TDC (CBCS) Even Semester Exam., 2023

COMPUTER SCIENCE

(Honours)

(6th Semester)

Course No. : CSCHCC–601T

(Artificial Intelligence)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* of the following questions : 2×10=20

1. Define AI in terms of human performance.

2. What is the role of agent in AI?

3. Discuss the importance of Turing test.

4. Differentiate informed and uninformed search techniques.

5. Why are heuristics search technique important in AI? Which searching algorithm uses heuristic function?

6. What is the purpose of alpha-beta pruning technique?

7. What is resolution principle in first-order predicate logic?

8. How does predicate logic differ from propositional logic?

9. What are existential and universal quantifiers in predicate logic? Give examples.

10. Define probabilistic reasoning. Give example.

11. What are the applications of truth maintenance system (TMS)?

12. Write down the different applications of Bayesian probabilistic inference theorem.

13. Give the formal definition of CFG.

14. Define par`ser. Give an example of parser.

15. Why is transition network important for NLP? What does RTN stand for?

SECTION—B

Answer any *five* of the following questions : 6×5=30

16. Discuss intelligent agents with their structure, behavior and environment.

17. What are the various areas where AI can be used? Discuss.

18. Using constraint satisfaction procedure, solve the following crypt-arithmetic :

$$\begin{array}{r} \text{CROSS} \\ +\ \text{ROADS} \\ \hline \text{DANGER} \end{array}$$

19. Explain 'A*search' algorithm with an example.

20. Translate the following sentences into formulas in predicate logic :

(a) John likes all kinds of food.

(b) Apple and vegetable are food.

(c) Anything anyone eats and not killed as food.

(d) Bill eats peanuts and is still alive.

(e) Sue eats everything Bill eats.

21. Define the following terms :

(a) Unification

(b) Semantic Nets

(c) Frame and Scripts

22. With an example, differentiate forward reasoning and backward reasoning.

23. Discuss the different methods which deal with uncertainty and inconsistencies in AI.

24. What do you mean by natural language processing? Discuss any two real world problems which are addressed by natural language processing.

25. Derive a parse tree for 'John loves the dog' using the following production rules :

$S \rightarrow NP\ VP$
$NP \rightarrow N\ DET\ N$
$VP \rightarrow VNP$
$DET \rightarrow the$
$V \rightarrow loves$
$N \rightarrow John\ I\ dog$

(a) Use top-down parsing.

(b) Use bottom-up parsing.

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