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Paper Code : PCC-AI402/PCCAIML 402 Optimization Techniques

UPID : 004825

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

(I) What is optimization?

(II) What is a single-variable optimization problem?

(III) Write true or false for the given statement.
All the variables in the solution of a linear programming problem are either positive or negative because of the existence of structural constraints.

(IV) What is multimodal function in Nonlinear Programming?

(V) What is the significance of the exponent in geometric programming?

(VI) What is the mixed-integer (discrete) programming Problem?

(VII) What is the minimax-maximin principle?

(VIII) What are the Chromosomes in the Genetic algorithm?

(IX) What are the Constraints in the optimization?

(X) What is global or absolute minimum?

(XI) Write true or false for the given statement.
When there are more than one optimal solution to the problem then the decision-maker will be unable to judge the best optimal solution among them.

(XII) What is the role of interpolation in optimization techniques?

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. What is the effect of the 'integer' restriction of all the variables on the feasible space of integer programming problem? [5]

3 How many types of strategies are followed by players in a game and decribe about them? [5]

4. Can you explain how Genetic Algorithms related to Darwinian Natural Selection? [5]

5. How can game theory be used in business strategy, and can you provide an example of a company that has successfully applied game theory principles in their operations? [5]

6. Write about all types crossover of the genetic algorithm with example. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) What is the Classical Optimization and goal of the this optimization? [3]

(b) What are the applications of the Classical Optimization techniques? [5]

(c) Find the extreme point and identify its nature for the given multivariable function with no constraints. [7]

$f(x_1, x_2) = x_1^3 + x_2^3 + 2x_1^2 + 4x_2^2 + 6$

8. (a) What are the Characteristics of an LP model. [5]

(b) What are the advantages of the Linear programming problem? [5]

(c) What are the drawbacks of the Linear programming problem? [5]

9. (a) What are the advantages and disadvantages of direct methods in solving nonlinear programming problems? [8]

(b) What are the advantages and disadvantages of indirect methods in solving nonlinear programming problems? [7]

10. (a) Solve the given Geometric Programming problem with no constraints . [8]

min $z = 2x_1 + 4x_2 + 10/x_1x_2$, where $x_1, x_2 > 0$.

(b) Write the Advantages and Disadvantages of the Geometric Programming Problem. [7]

11. (a) Write short note on Nonlinear Programming Problem, Linear Programming Problem, Integer Programming Problem, Geometric Programming Problem. [10]

(b) What are the differences between Separable Programming problem and Stochastic Programming problem. [5]

*** END OF PAPER ***