Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 20437

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth/Seventh Semester

Electrical and Electronics Engineering

EE 6006 — APPLIED SOFT COMPUTING

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering)

(Regulations 2013)

(Also common to PTEE 6006 – Applied Soft Computing for B.E. (Part-Time) Sixth Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the differences between artificial neural network and biological network.

2. What are merits and demerits of Back Propagation Algorithm?

3. What is a feedback networks? Give some examples of feedback networks.

4. What is the goal of inverted pendulum?

5. State the excluded middle laws and De Morgan's laws for classical sets.

6. Define core and boundaries of a membership function.

7. What are the basic elements of a fuzzy logic control system?

8. List some of the applications of fuzzy logic control system.

9. State the different selection methods in GA.

10. What is binary Encoding in GA?

PART B — (5 × 13 = 65 marks)

11. (a) Briefly explain about the architecture, flowchart and training algorithm of Back-propagation network. (13)

Or

(b) (i)   What is learning? Discuss about the different learning process. (7)

(ii) Explain about the different types of neuron connection architecture. (6)

12. (a) (i)   Explain in detail about the discrete Hopfield network by its architecture. (7)

(ii) Analyse and derive the energy function of continuous Hopfield network. (6)

Or

(b) What is Neuro-controller? Why Neuro-controller is preferred for the inverted pendulum operation? Explain in detail. (13)

13. (a) (i)   Given the two fuzzy sets, find the following : (7)

$$B_1 = \left\{ \frac{1.0}{1.0} + \frac{0.75}{1.5} + \frac{0.3}{2.0} + \frac{0.15}{2.5} + \frac{0.0}{3.0} \right\}, \quad B_2 = \left\{ \frac{1.0}{1.0} + \frac{0.6}{1.5} + \frac{0.2}{2.0} + \frac{0.1}{2.5} + \frac{0.0}{3.0} \right\}$$

(1) $B_1 \cup B_2$; (2) $B_1 \cap B_2$ (3) $B_1 \cap \overline{B}_1$ (4) B_1 / B_2 .

(ii) Discuss fuzzy Bayesian Decision making in detail. (6)

Or

(b) What is the membership function? Explain in detail about the methods of membership value assignment. (13)

14. (a) Why we use fuzzy logic control for aircraft landing and explain the operation and working principles of aircraft landing with neat schematic diagram? (13)

Or

(b) With neat flowchart describe the algorithm of fuzzy based motor control. (13)

15. (a) (i)   Describe the binary and real representation schemes of chromosomes in GA. (6)

(ii) What is selection? Explain the different selection methods. (7)

Or

(b) (i)   How constraints are handled in GA? Discuss. (6)

(ii) Explain how GA can be used to solve unit commitment problem. (7)

2   **20437**

PART C — (1 × 15 = 15 marks)

16. (a) (i) Describe a Neuro controller for inverted pendulum. (5)

    (ii) With the help of neat flowchart explain the algorithm of fuzzy based liquid level control. (10)

Or

(b) Explain in detail different search techniques in Genetic Algorithm. Discuss its merits and demerits. (15)

———