A

COLLEGE OF ENGINEERING AND TECHNOLOGY

SCHOOL OF BIOENGINEERING, DEPARTMENT OF BIOTECHNOLOGY

B. Tech. Biotechnology Program

ACADEMIC YEAR 2022-23 – ODD SEMESTER

Continuous Learning Assessment Test I

Reg. No.	R	A													

Course Code: 21BTB102T	Course Title: Introduction to Computational Biology		
Sem & Year: I/ I	Date:21/10/2022	Duration: 100 Minutes	Max. Marks: 50

	Course Outcomes (COs)	**Program Outcomes (POs)**												**PSOs**		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO-1	Correlate cell growth, reproduction, and differentiation				1											
CO-2	Categorize the concepts and principles of biochemistry and relate their application in genomics	2			2											

Part A (Answer all) **10 x1 Marks = 10 Marks**

Q. No.	**Questions**	**Marks**	**CO**	**BL**	**Marks Scored**	**PO(s)**
1	Diploid cell has _____ chromosomes (a)23 (b)24 (c)**46** (d)92	1	1	L1		4
2	Always the new generation will have better fitness score than the older one **(a)true** (b)false	1	1	L1		4
3	**metaphase** phase has chromosomes in the centre of the cell	1	1	L1		4
4	Inner cell mass is obtained from _____ (a) **blastocyst** (b)morula (c)gastrula (d) zygote	1	1	L1		4
5	Homologous pair of chromosome for X is (a)**Y** (b)23 (c) XY (d) 1	1	1	L2		4
6	GenBank is a (a)**primary** (b) secondary (c)tertiary (d)composite database	1	2	L1		1,4
7	The Rough draft of human genome was published through (a)**HGP** (b)HHF (c)HMM (d)HRP	1	2	L1		1,4
8	The blueprint for the construction of a protein is (a) tRNA(b) gRNA (c)**mRNA** (d) cDNA	1	2	L1		1,4
9	A molecule containing sugar, phosphate and a base is called (a) nucleoside (b) **Nucleotide** (c)aminoacid (d) carbohydrate	1	2	L1		1,4
10	Production of glucagon is because of (a)hyperglycemia (b) Hyperkalemia (c) Hypokalemia (d) **hypoglycemia**	1	2	L2		1,4

Part B (Answer any 3) **3 x 10 Marks = 30 Marks**

Q. No.	**Questions**	**Marks**	**CO**	**BL**	**Marks Scored**	**PO(s)**
11	Give a note on genetic algorithms (**unit 1- no. 62 onwards**)	10	1	L2		4
12	Write a detailed note on carbohydrates with illustrated examples (**unit 2- no. 16-22)**	10	2	L1		1,4
13	Explain the characteristics of a eukaryotic cell (**unit 1- no. 11-31**)	10	1	L1		4
14	Write about genomics with a special note on comparative genomics (u**nit 2- no 51-55)**	10	2	L2		1,4

PART C (Answer the Following) **1 x 10 Marks = 10 Marks**

Q. No.	**Questions**	**Marks**	**CO**	**BL**	**Marks Scored**	**PO(s)**
15 a	How did the eukaryotic cell develop organelles -which was missing in prokaryotes- which were the first organisms on earth? **(the endosymbiotic theory)**	10	1	L4		4
15 b	Give the ethical and legal issues of using stem cell. (**Ethical issues specific to human cloning include: the safety and efficacy of the procedure, cloning for destructive embryonic stem cell research, the effects of reproductive cloning on the child/parent relationship, and the commodification of human life as a research product.)**					

B

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CO-1	Correlate cell growth, reproduction, and differentiation				1											
CO-2	Categorize the concepts and principles of biochemistry and relate their application in genomics	2			2											

Part A (Answer all) **10 x1 Marks = 10 Marks**

Q. No.	**Questions**	**Marks**	**CO**	**BL**	**Marks Scored**	**PO(s)**
1	Haploid cell has _____ chromosomes (**a)23** (b)24 (c)46 (d)92	1	1	L1		4
2	The transfer of genetic material through viruses is called (a) translation (b) **transduction** (c) conjugation (d) transformation	1	1	L1		4
3	Cyclins regulate the **_____cell cycle_____**	1	1	L1		4
4	Afferent pathway is (a) brain to motor neurons (b) heart to brain (c)**sensory neuron to brain**(d) lungs to brain	1	1	L1		4
5	Sister chromatids are joined by **(a) centromere** (b) centrosome (c)centriole (d)telomere	1	1	L2		4
6	Cholesterol is a (a**) steroid** (b)hormone (c) enzyme (d)synthetic compound	1	2	L1		1,4
7	What is the bond between carbohydrates (a)alkyl (b)**glycosidic** (c)peptide (d)phosphate	1	2	L1		1,4
8	The mechanism of delivering aminoacids for translation is done by (a**) tRNA**(b) gRNA (c)mRNA (d) rDNA	1	2	L1		1,4
9	DNA is different from RNA because of the base (a) cytosine (b) guanine (**c)uracil** (d) adenine	1	2	L1		1,4
10	The algorithm compares a protein query sequence against a nucleotide sequence database dynamically translated in all reading frames. (a)BLASTn (b) BLASTp (c) **tBLASTn** (d) BLASTx	1	2	L2		1,4

Part B (Answer any 3) **3 x 10 Marks = 30 Marks**

Q. No.	**Questions**	**Marks**	**CO**	**BL**	**Marks Scored**	**PO(s)**
11	Illustrate and explain meiosis **unit 1(no- 49-52)**	10	1	L2		4
12	Write a detailed note on proteins with illustrated examples (**unit 2- slide no 29-38)**	10	2	L1		1,4
13	Explain the characteristics and uses of stem cells **unit 1(no- 54-61)**	10	1	L1		4
14	Write about BLAST algorithm and its types ((**unit 2- slide no 60 inwards)**	10	2	L2		1,4

PART C (Answer the Following) **1 x 10 Marks = 10 Marks**

Q. No.	**Questions**	**Marks**	**CO**	**BL**	**Marks Scored**	**PO(s)**
15 a	Human genome project – found the complete sequence of 46 chromosomes.- using this information what can be done**. (Personalised medicines, new drug targets, prediction of risks to diseases, familial disease identification, …. And many more)**	10	2	L4		1,4
15 b	Justify why structure of a protein determines the function of the protein. **(Protein function is based on structure. Shape of a protein determines function like hormones, enzymes will be globular, and will do various metabolic functions while fibrous like keratin hold the cell structure)**					

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CO-2	Categorize the concepts and principles of biochemistry and relate their application in genomics	2			2											

Part A (Answer all) **10 x1 Marks = 10 Marks**

Q. No.	Questions	Marks	CO	BL	Marks Scored	PO(s)
1	Meiosis produces (a) **Haploid** (b) Diploid (c) multiploidy (d) uniploid cells	1	1	L1		4
2	The genetic algorithm is inspired by (a) nature (b) nervous system **(c) evolution** (d) immunsystem	1	1	L1		4
3	**Pluripotent** cell can form into any type of cell except placenta	1	1	L1		4
4	Efferent pathway is **(a) brain to motor neurons** (b) heart to brain (c)sensory neuron to brain(d) lungs to brain	1	1	L1		4
5	Sister chromatids are separated in mitosis at (a) prophase (**b) anaphase** (c)metaphase (d)interphase	1	1	L2		4
6	Starch is a **(a) polysaccharide** (b)monosaccharide (c) lipid (d)wax	1	2	L1		1,4
7	What is the bond between nucleotides (a)alkyl (b)glycosidic (c)peptide (d)**phosphodiester**	1	2	L1		1,4
8	The RNA attached to ribosomes are (a) tRNA(b) gRNA (c)mRNA **(d) rRNA**	1	2	L1		1,4
9	"DNA is different from RNA because of" -Find the odd one(a) single stranded (b)5' oxygen (c)uracil (d) **more stable**	1	2	L1		1,4
10	-------- compares a protein query sequence against a protein sequence database dynamically translated in all reading frames. (a)BLASTn (**b) BLASTp (c) tBLASTn (d) BLASTx**	1	2	L2		1,4

Part B (Answer any 3) **3 x 10 Marks = 30 Marks**

Q. No.	Questions	Marks	CO	BL	Marks Scored	PO(s)
11	Illustrate and explain homeostasis **(unit 1- 33-37)**	10	1	L2		4
12	Write a detailed note on restriction digestion **(unit 2- slide number 32- 35)**	10	2	L1		1,4
13	Explain the characteristics of cell cycle and its control **(unit 1 39-41)**	10	1	L1		4
14	Explain genomics and its types **(unit 2- slide number 51-55)**	10	2	L2		1,4

PART C (Answer the Following) **1 x 10 Marks = 10 Marks**

Q. No.	Questions	Marks	CO	BL	Marks Scored	PO(s)
15 a	Explain how invitro fertilization is related to stem cell- (**embryonic stem cells)**	10	1	L4		4
15 b	Mesoderm forms the circulatory system- what is the parts and function of circulatory system (heart ,vascular system of arteries and veins, lungs etc)					

D

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CO-2	Categorize the concepts and principles of biochemistry and relate their application in genomics	2			2											

Part A (Answer all) **10 x1 Marks = 10 Marks**

Q. No.	Questions	Marks	CO	BL	Marks Scored	PO(s)
1	Mitosis produces gametes (a) True (b) **False**	1	1	L2		4
2	The organism that is unicellular but eukaryotic is (a) plant (b) animalia (**c)protist** (d) Monera	1	1	L1		4
3	**Fitness** score is used to find the best solutions in genetic algorithm	1	1	L1		4
4	Which is the control system involved in homeostasis (a**) CNS** (b) kidney (c)heart (d)stomach	1	1	L1		4
5	Meiosis I leads to separation of (a) two nucleus (b) sister chromatids (c)two cells (d) **homologous chromosomes**	1	1	L1		4
6	Estrogen is a **(a) steroid** (b) biomolecule (c) enzyme (d) protein	1	2	L1		1,4
7	Choose the disaccharide (a**) Sucrose** (b)ribose(c)fructose (d)glucose	1	2	L1		1,4
8	Choose the odd one out (a) tRNA(**b) gRNA** (c)mRNA (d) rRNA	1	2	L1		1,4
9	UNIPROTKB is a Sequence database for (a) nucleic acids (**b) proteins** (c) DNA (d) lipids	1	2	L1		1,4
10	Two similar protein sequences indicate (**a) Similar function** (b) Different function (c) both (d) no meaning	1	2	L2		1,4

Part B (Answer any 3) **3 x 10 Marks = 30 Marks**

Q. No.	Questions	Marks	CO	BL	Marks Scored	PO(s)
11	Illustrate and explain mitosis (**Unit 1- slide no 44-47)**	10	1	L2		4
12	Write a detailed note on lipids and its different types and uses (**Unit 2- slide no 23-28)**	10	2	L1		1,4
13	List a detailed role of cell organelles in eukaryotic cell (**Unit 1- slide no 12-31)**	10	1	L1		4
14	Write about the macromolecule nucleic acids (**Unit 1- slide no 39-45)**	10	2	L2		1,4

PART C (Answer the Following) **1 x 10 Marks = 10 Marks**

Q. No.	Questions	Marks	CO	BL	Marks Scored	PO(s)
15 a	Diabetes disease – what is the role of carbohydrates in this disease **– (Blood sugar should be 120mg/dL- anything higher is diabetes- caused by insulin resistance due to which cells receive less sugar and hence metabolism and cellular functions are disrupted)**	10	2	L4		1,4
15 b	Iterate how genomics can be used to make personalized medicines – (**genomics means whole genome of a patient is known. Hence by looking at the genomic information- medicines that will cause less sideeffects to the patient can be prescribed)**					