Seventh Semester BTech Degree Examination

(2013 Scheme)

Branch : Industrial Engineering

13.701 Heuristics for Decision Making (N)

Time : 3 Hours   Max. Marks : 100

*Instruction: Answer **all** questions in **Part A**. Each question in **Part A** carries **4** marks. Answer **any one full question** from **each** module in **Part B**. Each **full** question in **Part B** carries **20** marks.*

Part A (5 x 4 = 20 marks)

1. Explain the significance of intensification and diversification mechanisms in heuristic solution techniques.

2. Briefly explain Roulette Wheel and Tournament selection methods in Genetic Algorithm.

3. Explain the subgradient optimization method for updating Lagrangean multipliers.

4. Explain short term memory and long term memory structures as applied to Tabu Search.

5. Explain the difference between Constraint Programming and Mathematical Programming

Part B (4 x 20 =80 marks)

Module-I

6. a. What is Pareto optimality?

    b. How will you solve a transportation problem using Genetic Algorithm? Use spanning tree encoding and suggest suitable crossover and mutation operations.

OR

7. a. With suitable examples explain uniform crossover and partially mapping crossover.

    b. Explain Genetic Algorithm based solution procedure to solve an Assignment problem.

Module-II

8. Consider a two stage supply chain problem in which customer demands are met from plants with fixed production capacity. The products are transported to the customers from plants through warehouses which have limited storage capacity. Make suitable assumptions, propose a mathematical programming model for this scenario. Apply

Lagrangean relaxation to find lower bound for cost minimization of the above model. Also propose a heuristic based on Lagrangean relaxation to find an upper bound for the model.

OR

9.   With a numerical example, explain how to implement Ant Colony Optimization to solve a Travelling Salesman Problem.

Module-III

10.   What is the difference between Assignment problem and Quadratic Assignment Problem? How do you use Tabu Search to solve an Assignment Problem?

OR

11.   What are the factors that complicate the design of a Reverse Logistics network? Propose a mathematical model and Heuristic Concentration solution technique for a Reverse Logistics network.

Module-IV

12.   Briefly explain general algorithmic structure of Artificial Neural Network (ANN). Explain any one application of ANN in Finance.

OR

13.   What is Bin packing problem? Explain the application of Constraint Programming in Bin Packing problems.