This question paper contains 4 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **90**

Unique Paper Code : **223551** **G**

Name of the Paper : **LSPT-510 : Biochemistry and Immunology**

Name of the Course : **B.Sc. (Prog.) Life Sciences**

Semester : **V**

Duration : **3 Hours** Maximum Marks : **75**

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

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*) Differentiate between the following : 4

   (*i*) Reversible and irreversible enzyme inhibition.

   (*ii*) Oxidative decarboxylation and Oxidative Deamination.

   (*b*) Define : 2

   (*i*) Transamination

   (*ii*) Coenzyme.

   (*c*) State the functions of : 2

   (*i*) Aldolase

   (*ii*) Glucose-6-phosphatase.

P.T.O.

(*d*) Name and draw the structural formulae of the following : 2

(*i*) A disaccharide having glucose and fructose as their units.

(*ii*) A four carbon dicarboxylic acid which is a initiator of TCA cycle.

(*e*) Give the reactions involving the following enzymes : 2

(*i*) Pyruvate kinase

(*ii*) α-Ketoglutarate dehydrogenase.

(*f*) Mention the contributions of the following scientists : 2

(*i*) Eugene Knoop

(*ii*) Koshland.

2. (*a*) List the key enzymes of gluconeogenesis and explain how they help to by-pass the irreversible steps of glycolysis. 6

(*b*) Describe the process of glycogenolysis. How is it regulated ? 6

3. (*a*) Give reactions carried out by dehydrogenases in the process of β-oxidation of fatty acids. 6

(*b*) What are enzymes ? Explain the mechanism of enzyme action. 4

(*c*) What is the relation between $V_{max}$ and $K_m$ ? Discuss it briefly. 2

4. Write short notes on any *three* of the following : 3×4=12

(*i*) Electron transport chain

(*ii*) HMP pathway

(*iii*) Enzyme inhibition and its significance.

(*iv*) Urea cycle.

## Section B

## (Immunology)

1. (*a*) Expand : 3

(*i*) APC

(*ii*) CD

(*iii*) PAMP

(*iv*) HLA

(*v*) TCR

(*vi*) MALT.

(*b*) Define : 4

(*i*) Epitope

(*ii*) MHC restriction

(*iii*) Anaphylatoxin

(*iv*) Adjuvant.

(*c*) Differentiate between : 3

(*i*) Primary and Secondary lymphoid organs

(*ii*) Innate and Acquired immunity

(*iii*) Active and Passive immunity.

(*d*) Write the contribution of these scientists : 3

(*i*) Edward Jenner

(*ii*) Kohler and Milstein

(*iii*) Carl Landsteiner.

2. (*a*) Draw a typical IgG molecule showing antigen binding and cell binding domains. Also show the site of Pepsin and Papain digestion and describe the products formed. 8

(*b*) Describe the primary and secondary humoral response to an antigenic stimulus. 4

3. (*a*) How are exogenous and endogenous antigens processed and presented ? 8

(*b*) Differentiate between Class I and Class II MHC molecules on the basis of their structure. 4

4. Write short notes on any *three* of the following : 3×4=12

(*i*) New approaches in Vaccine Design

(*ii*) Hybridoma technology

(*iii*) Properties of Antigens

(*iv*) Cell Mediated Immunity.