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SARDAR PATEL UNIVERSITY
M.Sc. (II-SEMESTER) Examination (CBCS)
FRIDAY, 20th April, 2018
2:00 to 5:00 pm
M.Sc. Biochemistry
PS02EBIC22: MEDICAL BIOCHEMISTRY

TOTAL MARKS: 70

Q.1 Tick mark / select the correct answer for the following. (*Only correct option against given question number needs to be written in provided answer book*) **(08 Marks)**

1. Most circulating T3 and T4 is bound to
   a. Thyroxine binding globulin (TBG)
   b. Thyroxine binding prealbumin (TBPA)
   c. Gamma globulin
   d. Thyroglobulin

2. Which of the following LDH exhibits fastest electrophoretic mobility at pH 8.6?
   a. LDH 1
   b. LDH 3
   c. LDH 2
   d. LDH 4

3. Crigler-Najjar Syndrome is the inherited metabolic disorder of Bilirubin metabolism sue to defective enzyme
   a. Heme oxygenase
   b. UDP-Glucouronyl transferase
   c. Biliverdin reductase
   d. Beta - glucuronisase

4. One of the following is the principle secretion of the parietal cells of the stomach
   a. Mucous
   b. Hcl
   c. Gastrin
   d. Trypsin

5. Angina Pectoris refers to:
   a. Severe headache, usually due to decreased blood flow to the brain
   b. Severe headache, usually due to increased blood flow to the brain
   c. Chest pain or pressure, usually due to decreased blood flow to the heart muscle.
   d. Chest pain or pressure, usually due to increased blood flow to the heart muscle.

6. Parkinson's disease is marked by the shortage of one of the following neurotransmitters.
   a. Serotonin
   b. GABA
   c. Dopamine
   d. Norepinephrine

7. Which of the following pairs is not correctly matched?
   a. Vitamin C – Scurvy
   b. Vitamin $B_2$ – Pellagra
   c. Vitamin D – Rickets
   d. Vitamin $B_6$ – beriberi

8. An individual who has been exposed to and harbors a pathogen but has not become ill or shown any of the symptoms of the disease is called:
   a. Healthy carrier
   b. Passive carrier
   c. Convalescent carrier
   d. Temporary carrier

(P. T. O.)

Q.2 Answer **any seven** from the following: 14

a) Enlist serum enzyme for malignancies. Give the site, normal value and clinical importance of β-glucuronidase.

b) What is Haemoglobinopathies? Explain biochemical mechanism of sickle cell anaemia in brief.

c) Write about Van den Bergh Test for Bilirubin estimation.

d) Give an account on: Fractional Test Meal for gastric analysis.

e) Write down body distribution of phosphorus and enlist the causes of Hyperphosphatemia.

f) Enlist the fat soluble vitamins. Discuss the dietary source and importance of retinol.

g) What are atypical CPK isoenzymes?

h) Explain the term 'stroke' and enlist the risk factors associated with stroke.

i) Define hypertension. What is difference between of diastolic and systolic blood pressure?

Q.3 (A) List clinically important Isoenzymes. Add a note on properties, structure and clinical significance of LDH isoenzymes in detail. 6

(B) Explain the terms hypocalcaemia and hypocalcaemia. Explain how vitamin D and parathyroid gland regulates blood calcium levels. 6

OR

(B) Give a brief overview on serum enzyme that act as biomarkers of cardiac disease. 6

Q.4 (A) List the various kidney function tests and explain in detail the renal function tests based on Glomerular Filtration Rate (GFR). 6

(B) What is hyperbilirubinemias? Discuss the clinical features of various types of Jaundice in detail. 6

OR

(B) Write short note on Liver Function Tests 6

Q.5 (A) Write short note on **any one** of the following (i) Mechanism for development of atherosclerosis with various risk factors. (ii) Medical biochemistry of hypertension 6

(B) Name any three neurological disorders. Explain the different types of epilepsy and its mechanisms. 6

OR

(B) What are oncogenes? Discuss the role of various oncogenes in the development of cancer with special emphasis on the role of viral oncogenes. 6

Q.6 (A) Describe the structure and life cycle of HIV. 6

(B) Give a detailed account on transmission and pathogenesis of pulmonary TB. 6

OR

(B) Enlist host microbes interactions and explain any two interactions in human host. 6

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# SARDAR PATEL UNIVERSITY

## M.Sc. (I Semester) Biochemistry Examination

## 24th October, 2018 (Wednesday)

**Paper: PS01CBIC02- BIOINSTRUMENTATION**

**TIME- 10.00 AM - 01.00 PM**

**TOTAL MARKS: 70**

**Q-1 Choose the most appropriate answer:** **(8)**

1. Which of the following microscopy is best suited to observe cellular organelles?
   (a) SEM (b) STM
   (c) TEM (d) Phase contrast

2. The process in which radioisotopes emit radiations and particles is known as
   (a) emission (b) radioactive decay (c) absorption (d) none of these

3. In equation, $G = \omega^2 r$, $\omega$ denotes
   (a) angular velocity (b) radial distance (c) centrifugal force (d) none

4. A device that converts one form of energy into another form is called
   (a) Transducer (b) converter (c) emitter (d) all of these

5. The most sensitive method for measurement of alpha particle emitters is_____
   (a) Autoradiography (b) solid scintillation counting
   (c) Liquid scintillation counting (d) Geiger Muller Counters

6. For UV Spectrophotometer, only quartz cuvette is to be used because __
   (a) Quartz is unbreakable (b) Quartz is transparent to UV
   (c) Quartz is opaque to UV radiation (d) Quartz is cheaper than glass

7. Which of the following techniques may be employed for determination of functional groups of a molecule?
   (a) NMR (b) UV - visible (c) IEF (d) IR spectroscopy

8. Which of the following form of sample is suitable for X-ray diffraction studies?
   (a) liquid (b) solid (c) gaseous (d) crystalline

(P.T.O.)

**Q-2 Answer in Brief: (Any Seven)** (14)

1. Define interference
2. What is chromatic aberration?
3. Applications of TLC
4. Precautions to be taken in centrifugation
5. Chemical shift and its significance in NMR spectroscopy
6. Mid IR spectroscopy
7. Total consumption burner of AAS.
8. Principle of Mass Spectroscopy
9. Cerenkov radiation

**Q-3** (A) Explain the role of filters in fluorescence microscope. (06)

(B) Write a note on bright field microscopy (06)

**OR**

(B) Give an account of various sources of illumination used in light microscopes. (06)

**Q-4** (A) Describe the principle and applications of SDS PAGE. (06)

(B) Explain the principle and applications of centrifugation. (06)

**OR**

(B) Write a note on the principle and advantages of gas chromatography. (06)

**Q-5** (A) Explain the basic theory of IR spectroscopy. What are its limitations? (06)

(B) Write a note on chemical shift in NMR spectroscopy. (06)

**OR**

(B) Write a note on:
(i) Photomultiplier tubes (ii) Deuterium discharge lamp (06)

**Q-6** (A) Explain the principle of Mass Spectroscopy. What are its applications? (06)

(B) Write a note on the desirable properties of Biosensors. (06)

**OR**

(B) Write a note on the sample positioning methods for Autoradiography. (06)

—X—

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# SARDAR PATEL UNIVERSITY

**M. Sc. (II Semester) Biochemistry (under CBCS) Examination**
**Friday, 13th April 2018**
**Time: 2.00 p.m. to 5.00 p.m.**
**Paper: PS02CBIC03 (Enzymology)**

**Total Marks: 70**

**N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.**
**(ii) Figures in the right indicate marks.**

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

1. The enzymes
   (a) increase total energy of activation
   (b) decrease total energy of activation
   (c) increase total energy of the product
   (d) increase the equilibrium constant

2. In competitive inhibition
   (a) Km is increased and Vmax is increased
   (b) Km is decreased and Vmax is normal
   (c) Km is increased and Vmax is normal
   (d) Km is decreased and Vmax is increased

3. Allosteric enzymes show all the following characteristics except,
   (a) Sigmoid kinetics
   (b) binding between substrate and regulatory sites
   (c) Cooperative binding of the substrate
   (d) Substrate binding sites and regulatory sites are different

4. Which of the following is protease inhibitor?
   (a) Di-isopropyl flurophosphate
   (b) Phenyl methanesulfonyl fluoride
   (c) N-4-toluenesulfonyl- L- phenylalanine chloromethyl ketone
   (d) All of the above

5. An example of competitive inhibition of an enzyme is the inhibition of
   (a) succinic dehydrogenase by malonic acid
   (b) cytochrome oxidase by cyanide
   (c) hexokinase by glucose-6-phosphate
   (d) carbonic anhydrase by carbon dioxide

6. Fractional precipitation of one enzyme requires addition of 2.5 to 3.5 mM salt. Which of the following salts would you choose?
   (a) silver chloride, AgCl
   (b) ammonium sulfate, (NH4)2SO4
   (c) ammonium perchlorate, NH4ClO4
   (d) guanidinium chloride, CN3H6Cl

7. The process by which a substrate binds to an active site and alters the shape of the active site is
   (a) induced fit hypothesis
   (b) allosteric enzyme modeling
   (c) enzyme engineering
   (d) none of the above

8. A non-protein, organic molecule covalently bound to the active site, required to catalyze a reaction is termed as
   (a) Cofactor
   (b) prosthetic group
   (c) apoenzyme
   (d) Coenzyme

(P.T.O.)

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

1. Differentiate between cofactor and coenzyme.
2. Differentiate between unit activity and specific activity.
3. Differentiate between monomeric and oligomeric enzymes.
4. Give examples of any four allosteric enzymes.
5. Give examples (names) of any two enzymes present in nucleus of a cell.
6. Why the enzymes have fragile structure?
7. Define Salting in and salting out of proteins.
8. What are ribozymes? Give example/s.
9. Give two examples of anion exchangers and two examples of cation exchangers used in ion exchange chromatography.

**Q3.** (a) Using a flowchart, explain the steps involved in purification of an enzyme and list principle separation methods used in purification of enzymes. (6)

(b) Explain any one method of homogenization of animal and plant tissue used for isolation of enzymes. (6)

OR

(b) Explain the specificity of enzymes by giving examples. (6)

**Q4.** (a) Derive MM equation for single substrate reaction and explain its significance. (6)

(b) Explain the kinetics of reversible enzyme inhibition. (6)

OR

(b) Derive an equation for non-competitive inhibition (6)

**Q5.** (a) Explain in detail the mechanism of action of chymotrypsin. (6)

(b) Explain kinetic behaviour and physiological importance of allosteric enzymes by giving suitable example/s. (6)

OR

(b) What is catalytic efficiency? Explain factors associated with the catalytic efficiency of an enzyme. (6)

**Q.6** (a) Give examples and explain the regulatory enzymes that are activated by irreversible and reversible covalent modification of a specific functional group. (6)

(b) Explain Enzyme engineering and its applications. (6)

OR

(b) Give example and explain enzyme repression, induction and degradation for control. (6)