Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2013

Subject code: 730702 **Date: 15-05-2013**

Subject Name: Application of Artificial Intelligence to Power Systems

Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Distinguish Artificial Intelligence (AI) technique with other problem solving methodology. Discuss properties of AI techniques. Explain application areas of various AI techniques. **07**

(b) Discuss and compare various fuzzy implication methods. **07**

Q.2 **(a)** Why neural network need to be trained? Discuss various learning models of neural network in brief. **07**

(b) Explain and compare various fuzzy implication methods. **07**

OR

(b) Explain benefits and limitations of fuzzy logic system. **07**

Q.3 **(a)** Draw following membership functions for real variables *x, a, ß* and *?*. **07**

a.

$$\Gamma(x;\alpha,\beta)=\begin{cases}0 & x<\alpha\\ \dfrac{x-\alpha}{\beta-\alpha} & \alpha\le x\le\beta,\\ 1 & x>\beta\end{cases}$$

b.

$$\Lambda(x;\alpha,\beta,\gamma)=\begin{cases}0 & x<\alpha\\ \dfrac{x-\alpha}{\beta-\alpha} & \alpha\le x<\beta\\ \dfrac{\gamma-x}{\gamma-\beta} & \beta\le x\le\gamma\\ 0 & x>\gamma\end{cases}$$

(b) Explain steps to construct neural network. **07**

OR

Q.3 **(a)** With appropriate example explain complement, union and intersection operations on fuzzy membership functions. **07**

(b) What are various transfer functions in ANN. Define and draw various continuous transfer functions. **07**

Q.4 **(a)** Discuss various parts of fitness function, when schedule maintenance of electrical power transmission network is done using Genetic Algorithm (GA). **07**

(b) Discuss basic structure of ANN. **07**

OR

Q.4 **(a)** Discuss various steps required to solve optimization problem using GA. **07**

(b) Discuss difficulties in constrained reactive dispatch algorithmic methods. How AI techniques are better than algorithmic methods. **07**

Q.5 **(a)** What is security assessment in power system? How ANN is useful in security assessment. **07**

(b) Discuss various genetic operators and their role in genetic programming. **07**

OR

Q.5	**(a)**	Explain role of different AI techniques in demand forecasting.	**07**
	(b)	Compare various defuzzication methods. Comment on each of them.	**07**

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