INDIAN INSTITUTE OF INFORMATION TECHNOLOGY UNA [HP]

An Institute of National Importance under MoE

Saloh, Una (HP) – 177 209

Website: www.iiitu.ac.in

AY 2021-22

School of Basic Sciences

CURRICULUM: IIITUGCSE20

Cycle Test – I

15, Feb.'22

Degree	B. Tech.	**Branch**	CSE
Semester	First		
Subject Code & Name	BIC104: Introduction to Biotechnology		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

Sl. No.	Question	Marks
1.a	How the eukaryotic cell, removes the toxic components, e.g. peroxide toxic molecules, from the biological system?	(1)
1.b	Outline a bioengineered cell that can produce more proteins, carbohydrates, lipids and energy, respectively.	(2)
1.c	Demonstrate the process of semiconservative replication of DNA by drawing a replication fork and indicating important enzymes, proteins, and other components involved in this process.	(2)
2.a	List the biotechnological products used to treat the heart attacks and bleeding disorder, respectively.	(1)
2.b	Explain how do bacteria use operons to regulate gene expression?	(2)
2.c	Explain why some mutations alter the protein structure and function that can result in disease while other mutations have no such health issues?	(2)
3.a	Interpret the guanine percentage for a newly discovered bacterial strain with the genetic material (DNA) composed of 25% adenine.	(1)
3.b	Construct the complementary DNA sequence from the given single strand of the double stranded DNA as follows: 5′-CATAGTTCGTCGGTCAGCAAG-3′. And find out how many amino acids are coded by the following mRNA sequence: 5-AUGCCCCGAACCUCAAAGUGA-3'	(2)
3.c	Model the block diagram for an efficient downstream processing with suitable example of fusion protein.	(2)
4.a	Which purification method is more or less selective at separating proteins: affinity or IonX chromatography?	(1)
4.b	Identify the effect on translation of the mRNA sequence: 5'AUGGUGGCCUAUCAUUAGGGGCUU 3' of a single base (point) mutation which gave rise to an A instead of a U at the twelfth base.	(2)
4.c	Examine the working mechanism of Whole-Genome Shotgun Sequencing with suitable case study.	(2)

****GOOD LUCK****