APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code: 08CS22232-I (Pages: 2) **Name:**.....

Reg. No:.....

SECOND SEMESTER M.TECH. DEGREE EXAMINATION JULY 2022

Branch: Computer Science and Engineering Specialization: Computer Science and Engineering

08CS6032 EVOLUTIONARY COMPUTING

Time:3 hours **Max. marks: 60**

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	What are the features of evolutionary computing techniques?	3
	Answer b or c	
b	Explain different paradigms of evolutionary computing techniques in detail.	6
c	What are the advantages of EC techniques over traditional methods of problem solving?	6

Q.no.	Module 2	Marks
2.a	What are the disadvantages of simple hill climbing technique?	3
	Answer b or c	
b	On one bank of a river are three missionaries and three cannibals. There is one boat available that can hold up to two people and that they would like to use to cross the river. If the cannibals ever outnumber the missionaries on either of the river's banks, the missionaries will get eaten. How can the boat be used to safely carry all the missionaries and cannibals across the river? Define a heuristic function and using hill climbing technique, solve the problem.	6
c	Explain the algorithm for simulated annealing process. What is the objective function used in the process?	6

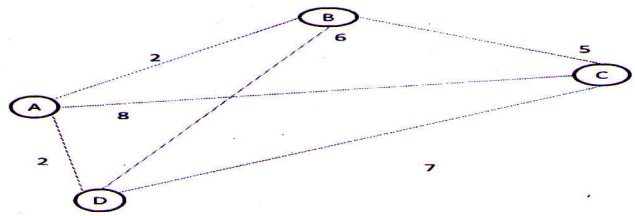
Q.no.	Module 3	Marks
3.a	Write a note on tournament selection.	3
	Answer b or c	
b	Using edge recombination method, find out the off springs for the next generation. Given the position of alleles of two parents 123456789 and 937826514.	6

c	State the schema theorem. Consider the strings and schemata of length 5. For the following schemata, predict the survival for two generations: *1*00, **11*. Assume Pm=0.1, Pc = 0.6. Assume that the population size is 6 and the following initial population: 01100, 00110, 00001, 11000, 11111, 10000. Fitness of a string is its decimal equivalent.	6

Q.no.	Module 4	Marks
4.a	Explain how pheromone deposit, evaporation and updation in ACO affects the solution generation.	3

Answer b or c

b	Using ACO, solve the TSP problem for the following graph. Given $\alpha=1$, $\beta=1$, $\rho=0.5$.	6



c	Explain MINMAX ACO algorithm. How it differs from RANKAS(Rank Based Ant Colony System)	6

Q.no.	Module 5	Marks
5.a	What are the basic principles of swarm intelligence?	4

Answer b or c

b	Explain PSO algorithm in detail. Explain how the velocity and distance factor affects the optimal solutions.	8
c	What are lbest, pbest and gbest and how it varies according to the change in topologies? Explain with the help of any three topologies.	8

Q.no.	Module 6	Marks
6.a	What are the different types of bees? Explain the function of each.	4

Answer b or c

b	Explain the working of ABC algorithm? What is the fitness function used so as to improve the performance of the algorithm?	8
c	Explain any two variations of ABC algorithm.	8