

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 8356

C

Roll No.....

Unique Paper Code : 223551

Name of the Paper : LSPT-510 : BIOCHEMISTRY AND IMMUNOLOGY

Name of the Course : B.Sc. LIFE SCIENCES

Semester : V

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Instructions for the Candidates :

Answer six questions in all.

Section A: Answer three questions including Q.No. **1** which is compulsory.
Write structural formulae where specified.

Section B: Answer three questions including Q.No. **5** which is compulsory.

SECTION A - BIOCHEMISTRY

1. a. Define:

i. Anaplerotic reaction

ii. Regulatory enzyme

2

b. Differentiate between the following:

i. Glucokinase and Hexokinase

ii. Oxidative phosphorylation and Substrate level phosphorylation

4

c. Comment on the importance of the following:

i. Reduced NADP

ii. Thioester group

2

d. Identify and draw the structural formulae of:

i. A 3-C amino acid which is a precursor in gluconeogenesis.

P.T.O.

- ii. A 4-C dicarboxylic acid having a keto group which is regenerated in the TCA cycle 2
- e. Fill in the blanks with the most appropriate word:
- i. NADH dehydrogenase is referred to as _____ in the electron transport chain.
 - ii. The action of epinephrine in glycogenolysis requires _____ as a second messenger.
 - iii. Glucose 6-phosphatase is _____ in the muscle.
 - iv. Pyridoxal phosphate is a carrier of an _____ group. 4
2. i. Give any *three* reactions catalysed by dehydrogenases in the TCA cycle (use structural formulae) and comment on their significance.
- ii. What are the factors that regulate the cycle?
- iii. Explain the function of transaminases in the catabolism of amino acids. 4,4,4
3. i. Explain the chemiosmotic theory of oxidative phosphorylation.
- ii. Elucidate the Michaelis-Menten kinetics for a one enzyme-one substrate reaction. 6,6
4. Write short notes on any **three** of the following:
- i. Action of glycogen synthase
 - ii. Malate shuttle
 - iii. Oxidative deamination of glutamate (use structural formulae)
 - iv. Role of dehydrogenases in the β -oxidation of palmitic acid (use structural formulae). 4,4,4

SECTION B - IMMUNOLOGY

5. a. Define:
- i. Epitope
 - ii. Anaphylatoxin
- 2
- b. Differentiate between the following:
- i. Lymphocytes and Granulocytes
 - ii. MHC Class I and MHC Class II molecules
- 4
- c. Expand the following:
- i. TCR
 - ii. PAMP
 - iii. ADCC
 - iv. Fc region
- 2
- d. Fill in the blanks with the most appropriate word:
- i. A weak immunogen can evoke a strong immune response if conjugated with a suitable _____.
 - ii. Vaccination induces _____ immunity.
 - iii. Elvin Kabat is associated with the discovery of _____.
 - iv. Histamine is released by _____ cells.
 - v. Exogenous antigens are processed by the _____ pathway.
- 5
6. ii. Give an account of the processing of endogenous antigens and their presentation by cells expressing class I MHC molecules.
- 5,7
7. i. Draw a well-labeled, schematic diagram of an antibody.
- ii. Distinguish between monoclonal and polyclonal antibodies.
 - iii. Outline the technique for production of monoclonal antibodies.
- 4,2,6

8. Write short notes on any **three** of the following:

- i. Dendritic cells
- ii. Thymus
- iii. Primary and secondary immune response
- iv. Vaccines

4,4,4