SKR/KW/24/2067

Faculty of Science & Technology

Seventh Semester B.E. (Information Technology) (C.B.S.) Examination

ARTIFICIAL INTELLIGENCE

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question No. **1 OR** Question No. **2**.

(3) Solve Question No. **3 OR** Question No. **4**.

(4) Solve Question No. **5 OR** Question No. **6**.

(5) Solve Question No. **7 OR** Question No. **8**.

(6) Solve Question No. **9 OR** Question No. **10**.

(7) Solve Question No. **11 OR** Question No. **12**.

1. (a) What do you mean by AI ? What are the different task domains of AI ? 4

   (b) List and discuss the 7 problem characteristics with one example of each. 10

OR

2. (a) What is production system ? Distinguish between monotonic and non-monotonic production system. Give the examples of monotonic and non-monotonic production systems. 9

   (b) Define the State-Space representation used to solve AI problems. Illustrate it with respect to water jug problem. 5

3. (a) What do you mean by heuristic function ? For the following AI problems, discuss the heuristic function :

   (i) Theorem proving

   (ii) Block world problem. 8

   (b) Write and elaborate the best-first search strategy or algorithm. 5

OR

4. (a) Write the steps used by mean-ends analysis. Explain the use of difference table for robot navigation scenario. 8

   (b) Differentiate between the Breadth first search and Depth first search algorithms. 5

5. (a) Enlist the steps used to solve the problem using resolution method in propositional logic. 5

   (b) Brief the following with suitable examples :—

   (i) Knowledge representation in AI

   (ii) Ontology. 8

OR

6. (a) Discuss the issues found with knowledge representation in AI. 5

(b) Elaborate the following :

(i) Formal logic

(ii) Propositional logic

(iii) First order logic

(iv) WFF. 8

7. (a) Convert the following sentences into predicate logic :

(i) Harry likes all kinds of food.

(ii) Everyone is loyal to someone. 4

(b) Discuss the following (any **two**) :—

(i) RTN and ATN

(ii) NLP & Applications of NLP

(iii) Truth Maintenance System. 10

OR

8. (a) What do you mean by Semantic network ? Explain with suitable example & its illustration with diagram. 5

(b) What is Script ? Explain the script for the following :—

"Shopping an Laptop on www.amazon.in the online shopping store or website." 9

9. (a) Define Expert system. Elaborate the architecture and life cycle of Expert system. 8

(b) Distinguish between problem domain and knowledge domain. Write one example of each. 5

OR

10. (a) Explain the following (any **one**) :—

(i) Rule-based Expert system

(ii) Expert system shell

(iii) Knowledge engineering. 5

(b) What are the advantages and disadvantages of expert system ? Explain how the conventional system differs from expert system. 8

11. (a) What do you mean by Bayes theorem ? Explain its significance in solving AI problems. 5

(b) Elaborate the MYCIN, an example of expert system. Also, explain the MB, CF and MD. 8

OR

12. (a) Write short notes on the following (any **two**) :—

(i) Uncertainty handling in AI

(ii) Dempster-Shafer theory

(iii) Crisp and fuzzy sets

(iv) Probability. 10

(b) What is fuzzy logic ? Write the applications of fuzzy logic. 3

PRS/KS/24/2394

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(6) Solve Question No. **9 OR** Question No. **10**.

(7) Solve Question No. **10 OR** Question No. **12**.

(8) Assume suitable data wherever necessary.

(9) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What do you mean by AI ? Discuss the applications of AI. 7

(b) Discuss the seven problem characteristics of AI problems with suitable example. 7

OR

2. (a) What is production system ? Explain the difference between monotonic and non-monotonic production systems. 7

(b) Discuss the state space representation for water-jug problem. Make suitable assumption by your own. 7

3. (a) State the difference between uninformed and informed search strategies. Write the steps used by Breadth first search strategy. 7

(b) Write and explain depth first search techniques. 6

OR

Model Questions

4. (a) Explain the means-end analysis approach with suitable example. 7

(b) Using constraint satisfaction approach and suitable assumption to solve the following :

$$\begin{array}{r} \text{SEND} \\ +\,\text{MORE} \\ \hline \text{MONEY} \end{array}$$ 6

5. (a) What do you mean by knowledge ? Discuss the issues in knowledge representation. 7

(b) Discuss the ontology and formal logic. 6

OR

6. (a) Discuss the resolution method in propositional logic. 7

(b) Discuss the approaches to knowledge representation used in solving AI problems. 6

7. (a) Write a script for following :

Going to the bank to withdraw money. 7

(b) What do you mean by predicate logic ? Represent the following statements in predicate logic :

(i) Ram is a boy.

(ii) All people loyal to someone.

(iii) Ram and Laxman are brothers. 6

OR

8. (a) Write a frame for representing a chair. Also, write about the frames is AI. 7

(b) Discuss the NLP and applications of NLP. 6

9. (a) Discuss the knowledge acquisition methods. 7

(b) Brief the knowledge engineering process. 6

OR

10. (a) What do you mean by Expert System ? Draw and explain the architecture of Expert System. 7

(b) Distinguish between problem domain and knowledge domain with respect to expert system. 6

11. (a) What do you mean by probability ? Explain the use of probability in solving real-world problem. Discuss the Baye's theorem. 7

(b) Explain the Dempster-Shafer theory in detail. 7

OR

12. Write short notes on :

(i) Fuzzy logic and its applications

(ii) Fuzzy sets and crisp sets. 14