

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: B.TECH.
BRANCH: ALL**

**SEMESTER: VII
SESSION: MO/2022**

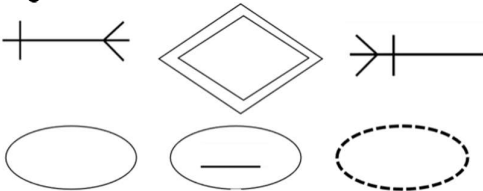
SUBJECT: BE316 BIOINFORMATICS ALGORITHMS

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.

		Marks	CO	BO
Q1 (a)	Enlist at least four advantages of using DBMS over file systems in the context of bioinformatics research.	[2]	CO1 CO4	Knowledge
Q1 (b)	Explain the meaning of following symbols used in the ER-diagram.	[3]	CO1 CO3	Knowledge
				
Q2 (a)	Draw an ER-diagram considering following statements. In the nucleus of each cell, the DNA molecule is packaged into thread-like structures called chromosomes. Human genome distributed in 23 pairs of chromosomes. In a Chromosome, several genes are present. Each gene transcribes to at least one mRNA. Each mRNA must translate to a protein. A protein must be link with a specific gene present in a chromosome.	[3]	CO2 CO3	Analysis
Q2 (b)	Enlist four important bioinformatics databases containing different types of biological data and explain their importance in biological research.	[2]	CO1 CO2	Knowledge
Q3 (a)	If you apply the bubble sort algorithm to sort the numbers 8, 27, 7, 11, 37, 3, 17 in ascending order. List down the swapping operations are needed.	[3]	CO3	Application
Q3 (b)	What is a stable algorithm? Which of the following is not an example of stable algorithm. Bubble sort, Merge sort, Insertion sort	[2]	CO3	Knowledge
Q4 (a)	Apply the insertion sort algorithm to sort the array [A] = {5,4,13,2,3}. Assume the cost associated with each sort is ₹10. Estimate the total cost of the insertion sort when element 2 reaches the first position of the array.	[3]	CO3	Application
Q4 (b)	Write down the time complexity of the following algorithms for best case scenario and arrange them in the ascending order. (i) insertion sort (ii) Quick sort (iii) Merge sort (iv) selection sort	[2]	CO3	Understanding
Q5 (a)	Considering the following data, calculate the maximum size of array that can be solved by merge sort algorithm in 6 minutes. Data: Worst case of merge sort algorithm take 30 seconds for the input of 64 numbers.	[3]	CO3	Analysis
Q5 (b)	Why we need sorting and searching algorithms for bioinformatics research? Explain with suitable examples.	[2]	CO3	Understanding