

**Elective - IV : Expert System Design**

P. Pages : 2

Time : Three Hours



**NKT/KS/17/7634**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Define Expert system. Write its characteristics features. Explain with block diagram the architecture of expert systems. **10**
- b) Enlist and briefly explain the concept of expert system tools. **4**
- OR**
2. a) Write a note on following. **8**
- i) Expert system structure.
  - ii) Heuristic Reasoning.
  - iii) User Interface.
- b) Explain : **6**
- i) MYCIN
  - ii) EMYCIN
3. a) List and explain the interference rules. **7**
- b) Convert the following sentences into first order logic. **6**
- i) Every gardener likes the sun.
  - ii) You can fool some of the people all of the time.
  - iii) Everyone is younger than his father.
  - iv) All purple mushrooms are poisonous.
  - v) Every dog owner is an animal lover.
  - vi) If an animal has feathers then it flies.
- OR**
4. a) Formulate the following facts in predicate logic. **6**
- i) Sita is an electrical engineer and an artist.
  - ii) Every Monday and Wednesday I go to John's house for dinner.
- b) Consider the following statements. **7**
- Puss is a calico  
Herb is a tuna  
Charlie is a tuna  
All tunas are fishes  
All calicos are cats  
All cats like to eat all kinds of fishes  
Prove that "puss likes to eat Charlie" using resolution technique.

5. a) Explain with example forward and backward reasoning technique. 7  
b) Explain non-monotonic reasoning system in brief with suitable example. 6

**OR**

6. a) What do you mean by certainty factor? How is certainty factor calculated for rule based system? 9  
b) State the difference between propositional logic and fuzzy logic. 4

7. a) Write short notes on **any four**. 14  
i) Frames.  
ii) Scripts  
iii) Semantic Networks.  
iv) Frames as representation formalism.  
v) Frames and multiple inheritance.

**OR**

8. a) Write short notes on : 14  
i) Augmented Transition Networks.  
ii) Transformational Grammar.  
iii) Inheritance and attribute facts.  
iv) Frames and single inheritance.

9. a) Write and explain Bayes theorem. What is the significance of probability of AI. 7  
b) Write a detail note on Dempster-Shafer theory. 6

**OR**

10. a) Explain the network model for expert system. 7  
b) Explain the following production rules. 6  
 $R_1$  : if a and (b or c) then h fi  
 $R_2$  : if d and f then b fi  
 $R_3$  : if f or g then h fi  
 $R_4$  : if a then d fi

11. a) Discuss the supervised and unsupervised learning methods in artificial neural networks. 6  
b) Write a note on following. 7  
i) Hybrid intelligence.  
ii) Biological neural system.

**OR**

12. a) What do you mean by single layer perceptrons and multilayer perceptrons. 7  
b) Discuss the steps involved in neural information processing. 6

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