-isotypic antibodies will be produced against human antibody if injected as antigen in
- |                        |                     |
|------------------------|---------------------|
| a. Another human being | c. A twin           |
| b. A Horse             | d. All of the above |
- D. A non peptide lipid antigen will be presented on antigen presenting cells by
- |                          |                                       |
|--------------------------|---------------------------------------|
| a. MHC class I molecule  | c. non classical Class I CD1 molecule |
| b. MHC class II molecule | d. None of these                      |
- E. When cytokine acts on the nearby cell the action is called
- |              |                |
|--------------|----------------|
| a. Autocrine | c. Synergistic |
| b. Endocrine | d. Paracrine   |
- F. Signal sequence for Ig gene segment recombination is having:
- |  |                      |
|--|----------------------|
| a. A conserved nonamer and heptamer                              | c. Both a and b      |
| b. Either 12 or 23 base pairs as spacer between conserved region | d. None of the above |
- G. Who was awarded Nobel prize for the work on anaphylaxis?
- |                   |                    |
|-------------------|--------------------|
| a. Charles Richet | c. Susumu Tonegawa |
| b. Jules Bordet   | d. Peter Doherty   |
- H. Enzyme TdT generated during Ig gene rearrangement is responsible for
- |                           |                        |
|---------------------------|------------------------|
| a. Junctional flexibility | c. P region nucleotide |
| b. N region nucleotide    | d. T region nucleotide |

- Q.2 Answer/attempt **any seven** from the following: (14 marks)
- Explain passive acquired immunity.
  - Explain allelic exclusion during Ig gene rearrangement.
  - Explain central tolerance.
  - What is SCID? Discuss specific defects leading to SCID.
  - Explain EAE.
  - What are superantigens? Explain their action and role.
  - Draw and label TCR complex.
  - Explain tuberculin reaction.
  - What are chemokines?
- Q.3 A. Discuss signs of inflammation and steps involved in generation of inflammation at the site of infection. (06 marks)
- B. Discuss role of various membrane receptors and soluble proteins in innate immune system. (06 marks)
- OR**
- B. Discuss formation of C5 convertase enzyme complex through different pathways of complement activation. (06 marks)
- Q.4 A. Discuss the mechanisms for generation of diversity in antibody variable regions. (06 marks)
- B. Give an account of different types of ELISA. (06 marks)
- OR**
- B. Discuss biological activities and effector functions of different Ig molecules. (06 marks)
- Q.5 A. What is self MHC restriction? Explain experiments which revealed self MHC restriction of T<sub>H</sub> and T<sub>C</sub> cells. (06 marks)
- B. Explain killing of target cells by T<sub>C</sub> cells. (06 marks)
- OR**
- B. Discuss cytosolic pathway for antigen processing and presentation of antigenic peptides. (06 marks)
- Q.6 A. Discuss Type II hypersensitivity reaction. (06 marks)
- B. Giving two examples discuss organ specific autoimmune diseases with the mechanism and the clinical symptoms. (06 marks)
- OR**
- B. Write on mechanism involved in allograft rejection and role of immunosuppressive drugs. (06 marks)

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

08

1. Cell permeability of *Corynebacterium glutamicum* during glutamic acid fermentation can be increased by.....
  - a) Addition of saturated fatty acids(C<sub>16</sub>-C<sub>18</sub>)
  - b) Addition of penicillin during growth phase
  - c) Ensuring biotin deficiency in the medium
  - d) All of the above.
2. Alkaloids can be formed in ----- stage of life cycle of ergot fungi.
  - a)Vegetative    b) Sclerotial    c) Sphacelial    d) All
3. Calf rennet is a/an .....
  - a) Aspartate protease    b) Lipase    c) Serine protease    d) Milk protein
4. The first commercial single cell protein "Pruteen" was produced by ICI using.....
  - a) Yeast    b) Fungi    c)Algae    d) Bacteria
5. When apparent viscosity of the fluid decrease with time at a constant shear rate, it is termed as .....
  - a) Pseudoplasticity    b) Viscoelasticity    c) Thixotrophy    d) None of the above
6. Which of these criteria is associated with economics of single cell oil production?
  - a) Lipid content    b) Lipid yield    c) Fat coefficient    d) All
7. Which of the following is not a precursor for penicillin biosynthesis?
  - a) Cysteine    b)Valine    c)α-Amino adipic acid    d)Aspartate
8. Wheat gluten is made up of .....
  - a) Gliadin    b) Dextrins    c) Glutenin    d)Gliadin and glutenin

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

14

- a) Enlist the criteria to judge quality of single cell protein.
- b) Differentiate between lager and ale beer.
- c) Enlist the applications of microbial proteases.
- d) Name the sterols used for synthesis of steroid drugs and write their sources.
- e) Write functions of coenzyme B<sub>12</sub>.
- f) Explain the function of yoghurt starter cultures.
- g) Explain the mode of action of streptomycin.
- h) Write the major reactions occurring during baking of wheat bread.
- i) List the applications of Acetic acid.

Q-3A Discuss the cultural and environmental factors governing the conidiogenesis and alkaloid production stages in saprophytic production of ergot alkaloids. 06

Q-3B Explain the deregulation of L lysine biosynthesis in L lysine overproducing mutants. 06

OR

List and describe the raw materials used in beer brewing. 06

Q-4A Explain the downstream processing in penicillin fermentation. 06

Q-4B What are amylases? Explain their functions and industrial applications. 06

OR

Explain the biochemistry of citric acid overproduction and discuss the role of trace metal ions. 06

Q-5A Explain any two microbial transformations of steroids which provide therapeutic benefits and explain the methods to enhance the efficiency of biotransformations. 06

Q-5B Describe the cultivation method for edible mushrooms and explain the beneficial effects of mushrooms on human health. 06

OR

Write in detail on microbial production of PHA. 06

Q-6A Describe the sources, properties and action of milk clotting enzymes in cheese production. 06

Q-6B Discuss the factors governing fermentative production of commercially important exopolysaccharides. 06

OR

Describe the metabolism and functions of bakers yeast in bread making. 06

54

[142/162/AS8/A62]

No. of Printed Pages : 2

M. Sc. THIRD SEMESTER  
MICROBIOLOGY / BIOTECHNOLOGY EXAMINATION

TUESDAY, DATE: 07-11-2017

PS03CMIC/BIT03 ENZYMOLOGY

TIME: 2:00 to 5:00 pm

MAX. MARKS: 70

- Q. 1 Choose the correct answer (08)
- Which of the statements regarding enzymes is false  
a) Enzymes are proteins that function as catalysts  
b) Enzymes may be used many times for a specific reaction  
c) Enzymes provide activation energy for reactions  
d) Enzymes are specific and enzyme activity can be regulated
  - E.C. 1.1.1.1 represents  
a) Invertase  
b) alcohol dehydrogenase  
c) lysozyme  
d) alkaline phosphatase
  - The number of times the rate of reaction increases in presence of enzyme than its absence is known as  
a) turnover number  
b) enzyme efficiency  
c) progress curve  
d) rate enhancement
  - Chymotrypsin is an example of  
a) acid base catalysis  
b) covalent catalysis  
c) sigmoidal kinetics  
d) electrostatic catalysis
  - Ribozymes are  
a) catalytic antibodies  
b) Ribonucleases  
c) allosteric enzymes  
d) RNA catalysts
  - Fold purification is  
a) Number of times the enzyme concentration increases  
b) Number of times the unit activity increases  
c) Number of times enzyme folds into active structure  
d) Number of times specific activity increases
  - Which of the following is incorrect about non competitive inhibition?  
a) Decrease in slope value  
b) Decrease in  $V_{max}$  value  
c) Increase in slope value  
d) Unchanged  $K_m$  value
  - Under the effect of increasing temperature the rate of enzyme reaction  
a) only increases  
b) increases then decreases  
c) only decreases  
d) increases then remains constant

(1)

(PT00)

Q-2 Attempt: (Any Seven)

[14]

- a. Define unit and specific activity
- b. What are cofactors and coenzymes?
- c. Draw Scatchard plot.
- d. What is  $K_{cat}/K_m$ ?
- e. Draw the Arrhenius plot.
- f. Write Adair's equation for a trimer
- g. Draw Gibbs free energy profile for an enzyme catalysed reaction
- h. What are pseudosingle substrate reactions?
- i. Write the Michaelis Menton assumption

- Q. 3 a) List techniques used for enzyme purification and explain methods based on solubility. (06)  
b) Write a note on: (any one) (06)  
i) IUBMB  
ii) Progress curve

- Q. 4 a) Derive an equation for noncompetitive inhibition (06)  
b) Explain various types of secondary plots used to determine  $K_i$  in reversible inhibitions (06)  
OR  
b) Explain various types of two substrate reaction mechanisms (06)

- Q. 5 a) Discuss ATCase to explain enzyme regulation. (06)  
b) Explain the catalytic triad of Chymotrypsin (06)  
OR  
b) Explain how D-E was established as the cleavage site of lysozyme action (06)

- Q. 6 a) Explain how enzymes can be used as analytical reagents (06)  
b) Write a note on: (any one) (06)  
i) Enzyme engineering  
ii) Ribozymes

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2

(168)

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

No. of Printed Pages : 2

SC

**Sardar Patel University**  
**M.Sc. III Semester Biotechnology**  
**PS03EBIT04 (Animal Biotechnology)**

Date: 09/14/17 (Thursday)

Max Marks: 70

Time: 2:00 – 5:00pm

**Q.1** Select the most appropriate answer from the following **1×8**

- I. The cytoskeleton involved in the formation of stress fiber is
  - a. Microfilament
  - b. Microtubule
  - c. Intermediate filament
  - d. Microtubule associated motor protein
  
- II. The MDCK is a .....cell line.
  - a. Kidney epithelial
  - b. Mouse embryonic lung fibroblast
  - c. Adult human lung
  - d. Human colon epithelial
  
- III. The media that does not require CO<sub>2</sub> during transportation of tissue is
  - a. DMEM
  - b. CMRL
  - c. L15
  - d. MB
  
- IV. The cells which are required to be placed at air-liquid inter phase during culture is
  - a. Hematopoietic cells
  - b. Adenocarcinoma cells
  - c. Growth factors
  - d. Pneumocytes
  
- V. Which of the following increases the viscosity?
  - a. PVP
  - b. CMC
  - c. Both A and B
  - d. None of the above
  
- VI. Ciprofloxacin used in animal tissue culture media act against
  - a. Bacteria
  - b. Viruses
  - c. Mycoplasma
  - d. Fungi
  
- VII. Excess CO<sub>2</sub> suppress cell growth and productivity by
  - a. inhibiting respiration
  - b. altering intracellular pH by diffusing across cell membrane
  - c. both (a) and (b)
  - d. altering pH of the medium
  
- VIII. Which of the following is correct
  - a. Serum never provides any mineral
  - b. Mycoplasma contamination are very easy to detect
  - c. Stem cells are independent of senescence
  - d. DMSO is not a preferred cryoprotactant

(P.T.O.)

①

- Q.2 Attempt any seven of the following and describe in brief 2×7
- I. Write the importance of **CO<sub>2</sub> incubator** in cell culture.
  - II. Define **conditioned medium** and write its composition as well as its significance in cell culture.
  - III. Write the importance of **micro-titration assay** for toxicological studies.
  - IV. Check points of the cell cycle
  - V. **Passaging** of animal cells.
  - VI. Pre-requisites for **primary cell culture**.
  - VII. **Genetic instability** in cell transformation.
  - VIII. **MACS**.
  - IX. Explain **stem cell niche** with appropriate examples.
- Q.3 A. Describe the development of a **cell line** from primary culture. 06  
 B. Write a note on **cell adhesive molecules**. 06
- OR
- B. Write notes on chemicals and their mode of action used for **sterilization** in animal tissue culture. 06
- Q.4 A. Give the details of composition of **serum** and write its importance in cell culture. 06  
 B. Write a note on the growth of cultured cells as **sigmoid curve**. 06
- OR
- B. Write a note on **complete media**. 06
- Q.5 A. Discuss different **methods for disaggregation** of tissue 06  
 B. Write different techniques used for identification of **apoptosis** in cell lines. Discuss the process of apoptosis in details. 06
- OR
- B. What are the different techniques involved in the **animal cell separation**. Explain **fluorescence activated cell sorter** in details. 06
- Q.6 A. Describe the culture protocol and characterization of any **stratified epithelia**. 06  
 B. What are **stem cells**? Discuss its therapeutic potential in details. 06
- OR
- B. Discuss the process and procedure of **nuclear transplantation** with suitable example. 06

ALL THE BEST

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 (3)