Printed page: 02…. **Subject Code: AMTBT0101**

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M. Tech

(SEM: I THEORY EXAMINATION (2020-2021)

Subject Name: Applied Biochemistry & Molecular Biology

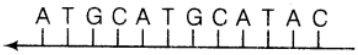
Time: 3 Hours **Max. Marks:70**

General Instructions:

- All questions are compulsory. Answers should be brief and to the point.
- This Question paper consists of 2 pages & 8 questions.
- It comprises of three Sections, A, B, and C. You are to attempt all the sections.
- Section A -Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each. You are expected to answer them as directed.
- Section B - Question No-3 is Long answer type -I questions with external choice carrying 4marks each. You need to attempt any five out of seven questions given.
- Section C - Question No. 4-8 are Long answer type –II (within unit choice) questions carrying 7 marks each. You need to attempt any one part *a* or *b*.
- Students are instructed to cross the blank sheets before handing over the answer sheet to the invigilator.
- No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION – A

1.	**Answer the following in short:**		**[5x1=5]**	**CO1**
	a.	Give one example each of an acidic & basic amino amino	**(1)**	**CO1**
	b.	How is Gibb's Free Energy related to enthalpy and entropy?	**(1)**	**CO2**
	c.	Define Oxidative phosphorylation	**(1)**	**CO3**
	d.	Give the contribution of Meselson and Stahl.	**(1)**	**CO4**
	e.	What does central dogma state in molecular biology? How does it differ in some viruses?	**(1)**	**CO5**
2.	**Answer the following question briefly:**		**[5×2=10]**	**CO2**
	a.	What are aldoses and ketoses? Give examples of each.	**(2)**	**CO1**
	b.	What happens to pyruvic acid under anaerobic respiration?	**(2)**	**CO2**
	c.	What is the net gain of ATP during glycolysis? Also give the chemical reactions involved.	**(2)**	**CO3**
	d.	Give any two major evidences that prove the evolution of life around RNA.	**(2)**	**CO4**
	e.	Construct a complete transcription unit with promoter and terminator on the basis of hypothetical template strand given below:	**(2)**	**CO5**



SECTION – B

3.	**Answer any five of the following-**		**[5x4=20]**	**CO**
	a.	Diagrammatically explain the clover leaf structure of t-RNA.	**(4)**	**CO1**
	b.	With any one suitable example explain the energy relationships involved in any catabolic pathway.	**(4)**	**CO2**
	c.	Describe Cori's cycle along with its significance.	**(4)**	**CO3**
	d.	What are telomeres? How is it associated with cancer?	**(4)**	**CO4**
	e.	Explain Wobble hypothesis. How does it contribute for the degeneracy of genetic code?	**(4)**	**CO5**
	f.	Describe the fate of pyruvic acid under aerobic conditions.	**(4)**	**CO3**
	g.	Define transposons. Enumerate the different types of transposons.	**(4)**	**CO5**

SECTION – C

CO

4	**Answer any one of the following-**		**[5×7=35]**	
	a.	Discuss the structural organization of proteins with suitable examples. Add a note on some important functions of proteins.	**(7)**	**CO1**
	b.	Enumerate the salient features of the double helical structure of DNA.	**(7)**	**CO1**
5.	**Answer any one of the following-**			
	a.	Outline the biosynthesis of fatty acids with the help of fatty acid synthase complex.	**(7)**	**CO2**
	b.	Draw the structure of ATP and list out its significance. Additionally elaborate on the role of kinases in transferring phosphoryl groups.	**(7)**	**CO2**
6.	**Answer any one of the following-**			
	a.	Define chemiosmosis. Discuss how a high concentration of protons is built up in the inter-membranous space of mitochondria.	**(7)**	**CO3**
	b.	Give an account of β – oxidation of saturated even carbon fatty acid (Palmitic acid) along with its energetics and regulation.	**(7)**	**CO3**
7.	**Answer any one of the following-**			
	a.	How is a lengthy linear DNA molecule accommodated in the nucleus as a condensed chromosomal structure?	**(7)**	**CO4**
	b.	Elaborate the process of DNA replication. Add a note on the significance of different enzymes involved in it.	**(7)**	**CO4**
8.	**Answer any one of the following-**			
	a.	Briefly describe the process of regulation of gene expression in Lac Operon.	**(7)**	**CO5**
	b.	Describe the process of translation in prokaryotes. Discuss the roles of Shine-dalgarno sequence, tRNA and releasing factors. Frame your answer chronologically in context of the three temporal phases of translation.	**(7)**	**CO5**