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VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD

## B.E. (I.T.) IV Year I-Semester Main Examinations, December-2017

Artificial Intelligence
Time: $\mathbf{3}$ hours
Note: Answer ALL questions in Part-A and any FIVE from Part-B
Part-A ( $10 \times 2=20 \mathrm{Marks}$ )

1. Outline four applications of AI.
2. What is State space search?
3. What is Alpha-Beta Pruning?
4. Find resolvent of the clauses in the set $\{\mathrm{AV} B, \sim \mathrm{AV} D, \mathrm{C} V \sim \mathrm{~B}\}$
5. List the approaches to Knowledge representation.
6. What are the programming techniques in Prolog?
7. What is an Expert System?
8. State and prove Bayes theorem.
9. Define Artificial Neural Networks.
10. List some commonly used activation functions.

Part-B $(5 \times 10=50$ Marks $)$
11. a) Explain $A^{*}$ algorithm with an example.
b) What is Manhattan distance heuristic? Solve the following 8-puzzle problem by using Manhattan distance heuristic. $(\mathrm{g}(\mathrm{n})=$ depth of node n in the search tree).

| 3 | 7 | 6 |
| :--- | :--- | :--- |
| 5 | 1 | 2 |
| 4 |  | 8 |


| 5 | 3 | 6 |
| :--- | :--- | :--- |
| 7 |  | 2 |
| 4 | 1 | 8 |

Goal state
12. a) Write MINIMAX procedure and illustrate the method with the game of Tic-Tac-Toe.
b) Show that a set $S=\{\sim(A \vee B),(B \rightarrow C),(A \vee C)\}$ is consistent using Tableau method
13. a) Develop the prolog code to find GCD of two integers.
b) Discuss about knowledge representation using frames.
14. a) Discuss in details Truth Maintenance Systems
b) For the Belief Network given below and the corresponding probabilities, compute the following probabilities.
i) $\mathrm{P}(\mathrm{B}, \sim \mathrm{E}, \mathrm{A}, \mathrm{J}, \mathrm{M})$
ii) P (John calls | Burglary).

15. a) Explain about Hopfield network.
b) Discuss about Single layer Feed Forward network.
16. a) Obtain the resolution proof for the proposition "Angle B is equal to Angle C" from the following axioms.
i) If a triangle is equilateral then it is isosceles.
ii) If a triangle is isosceles then two sides AB and AC are equal.
iii) If AB and AC are equal then angle B and angle C are equal.
iv) ABC is an equilateral triangle.
b) Apply Branch and Bound algorithm on the following state space and show the contents of OPEN and CLOSED lists.

17. Answer any two of the following:
a) Discuss about Semantic network with an example.
b) Discuss about Certainty Factor Theory
c) Discuss about Recurrent networks

