Printed Page:- **Subject Code:- AMTBT0101**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: I - THEORY EXAMINATION (2022 - 2023)

Subject: Applied Biochemistry & Molecular Biology

Time: 3 Hours **Max. Marks: 70**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **15**

1. Attempt all parts:-

1-a. Which of the following glucose transporters are important in fructose transport in the intestine? (CO1) 1

(a) GLUT5

(b) GLUT3

(c) GLUT4

(d) GLUT7

1-b. Which of the following hormones decreases blood glucose and increases the uptake of glucose in various tissues like skeletal muscle, adipose tissues? (CO2) 1

(a) Insulin

(b) Cortisol

(c) Glucagon

(d) Epinephrine

1-c. The main difference between nucleotide excision repair (NER) and base excision repair (BER) is: (CO3) 1

(a) In NER double strand breaks are repaired where as in BER single strand

breaks repaired

(b) NER is a light dependent reaction whereas BER is light independent process

(c) In NER phosphodiester backbone is first cleaved where as in BER phosphodiester backbone is cleaved later

(d) All of these

1-d. DNA polymerase enzyme involved in base excision repair mechanism is _____. (CO4) 1

(a) Pol-α

(b) Pol-β

(c) Pol-γ

(d) Pol-δ

1-e. The genetic code is a triple nucleotide sequence in the mRNA that determines the amino acid sequence of the protein. Following are the characteristics of amino acid EXCEPT: (CO5) 1

(a) Specificity

(b) Universal

(c) Redundant

(d) Overlapping

2. Attempt all parts:-

2.a. What are monosaccharides, oligosaccharides and polysaccharides? (CO1) 2

2.b. What is the definition of bioenergetics? (CO2) 2

2.c. What are the two phases of glycolysis? (CO3) 2

2.d. Differentiate between leading strand and lagging strands. (CO4) 2

2.e. What are transposons in genetics? (CO5) 2

SECTION B **20**

3. Answer any <u>five</u> of the following:-

3-a. Describe three reactions in which triglycerides are reactants. (CO1) 4

3-b. Distinguish glycerophospholipids from sphingophospholipids. (CO1) 4

3-c. How do you find the free energy of ATP hydrolysis? (CO2) 4

3-d. If a chemical reaction could occur without an enzyme, provide the reasoning to explain why it is important to have an enzyme to catalyze that reaction. (CO2) 4

3.e. What is the difference between oxidative phosphorylation and electron 4

transport chain? (CO3)

3.f. Understand and explain translation and define the term “codon.” (CO4) 4

3.g. What is the lac operon and how does it work? (CO5) 4

SECTION C **35**

4. Answer any <u>one</u> of the following:-

4-a. Explain how aspirin, ibuprofen, and acetaminophen work to reduce fever, swelling, and pain. (CO1) 7

4-b. Classify aminoacids in various ways with suitable examples. (CO1) 7

5. Answer any <u>one</u> of the following:-

5-a. Draw a diagram that shows the metabolic connections between catabolism and anabolism. Do your best at identifying the main substrates and products of each metabolic component. (CO2) 7

5-b. Explain the creatine kinase shuttle and provide some insight into why this is so important for understanding free energy transfer within a cell during metabolic stress. (CO2) 7

6. Answer any <u>one</u> of the following:-

6-a. Name the products formed during the digestion of polysaccharides, triglycerides, and proteins, and know the part(s) of the digestive track where each occurs. (CO3) 7

6-b. Compare the malate-aspartate shuttle and the glycerol 3-phosphate shuttle and understand their significance in affecting the amount of ATP that can be produced from glucose. (CO3) 7

7. Answer any <u>one</u> of the following:-

7-a. Given the primary structure of DNA or mRNA, use the genetic code table to predict the sequence of amino acids in the polypeptide that would be produced in translation. (CO4) 7

7-b. Define and understand the terms “mutation,” “genome,” and “gene therapy.” Explain how mutations can lead to genetic diseases. Give an example of a monogenic disease. (CO4) 7

8. Answer any <u>one</u> of the following:-

8-a. Compare the structure and functions of DNA and RNA. (CO5) 7

8-b. Explain two ways that genes can be controlled in eukaryotes. (CO5) 7