B-1603220001010400 Seat No. _____

B. Sc. (Sem. I) (W.E.F. 2019) Examination

March - 2021

BI-104 : Bioinformatics

(Fundamentals of Biochemistry & Biophysics)

(New Course)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Attempt any five questions.
(2) The right-side figure indicates total marks of the question.

1 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) A water strider can walk across the surface of a small pond which of the effects is produced by water?

(2) The pH of a solution is determined by _____ concentration.

(3) Is DNA composed of repeating units of deoxyribonucleosides or deoxyribonucleotides?

(4) How many pyrimidine bases are in GATCAATGC nucleotide sequence?

(b) What is pH Scale? **2**

(c) Discuss structure of water molecules **3**

(d) Explain non- covalent bonds/interactions: electrostatic (ionization), hydrogen bond, non-polar interaction (hydrophobic interaction), Vander Walls interaction, dipolar interaction. **5**

2 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) Water is a nonpolar solvent. (True/False)

(2) The pH of a solution is determined by _____ ion concentration.

(3) Standard conditions pure water are correctly represented by _____ pH and _____ temperature ^{o}C.

(4) Which type of bond occurs oppositely charged ions attraction?

(b) Discuss structure of atom. **2**

(c) What is Importance of water on the earth? 3

(d) What is Covalent bond? Explain Covalent bond in biomolecules: phosphodiester bond, glycosidic bond, peptide bond, disulphide bond. **5**

3 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) Which vitamins helpful for coagulation of blood?

(2) Fat soluble Vitamins are _____.

(3) Retinol is the scientific name of which Vitamin?

(4) Niacin is the chemical name of which Vitamin?

(b) What is Free energy? **2**

(c) Write source, function, deficiency/disorders of Vitamin C. **3**

(d) Discuss in detail Fat-soluble vitamins. **5**

4 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) What does the first law of thermodynamics state?

(2) Sources of Vitamin C?

(3) Liver damage is caused due to the overdose of which Vitamin?

(4) The study of energy relationships and conversions in biological systems is called _

(b) Explain Enthalpy. **2**

(c) Write source, function, deficiency/disorders of Vitamin B_{12}. **3**

(d) Write a note on Water-soluble vitamins. **5**

5 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(l) Non-protein part of an enzyme is called _____.

(2) Enzyme term is given by _____.

(3) The Michaelis-Menton equation relates the rate of an enzyme-catalysed reaction to Substrate concentration. (True or False)

(4) Which enzyme hydrolyses starch to maltose?

(b) What are Active sites of enzymes ? **2**

(c) Discuss any one Mechanism of enzyme action. **3**

(d) Explain inhibition: competitive and non-competitive inhibition. **5**

6 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) Enzymes are made up of _____.

(2) Enzymes are polymers of _____.

(3) The enzyme which hydrolyses starch to maltose is _____.

(4) Name the enzyme secreted by pancreas.

(b) Write different components of enzyme. **2**

(c) Discuss in detail Effects of temperature & pH on enzyme activity. **3**

(d) Explain M. M. Equation along with Line-Weaver Burk Equation. Write the significance of Km and Vmax. **5**

7 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) The five-member ring structure of monosaccharides are called as _____.

(2) D-Glucose and D mannose are epimer (True or False)

(3) The number of molecules of ATP produced by the total oxidation of acetyl CoA in the TCA cycle is _____.

(4) Six-member ring structure of monosaccharides are called as _____.

(b) Draw the structure of glucose. **2**

(c) Discuss functions of lipid. **3**

(d) Write a detailed note on Krebs cycle. **5**

8 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) Fatty acids are amphipathic bv nature. (True/False)

(2) Name the two essential fatty acids?

(3) Name the reagent which is used in Saponification?

(4) Two sugars which differ from one another only in configuration around a single carbon atom are termed as _____.

(b) Explain Mutarotation. **2**

(c) Discuss various types of fatty acids. **3**

(d) Discuss in detail EMP Pathway. **5**

9 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) The sugar in RNA is _____, the sugar in DNA is _____.

(2) Which type of RNA is the smallest?

(3) Amino acids are Joined by _____ bond.

(4) Nucleotide bases and aromatic amino acids absorb light respectively at _____ nm and _____ nm.

(b) What are Pyrimidines? **2**

(c) Explain urea cycle. **3**

(d) How Protein Primary Structure is Determination? Discuss any one method in detail. **5**

10 The following questions : **14**

(a) Attempt the following : (ALL COMPULSORY) **4**

(1) The length of one turn of DNA is _____ A°.

(2) The secondary structure of the protein is primarily maintained by _____ bond.

(3) What term is used to describe the process by which DNA is copied to produce two daughter DNA molecules?

(4) What term is used to describe the technique of transfer of genetic material from one to another bacteria using a cloning vector?

(b) Enlist various functions of Protein. **2**

(c) Differentiate between DNA and RNA. **3**

(d) Explain four structures of proteins. **5**