No. of Printed Pages: 3

[128]

SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR-388120.
M.Sc. (III SEM) Biochemistry PS03C BIC02 - Immunology
1Dec 2012, Saturday ,2.30p.m. to 5.30 p.m.

Total Marks: 70

Q I **(1x8=8)**

1. Class switching of immunoglobulins occurs

   A. Usually with booster immunizations, going from IgM to IgG
   B. binds complement
   C. mediates immunoglobulin class switching
   D. results in the glycosylation of immunoglobulins

2. The class of an immunoglobulin

   A. is determined by Class I and Class II major histocompatibility complex proteins
   B. is determined by the carbohydrate attached to the light chain is
   C. is determined by the heavy chain type
   D. Is determined by the all H , L and J-chain(If Present)

3. Each of the following is a characteristic of antibodies, EXCEPT which one?

   A. they are proteins with variable and constant regions
   B. they contain carbohydrates
   C. they are only secreted by T-cells
   D. they are structurally organized in globular domains

4. Which of the following is NOT true of interleukins?

   A. They are cytokines which can be produced by various cells of the immune system.
   B. They are hormones which allow one cell to communicate with another cell.
   C. They are in need of receptors on the target cell in order to mediate their effects.
   D. They are able bind antigen with a high level of specificity.

5. Individuals unable to make the J protein found in certain immunoglobulins would be expected to have frequent infections of the

   A. blood.
   B. lymphnode.
   C. pancreas.
   D. intestinal tract.

6. One principal function of complement is to

   A. inactivate perforins
   B. mediate the release of histamine
   C. Bind antibodies attached to cell surfaces and to lyse these cells
   D. phagocytize antigens

7. Which of the following statement regarding B Cell Hybridoma is true

   A. They are immortal cell lines that produce antibodies with more than one specificity

B. They are derived from B cells that are first cloned and grown in cell culture for short periods
C. They contain one nucleus
D. They are derived by fusing B cells with malignant plasma cells that are unable to secrete immunoglobulin.

8. The usual sequence of events in an allergic reaction is as follows

A. The allergen combines with circulating IgE; then the IgE –allergen complex binds to mast cells
B. The allergen binds to IgE fixed to Mast cells
C. The allergen is processed by APC and then binds to histamine receptors
D. The allergen is processed by APC and then bind to mast cell.

Q II Answer any seven questions **(2x7=14)**

1. Describe the manner in which virally infected cells are recognized and killed by the immune system.
2. What is the major role of C3b in innate immune response?
3. What is the major preformed mediator released by mast cells?
4. Discuss the importance of complement and antibody opsonization in the elimination of bacteria
5. What are natural killer cells? Explain their function
6. Explain the clonal selection theory of antibody diversity
7. Explain the oxygen dependent mechanism of phagocytosis
8. What are CDRs- explain
9. Explain the term hybridoma
10. Differentiate between precipitin and agglutination reaction

---

Q III
a. Summaries the various biological effects mediated by complement. (6)
b. Briefly describe the three major events in the inflammatory response (6)

OR

QIII Explain the structure of immunoglobulin with experimental support. Differentiate the structure and functions of IgG, IgM and IgA (12)

QIV Differentiate between Polyclonal and Monoclonal antibody. Write the details of methodology used to produce Monoclonal antibody (12)

OR

QIV Differentiate between central and peripheral tolerance. Explain the role of T cells in tolergenic and immunogenic response. (12)

QV List the various different means of antibody diversification have been identified in mice and human.Explain the mechanism of combinatorial V- (D)-J joining in detail. (12)

OR

QV Explain the term MHC. Give the structure and functions of Class I and II MHC and its products.(12)

QVI Write notes on any three (3x 4)

a. molecular mechanism of IgG-IgM switch
b. Role of T_H cells in humoral response
c. Mechanism of type I hypersensitivity
d. Consequences of immune dysfunction
e. functions of Dendritic cells

No. of Printed Pages: 3

[68]

SARDAR PATEL UNVERSITY

M.Sc., 1st Semester examination

Saturday, 1st December

10.30 a.m to 1.30 p.m

PS01CBIC02- Bioinstrumentation

Max.Marks 70

Q. 1. Choose the correct answer **(1x8=8)**

(i) Partition chromatography will have

a. liquid stationary phase
c. either liquid or solid stationary phase
b. solid stationary phase
d. none of the above

(ii) The wave length of fluorescent light is

a. longer than the incident light
c. same as the incident light
b. shorter than the incident light
d. none of the above

(iii) Resolution of microscope is limited by the

a. numerical aperture
c. both numerical aperture and wave length
b. wave length
d. none of the above

(iv) Flame ionization detector is a

a. non destructive detector
c. general purpose detector
b. destructive detector
d. both b and c

(v) In IR spectroscopy, water is not used as a solvent since

a. Water has two proton
c.Water is polar in nature
b. Water has a high dielectric constant
d. None of the above

(vi) In NMR spectroscopy the following sources of energy are used

a. magnetic and microwave
c. radiowave and microwave
b. magnetic and radiowave
d. visible and radiowave

(vii) In positron emission, the atomic number---------- and the mass number ----------

a. Reduces and remains same
c. increases and decreases
b. Both remain same
d. both decreasae

viii) Biosensors essentially contain

a. biocatalyst and transducer c. biocatalyst and an enzyme

b. transducers and a detector d. only biocatalysts

Q.2 Answer <u>any seven</u> : **(2x7=14)**

a. Define interference in microscopy

b. Define: tunneling current

c. Differentiate bonded phase and liquid-liquid chromatography

d. What is the function of riboflavin in photopolymerization of acrylamide gel?

e. What is meant by long pass filter?

f. Write any two desirable properties of radiation sources used in spectroscopy

g. Define 'Chemical shift"

h. What are 'parent ion and fragmentation ions"?

i. Define transducer. Give one example for a transducer

Q. 3. (a) Write a brief note on instrumentation of phase contrast microscope. **(06)**

(b) Explain the scanning modes in scanning tunneling microscope. **(06)**

OR

(b) Write a note on construction and function of electron gun. **(06)**

Q.4. (a) Explain the process of differential centrifugation. **(06)**

(b) Explain the principle and application of affinity chromatography. **(06)**

OR

(b) Write note on isoelectric focusing. **(06)**

Q.5. (a) List the methods for radioactive decay. Describe decay by alpha particle emission. **(06)**

(b) Write notes on

i) Photodiode array ii) Thermistor **(06)**

OR

b) Explain Peptide Mass Fingerprinting by Mass Spectroscopy. **(06)**

Q.6. (a) Describe 'Bragg's rule". What are the applications of X-ray diffraction analysis? **(06)**

(b) Explain the working of T-cell in ESR spectroscopy in detail. **(06)**

OR

(b) What are Biosensors? Explain the desirable properties and uses of biosensors. **(06)**

xxxxxxxxxxxx

(114) No. of Printed Pages: 03

SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR-388120.
M.Sc. (II Sem) Biochemistry
PS02C BIC03 – Enzymology
5 Dec 2012, Wednesday,2.30p.m. to 5.30 p.m.

Total Marks: 70

QI **(1x8)**

1. The active site of an enzyme
   a. remains rigid and does not change shape
   b. is found at the center of globular enzymes
   c. is complementary to the rest of the molecule
   d. contains amino acids without side chains

2. A competitive inhibitor of an enzyme is usually
   a. a highly reactive compound
   b. a metal ion such as Hg2+ or Pb2+
   c. structurally similar to the substrate
   d. a poison

3. An uncompetitive inhibitor of an enzyme catalyzed reaction
   a. binds to the Michaelis complex (ES).
   b. decreases Vmax.
   c. is without effect at saturating substrate concentration
   d. The first and second choices are both correct

4. Which statement about enzyme catalyzed reactions is NOT true?
   a. enzymes form complexes with their substrates.
   b. enzymes lower the activation energy for chemical reactions
   c. enzymes change the K eq for chemical reactions
   d. many enzymes change shape slightly when substrate binds

5. Unit of enzyme activity is :
   a. µg of product/min
   b. µg of product/ml of substrate/min
   c. µmoles of product/ml of substrate/min
   d. µmoles of product/ml of enzyme/min

6. Which of the following is Eadie-Hofstee equation :
   a. 1/v = km/[S]. 1/Vmax + 1/Vmax
   b. [S]/v = [S]/Vmax + km/Vmax
   c. v/[S] = Vmax/km – v/km
   d. v= Vmax[S]/ k+ [S]

7. The aim of a purification procedure is to obtain enzyme of :
   a. Maximum stability
   b. Maximum possible purity
   c. Maximum catalytic activity
   d. all the three

8. km is expressed in units of concentration :
   a. µmoles/ml
   b. mol/dm3
   c. µmoles/mg
   d. µmolesdm-3

QII Answer any seven questions from the following (2x7 =14)

a. What is active site and catalytic site of enzyme?
b. Define Michelis Menton constant
c. Major difference of competitive and non competitive inhibition
d. What is IpH of amino acid and protein
e. Differentiate the MM curve of nonregulatory enzyme from allosterically regulatory enzyme
f. Define specific activity of enzyme and its application
g. How do you differentiate the monomeric enzyme from homomultimeric enzyme
h. Define abzymes
i. Coupled enzyme assays

QIII Explain (2x6)

a. Factors effecting catalytic efficiency of enzyme.
b. Coordinated activation of pancreatic proteases

OR

b.Give a brief account on methods used in molecular weight determination of proteins in native and denatured proteins (6)

QIV

Short notes on : (Any three) (4x3)

a. enzyme assay
b. Isoenzyme
c. Factors effecting mechanism of enzyme action
d. Site directed mutagenesis
e. Microenvironment of immobilized enzyme
f. MWC model of enzyme regulation

QV

a. How do you distinguish ternary complex mechanism from ping pong mechanism of two substrate reaction (6)

b. An enzyme preparation containing 6000 units are required for a reaction system. How much weight of its partially purified enzyme with specific activity 32 will be required for the reaction system. (6)

OR

b.Why NADP+ cannot replace NAD+ for LDH reaction (6)

QVI

With suitable example for each case discuss any two (2x6)

a. Concerted acid base catalysis
b. Covalent catalysis
c. Metal ion catalysis
