

**B.Tech. MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)**

00490 Term-End Examination

June, 2016

BME-022 : SOFT COMPUTING IN CIM

Time : 3 hours

Maximum Marks : 70

*Note : Answer any **five** questions. All questions carry equal marks. Assume suitable missing data, if any.*

1. (a) What is a neural network ? What is the role of the hidden layers in a neural network ? 7
- (b) What do you understand by the expert system shell ? What factor determines the proper form of knowledge representation ? 7
2. (a) Given a fuzzy logic implication statement "IF a_1 is A_1 AND a_2 is not A_2 OR a_3 is not A_3 THEN b is B ." How can we rewrite it as a set of equivalent general fuzzy IF-THEN rules in the unified form ? 7
- (b) What is genetic algorithm ? Discuss the performance measure of Tabu search algorithm as compared to the genetic algorithm and simulated annealing. 7

3. (a) What is the effect of pheromone evaporation on the performance of ACO algorithm ? 7
- (b) What is the practical significance of hypermutation in artificial immune system ? With help of a flow chart, illustrate the Psycho-Clonal algorithm. 7
4. (a) Discuss the application of AIS in data analysis. 7
- (b) With the help of a block diagram, illustrate an Expert system based robot controller. 7
5. (a) Define FPN. Can FPN deal with compound production rule ? 7
- (b) Enlist the basic principles of Hopfield neural network. Illustrate the basic elements of group technology and cellular manufacturing. 7
6. (a) Briefly describe the Ant colony optimization technique. 7
- (b) Describe how an Adaptive production control system works. 7

7. (a) Model the four seasons of the year together with their properties by a Petri net. Denote the current season {spring, summer, autumn, winter}, the temperature {hot, cold} and the light level {bright, dark}. As a first step, you can model the seasons (with a token to represent that it is currently autumn). 7
- (b) Illustrate the hierarchy of neural network application for process modelling and control. 7
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