K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Nov–Dec 2023

(M.Tech.) Program: **Computer Engineering - Artificial Intelligence** Scheme :**II**
Examination: **FY** Semester: **II**
Course Code: **PCEC203** and Course Name: **Bio-inspired Artificial Intelligence**

Date of Exam: 22/05/2024   Duration: 2.5 Hours   Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q. 1	**Solve any six questions out of eight:**	12		
i)	What do you mean by optimization? Discuss it in detail.	2	1	U
ii)	Explain convergence criteria for a genetic algorithm.	2	2	U
iii)	Discuss the applications of the ACO algorithm.	2	3	U
iv)	Explain Lessons for AIS.	2	4	U
v)	Draw the flow chart of the PSO algorithm.	2	5	U
vi)	Explain comparison factors of 'Harmony Search' algorithm.	2	5	U
vii)	Compare 'Genetic Algorithm' with 'Genetic Programming'	2	6	An
viii)	Explain 'Ant foraging' behavior.	2	3	U
Q.2	**Solve any four questions out of six.**	16		
i)	What is a constraint satisfaction problem? Explain it with an example.	4	1	U
ii)	Explain the general structure of an EA.	4	2	U
iii)	Discuss the 'ABC' algorithm in detail.	4	3	U
iv)	Explain in detail 'Negative Selection Algorithm'	4	4	U
v)	What is the best search strategy used in PSO? Explain in detail PSO algorithm fundamentals?	4	5	U
vi)	What is the mesh partitioning problem? Explain one of the optimization algorithms which help to solve this problem?	4	6	U
Q.3	**Solve any two questions out of three.**	16		

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i)	Discuss medical imaging and diagnostic work by applying the genetic algorithm.	8	2	Ap
ii)	Apply 'ACO' algorithm on a suitable example and describe the fundamentals of this algorithm	8	3	Ap
iii)	Illustrate the population-based metaheuristic algorithm inspired from musical harmony? With the use of this, find the optimal solution for any one of the evaluation functions f(n).	8	5	Ap
Q.4	**Solve any two questions out of three.**	16		
i)	The obvious limitation of the Intrusion Detection System is its failure in detecting previously unknown intrusions. Provide a solution to this problem using an artificial immune system.?	8	4	Ap
ii)	Apply 'Honey-Bee Optimization' algorithm for cloud scheduling? Also discuss the advantages and disadvantages of this design?	8	5	Ap
iii)	Develop and analyze one of the Evolutionary algorithmic solutions for following restraints. Problem: "Plastic Can Collecting navigating robot" Grid space consist "HOLE" and "Plastic Can" Robot has Collect "plastic cans" without falling into "Hole" Objective: Without getting GAME OVER Collect Plastic Cans . Conditions: If (move East = CAN & Move North = Empty Grid) Then - > Move East else - > Move South ?	8	6	An

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