Printed Page:- Subject Code:- ABT0301

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: III - THEORY EXAMINATION (2021 - 2022) (ONLINE)

Subject: Biochemistry

Time: 02:00 Hours Max. Marks: 100

General Instructions:

1. *All questions are compulsory. It comprises of two Sections A and B.*

- *Section A - Question No- 1 has 35 objective type questions carrying 2 marks each.*
- *Section B - Question No- 2 has 12 subjective type questions carrying 3 marks each. You have to attempt any 10 out of 12 question.*
- *No sheet should be left blank. Any written material after a Blank sheet will not be evaluated/checked.*

SECTION A 35 x 2 = 70

1. Attempt ALL parts:-

1.1.a Which of the following is an example of a natural buffer? (CO1) 1

(a) Blood
(b) Water
(c) Acetic acid
(d) Ammonium

1.1.b Water has maximum density at 1

(a) 0 degree C
(b) 4 degree C
(c) 37 degree C
(d) 100 degree C

1.1.c Who had invented the pH Scale? 1

(a) S.P.L Sorenson
(b) Benjamin Franklin
(c) Henry Moseley
(d) Wilhelm Rontgen

1.1.d In which of the following field pH scale is important for measurements? 1

(a) Medicine
(b) Forestry
(c) Food Science
(d) All of the above

1.1.e The H-O-H bond angle in water molecule is 1

(a) 104 degree C
(b) 104.5 degree C
(c) 105.0 degree C
(d) 105.5 degree C

1.1.f Which of the following could be added to a solution of sodium acetate to produce a buffer? 1

(a) Acetic acid
(b) Hydrochloric acid
(c) Potassium acetate

(d) Sodium citrate

1.1.g The pH of the body fluids is stabilized by buffer systems. Which of the following compounds is the most effective buffer system at physiological pH ? 1

(a) Bicarbonate buffer
(b) Phosphate buffer
(c) Protein buffer
(d) All of the above

1.2.a Which enzyme catalyzes the conversion of pyruvate to oxaloacetate? 1

(a) Pyruvate carboxylase
(b) Pyruvate dehydrogenase
(c) Pyruvate kinase
(d) Phosphofructokinase-1

1.2.b Oxaloacetate is reduced to malate by which enzyme? 1

(a) Pyruvate carboxylase
(b) Malate dehydrogenase
(c) Pyruvate kinase
(d) Phosphofructokinase-1

1.2.c Which of the following organisms cannot convert acetyl-coA derived from fatty acids into glucose? 1

(a) Animals
(b) Plants
(c) Bacteria
(d) Fungus

1.2.d What is the main source of glucose carbons for gluconeogenesis? 1

(a) Guanine
(b) Alanine
(c) Cysteine
(d) Threonine

1.2.e Your patient has been walking and begins to sprint. All of the following changes would occur EXCEPT 1

(a) A. ATP hydrolysis by muscle and ATP synthesis by ATP synthase would increase
(b) A. ADP concentrations would increase and glycolysis would be activated
(c) A. Pyruvate oxidation by the pyruvate dehydrogenase complex would increase
(d) A. Acetyl CoA oxidation by the TCA cycle would decrease

1.2.f NADPH is used by most cells as 1

(a) A. A substrate for the electron transport chain
(b) A. To produce ribose-5-P from glyceraldehyde-3-P and fructose-6-P
(c) A. A reducing agent in detoxification reactions
(d) A. An oxidizing agent in reductive biosynthesis

1.2.g Oxidation of a molecule involves? 1

(a) gain of electrons
(b) loss of electrons
(c) gain of proton
(d) loss of proton

1.3.a The triglycerides of which of the following saturated fatty acids are not present in oils and fats? 1

(a) Palmitic acid

(b) Acetic acid
(c) Stearic acid
(d) Cerotic acid

1.3.b Naturally occurring fatty acids have 1

(a) Even number of carbons
(b) Odd number of carbons
(c) 1 carbon
(d) 0 carbon

1.3.c The free fatty acids are transported by blood associated with 1

(a) β -lipoprotein
(b) a fatty acid-binding protein
(c) albumin
(d) none of the above

1.3.d Which one of the following is an essential fatty acid? 1

(a) Linolenic acid
(b) Palmitic acid
(c) Linoleic acid
(d) both a and c

1.3.e Which are essential for the proper functioning of certain enzymes? 1

(a) Prosthetic group
(b) Functional groups
(c) Molecules
(d) none of the above

1.3.f Another source of electrons for the transport chain is? 1

(a) NAD
(b) NADH2
(c) FADH2
(d) FAD

1.3.g In what compartment does the de novo fatty acid synthesis occur? 1

(a) Mitochondria
(b) Cytosol
(c) Insulin
(d) Collagen

1.4.a Which of the following essential amino acids is not synthesized by the body? 1

(a) Arginine
(b) Glutamine
(c) Histidine
(d) Proline

1.4.b Out of these, which one is the non essential amino acid? 1

(a) Lysine
(b) Threonine
(c) Serine
(d) Histidine

1.4.c Which of the following is an essential amino acid? 1

(a) Cysteine
(b) Asparagine

(c) Glutamine

(d) Phenylalanine

1.4.d Among the 20 standard proteins which coding amino acids, which of the following occurs the least number of times in proteins? 1

(a) Glycine

(b) Alanine

(c) Tryptophan

(d) Methionine

1.4.e Which of these is the first amino acid in a polypeptide chain? 1

(a) Serine

(b) Valine

(c) Alanine

(d) Methionine

1.4.f Out of theses, the acidic amino acids are- 1

(a) Arginine and glutamate

(b) Aspartate and asparagine

(c) Aspartate and lysine

(d) Aspartate and glutamate

1.4.g The simplest amino acid is 1

(a) Glycine

(b) Alanine

(c) Asparagine

(d) Tyrosine

1.5.a Which of the following is true about phosphodiester linkage? 1

(a) 5’-phosphate group of one nucleotide unit is joined to the 3’-hydroxyl group of the next nucleotide

(b) 3’-phosphate group of one nucleotide unit is joined to the 5’-hydroxyl group of the next nucleotide

(c) 5’-phosphate group of one nucleotide unit is joined to the 5’-hydroxyl group of the next nucleotide

(d) 1.3’-phosphate group of one nucleotide unit is joined to the 3’-hydroxyl group of the next nucleotide

1.5.b Building blocks of nucleic acids are 1

(a) Nucleotides

(b) Nucleosides

(c) Amino acids

(d) Histones

1.5.c Number of hydrogen bonds between adenine and thymine? 1

(a) 1

(b) 2

(c) 3

(d) 4

1.5.d Which ratio is constant for DNA? 1

(a) A + G / T + C

(b) A + T / G + C

(c) A + C / U + G

(d) A + U / G + C

1.5.e According to Chargaff's rule, in a DNA molecule 1

(a) The amount of adenine and thymine is equal to the amount of guanine and cytosine
(b) The amount of adenine and guanine is equal to the amount of thymine and cytosine
(c) The amount of adenine and uracil is equal to the amount of guanine and cytosine
(d) The amount of adenine and guanine is equal to the amount of uracil and cyt

1.5.f Group of adjacent nucleotides are joined by 1

(a) Phosphodiester bond
(b) Peptide bond
(c) Ionic bond
(d) Covalent bond

1.5.g What is the composition of nucleoside? 1

(a) a sugar + a phosphate
(b) a base + a sugar
(c) a base + a phosphate
(d) a base + a sugar + phosphate

SECTION B 10 X 3 = 30

2. Answer any TEN of the following:-

2.1.a What are hydrogen bonds? 2

2.1.b Differentiate between covalent and non covalent interaction? 2

2.2.a What is the difference between glycolysis and gluconeogenesis? 2

2.2.b What do you understand by epimers? Explain with suitable example? 2

2.2.c How will you characterize Type 1 and Type 2 Diabetes Mellitus? Mention the test used to diagnose diabetes? 2

2.3.a What are two kinds of protein quartenary structure? 2

2.3.b What is Ramachandran plot? 2

2.3.c What are the physical properties of fatty acids? 2

2.4.a What do you mean by pka value of amino acids? 2

2.4.b Give example of positive and negative charged amino acids? 2

2.5.a What holds one strand against the other in the double helix? How do cells make accurate copies of DNA? 2

2.5.b When do cells duplicate their DNA? 2