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B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Fifth Semester

18CSE387T - GENETIC ALGORITHM AND ITS APPLICATIONS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks) — Marks | BL | CO

Answer **all** Questions

1. The key aspect distinguishing an evolutionary search algorithm from traditional algorithms is — 1 | 1 | 1
   (A) exhaustive search (B) population-based
   (C) random walk (D) meta heuristic

2. The basic differences between the paradigms not lie in the nature of — 1 | 2 | 1
   (A) representation schemes (B) reproduction operators
   (C) selection methods (D) search space

3. ---------- is the key operator for natural evolution — 1 | 1 | 1
   (A) Mutation (B) Crossover
   (C) Selection (D) Recombination

4. Which of the following is an unintelligent strategy? — 1 | 1 | 1
   (A) Gradient based local optimization (B) Random search
   (C) Stochastic hill climbing (D) Simulated annealing

5. A bit string of length 'n' can represent ---------- intervals — 1 | 1 | 2
   (A) 2n-1 (B) $2^n - 1$
   (C) N-1 (D) 2n-2

6. For calculating fitness, the chromosome has to be first decoded and the ---------- has to be evaluated — 1 | 1 | 2
   (A) Crossover (B) Mutation
   (C) Reproduction (D) Objective function

7. For each and every problem, the population size will depend on the ---------- of the problem — 1 | 1 | 2
   (A) Number of iterations (B) Number of generations
   (C) Complexity (D) Termination Condition

8. Mutation prevents the algorithm to be trapped in a ---------- — 1 | 2 | 2
   (A) Global minimum (B) Local minimum
   (C) Stopping criteria (D) Converge

9. In the diploid form, a genotype carries ---------- pairs of chromosomes — 1 | 1 | 3
   (A) One or two (B) Two or more
   (C) One or more (D) Exactly two

10. Multiploid genetic algorithm incorporates ---------- candidates for each gene within a single genotype — 1 | 1 | 3
    (A) Several (B) One
    (C) Two (D) Three

11.	----------contain a huge body of problems with different features and properties. (A) Bi objective optimization (B) Combinatorial optimization (C) Single objective optimization (D) Multi objective optimization	1	1	3
12.	---------- are usually implemented as master-slave programs. (A) Global parallel GAs (B) Simple GA (C) Distributed GA (D) Cellular GA	1	1	3
13.	Genetic Programming achieves this goal of automatic programming by genetically breeding a population of ---------- (A) Computer programs (B) Individuals (C) Chromosomes (D) Genes	1	2	4
14.	Which of the following is not the structure of GP (A) Tree (B) Graph (C) Non linear (D) Linear	1	2	4
15.	The need for a good representation in evolutionary computation, and in artificial intelligence more generally, is called the ---------- (A) Representation problem. (B) Initialization problem. (C) Optimization problem. (D) Minimization problem.	1	1	4
16.	The ---------- determines how well a program is able to solve the problem. (A) Representation (B) Initialization (C) Fitness function (D) Reproduction	1	1	4
17.	----------has been developed to a point where most designs can be generated automatically on a computer. (A) 3D printing (B) Digital network synthesis (C) Data mining (D) VLSI	1	1	5
18.	To test the effectiveness of the hybrid GA network synthesis program, it was used to design a passive LCR filter to the given specification. (A) Gaussian filter (B) Passive LCR filter (C) Context filter (D) Dimension filter	1	2	5
19.	Traditional methods of texture feature extraction are based either on statistical or structural models (A) Linear (B) Statistical (C) Convolutional (D) Non linear	1	1	5
20.	---------- operator allows diversity. (A) Initialization (B) Mutation (C) Reproduction (D) Termination	1	1	5

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	Explain survival of fittest.	4	1	1
22.	Demonstrate bit flipping mutation.	4	1	1
23.	Demonstrate Roulette Wheel Selection.	4	1	2
24.	Compare single point and two point crossover.	4	2	2
25.	Define selection operator of adaptive Genetic algorithm.	4	1	3
26.	Illustrates primitives of genetic programming.	4	1	4
27.	Describe the steps of particle swarm optimization.	4	1	5

		Marks	BL	CO
	PART - C (5 × 12 = 60 Marks) Answer **all** Questions			
28.	(a) Explain the features of evolutionary computation in detail	12	1	1
	(OR)			
	(b) Describe Gradient-Based Local Optimization Method and random search.			
29.	(a) Compare various selection techniques of genetic algorithm.	12	4	2
	(OR)			
	(b) Assess and conclude why do genetic algorithms work.			
30.	(a) Describe inversion and reordering with its types	12	2	3
	(OR)			
	(b) Construct remove sharp algorithm			
31.	(a) Evaluates primitives of genetic programming in detail	12	3	4
	(OR)			
	(b) List and explain the applications of genetic programming.			
32.	(a) Demonstrate Ant colony optimization in detail	12	2	5
	(OR)			
	(b) Evaluate Feature Selection in Machine learning using GA			

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