

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. 0
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- (b)** Discuss and compare various fuzzy implication methods. 0
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- Q.2 (a)** Why neural network need to be trained? Discuss various learning models of neural network in brief. 0
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- (b)** Explain and compare various fuzzy implication methods. 0
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OR

- (b)** Explain benefits and limitations of fuzzy logic system. 0
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- Q.3 (a)** Draw following membership functions for real variables x , a , β and γ . 0
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- a.
$$\Gamma(x; \alpha, \beta) = \begin{cases} 0 & x < \alpha \\ \frac{x - \alpha}{\beta - \alpha} & \alpha \leq x \leq \beta \\ 1 & x > \beta \end{cases}$$
- b.
$$\Lambda(x; \alpha, \beta, \gamma) = \begin{cases} 0 & x < \alpha \\ \frac{x - \alpha}{\beta - \alpha} & \alpha \leq x < \beta \\ \frac{\gamma - x}{\gamma - \beta} & \beta \leq x \leq \gamma \\ 0 & x > \gamma \end{cases}$$

- (b)** Explain steps to construct neural network. 0
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OR

- Q.3 (a)** With appropriate example explain complement, union and intersection operations on fuzzy membership functions. 0
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- (b)** What are various transfer functions in ANN. Define and draw various continuous transfer functions. 0
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- Q.4 (a)** Discuss various parts of fitness function, when schedule maintenance of electrical power transmission network is done using Genetic Algorithm (GA). 0
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- (b)** Discuss basic structure of ANN. 0
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OR

- Q.4 (a)** Discuss various steps required to solve optimization problem using GA. 0
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- (b)** Discuss difficulties in constrained reactive dispatch algorithmic methods. How AI techniques are better than algorithmic methods. 0
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- Q.5 (a)** What is security assessment in power system? How ANN is useful in security assessment. 0
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- (b)** Discuss various genetic operators and their role in genetic programming. 0
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OR

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

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0
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