BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH **SEMESTER : II**
BRANCH: CS **SESSION : SP/2024**

SUBJECT: CS636 EVOLUTIONARY COMPUTING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. **The question paper contains 5 questions each of 10 marks and total 50 marks.**
2. **Attempt all questions.**
3. **The missing data, if any, may be assumed suitably.**
4. **Before attempting the question paper, be sure that you have got the correct question paper.**
5. **Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.**

			CO	BL
Q.1(a)	What are the different types of Evolutionary Algorithms? Briefly discuss their basis of operation.	[5]	1	2
Q.1(b)	What is Elitism? Name two schemes for Elitism that are preferred over Random Elitism?	[5]	1	2
Q.2(a)	State two scenarios where you like to apply Roulette wheel and Rank based selection. Justify your answer with proper arguments with the steps involved.	[5]	2	4
Q.2(b)	To stop the flow of Program using Genetic Algorithm, what criterions may you follow? State the conditions of each criterion.	[5]	2	3
Q.3(a)	$Maximize\ f(x) = \sin(x)$ where $0 \leq x \leq \pi$ Consider 6 bit string to represent the solution. Assume population size of 4. Solve this problem by hand calculation for one iteration showing all steps of Evolutionary Computing.	[5]	3	3
Q.3(b)	State the working principle of Island Genetic Algorithms and Niching Genetic Algorithms.	[5]	3	2
Q.4	Design a multi objective transportation problem where objective is to travel a source destination pair with shortest possible time for individual as well as all users/vehicles. Assume there are n number of intersections of roads with traffic signals in the road network and m numbers of users/vehicles are currently active in the road network. First map the problem in multi-objective domain with mathematical modelling and the show the steps of solution using all operators applied using GA for one iteration. Also denote which type of multi-objective solution strategy you like to apply for the assumed environment with proper justification.	[10]	4	4
Q.5(a)	How Smith's Poker Player is different from CS1 in structure? Explain in detail.	[5]	5	3
Q.5(b)	"Classifier systems can emulate the complex models of symbolic AI". Justify the statement with respect to Forrest's CL-ONE structure.	[5]	5	4

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