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(July)

COMPUTER SCIENCE

(Honours)

(Artificial Intelligence)

(CS–602 BT)

Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **one** question from each Unit

UNIT—I

1. *(a)* How does an AI program differ from a traditional program? List any three application areas of AI. 4+3=7

(b) What do you understand by uninformed search? Explain any two uninformed search strategies with example. 2+6=8

2. *(a)* Give the formal description of a problem as a state space problem. Illustrate with a suitable example. 4+3=7

(b) Write a short note on 'iterative deepening search'. 5

(c) List three abilities that a machine must possess in order to pass the Turing test. 3

UNIT—II

3. *(a)* How is a heuristic search strategy different from that of uniformed search strategy? 4

(b) Discuss hill climbing search with an example. What are the problems associated with hill climbing search? Explain how each of these problems can be resolved. 5+3+3=11

4. *(a)* What is problem reduction search? Explain the AO^* algorithm for problem reduction search with a suitable example. 3+10=13

(b) What are the two types of nodes involved in the minmax algorithm? 2

UNIT—III

5. Convert the following English sentences into first-order predicate logic statements : 3×5=15

(a) Every child loves chocolates.

(b) Not all students take both History and Biology.

(c) None of the students passed in both History and Biology.

(d) Some real numbers are rational.

(e) I will carry an umbrella if it rains.

6. *(a)* Distinguish between forward reasoning and backward reasoning. 5

(b) Convert the following to clausal form : 5

$$x[P(x) \quad (\ y Q(x, y) \quad \sim R(y))]$$

(c) What are the steps involved in resolution refutation proof? 5

UNIT—IV

7. *(a)* Describe the architecture of an expert system. 10

(b) Write a short note on morphological analysis phase of natural language processing. 5

8. *(a)* Discuss some of the characteristics of an expert system. 5

(b) Write a short note on learning by induction. 5

(c) Explain some of the challenges in natural language processing. List three application areas of NLP. 2+3=5

UNIT—V

9. *(a)* List five data types of Prolog with an example of each. 5

(b) Explain, with an example, how facts and rules are represented in Prolog. Represent the following as facts and rules in Prolog : 5+1+1+2+1=10

(i) Aron likes Mary.

(ii) John does not like Burgers.

(iii) *X* and *Y* are friends if they like each other.

(iv) If *X* is the father of *Y* then *X* is the parent of *Y*.

10. *(a)* Write a program in Prolog to perform depth first search. 8

(b) Explain how operators are created in Prolog. 7

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