**Code No: 157AM** **R18**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech IV Year I Semester Examinations, February/March - 2022**
**ARTIFICIAL INTELLIGENCE**
**(Computer Science and Engineering)**

**Time: 3 Hours** **Max. Marks: 75**

**Answer any five questions**
**All questions carry equal marks**
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1.a) Give an overview of different kinds of agent programs.
b) Explain A* algorithm. What are the conditions for optimality? [7+8]

2.a) Explain hill-climbing algorithm with an example. What are the problems associated with hill-climbing algorithm.
b) What is an AND-OR search tree/graph? Give algorithm for searching AND-OR tree/graph. [8+7]

3. Demonstrate with an example the working of '*minimax*' algorithm and explain alpha-beta pruning technique. [15]

4.a) What are different types of local consistencies? Explain.
b) Consider the following sentence and determine whether this sentence is valid using enumeration and resolution.
$[(Food \Rightarrow Party) \vee (Drinks \Rightarrow Party)] \Rightarrow [(Food \wedge Drinks) \Rightarrow Party]$ [7+8]

5.a) Represent the following sentences using first-order logic:
i) One's mom is one's female parent.
ii) One's husband is one's male spouse
iii) Parent and child are inverse relations.
iv) A grand parent is a parent of one's parent.
b) Write short note on circumscription and default logic. [7+8]

6.a) Trace the operation of the unification algorithm on each of the following pairs of literals:
i) $f(Marcus)$ and $f(Caesar)$
ii) $f(x)$ and $f(g(y))$
iii) $f(Marcus, g(x,y))$ and $f(x, g(Caesar, Marcus))$
iv) $p(x,x)$ and $p(y,z)$
b) Explain how reasoning is accomplished using semantic networks. [8+7]

7.a) Comment on the complexity of classical planning.
b) Explain job-shop scheduling problem with and without resource constraints. [7+8]

8. Generate decision tree for the following data: [15]

| Outlook | Temp | Humidity | Windy | Play Golf |
|---|---|---|---|---|
| Rainy | Hot | High | False | No |
| Rainy | Hot | High | True | No |
| Overcast | Hot | High | False | Yes |
| Sunny | Mild | High | False | Yes |
| Sunny | Cool | Normal | False | Yes |
| Sunny | Cool | Normal | True | No |
| Overcast | Cool | Normal | True | Yes |
| Rainy | Mild | High | False | No |
| Rainy | Cool | Normal | False | Yes |
| Sunny | Mild | Normal | False | Yes |
| Rainy | Mild | Normal | True | Yes |
| Overcast | Mild | High | True | Yes |
| Overcast | Hot | Normal | False | Yes |
| Sunny | Mild | High | True | Nl |

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