

Time: 3 Hours

Total Marks = 80

Note:

- (i) Each question carries 20 marks
- (ii) **Question 1** is compulsory
- (iii) Attempt any **three (3)** from the remaining questions
- (iv) Assume suitable data wherever required

Q1. Attempt any **four (4)** questions from the following: [20]

- (a) Compare Model based agent with Goal based agent.
- (b) Given a full 5-gallon jug and an empty 3- gallon jug, the goal is to fill the 3-gallon jug with exactly one gallon of water. Give state space representation
- (c) Explain conditional independence relation in belief network with example
- (d) Describe the environmental characteristics of WUMPUS world Puzzle.
- (e) What is Supervised and Unsupervised learning? Give example of each.

Q2 (a) Draw and illustrate the Architecture of Learning agent. Describe each of its component w.r.t. Medical diagnosis system [6+4]

(b) Distinguish between Propositional logic (PL) and first order predicate logic (FOPL) knowledge representation mechanisms. Take suitable example for each point of differentiation. [10]

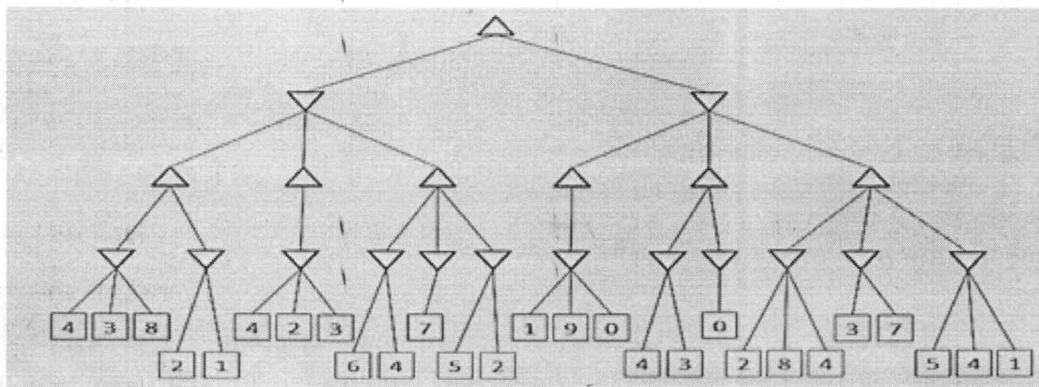
Q3 (a) Consider the following set of sentences [10]

- a) Whoever can read is literate
- b) Birds are not literate
- c) Some birds are intelligent

Prove the following using forward reasoning **“Some who are intelligent cannot read”**

(b) Evaluate **IDA* search** algorithms based on performance measures such as Complete, Optimal, Time and Space complexity with justification. Illustrate its working with a suitable example. [6+4]

Q4 (a) Apply Alpha-Beta Pruning on following example [10]



(b) Define Belief Network. Describe the steps of constructing belief network with an example. What types of inferences can be drawn from that? [2+6+2]

Q5 (a) Explain Partial order planning with example. [10]

(b) Describe each component in the architecture of Expert System? What are the limitations of Expert System? [10]

Q6 Answer any two (2) of the following [20]

(a) Construct the decision tree from the following set of training data. Classify the new record: outlook=rain, temp =70, humidity=65, windy=true.

Tid	Refund	Marital Status	Taxable Income	Cheat
1	Yes	Single	>100	No
2	No	Married	80-100	No
3	No	Single	<80	No
4	Yes	Married	>100	No
5	No	Divorced	80-100	Yes
6	No	Married	<80	No
7	Yes	Divorced	>100	No
8	No	Single	80-100	Yes
9	No	Married	<80	No
10	No	Single	80-100	Yes

(b) What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence.

(c) Write a short note on local search algorithms.
