SASTRA DEEMED UNIVERSITY

(A University under section 3 of the UGC Act, 1956)

End Semester Examinations

May 2025

Course Code: **INT314**

Course: **ARTIFICIAL INTELLIGENCE & LOGICAL REASONING**

QP No. **:U129-6**

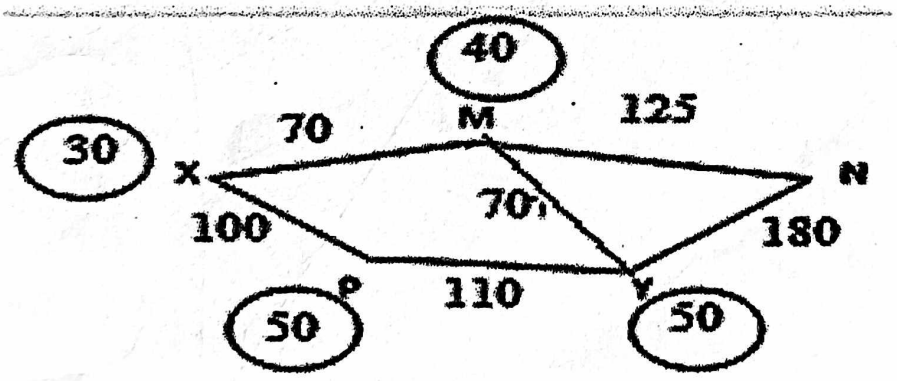
Duration: **3** hours

Max. Marks**:100**

PART – A

Answer any Four questions **4 x 20 = 80 Marks**

1. Your Bot needs to reach Mall in a city from Airport (X). Apply A* search to get minimal cost. Critic the process by explaining concepts



2. Illustrate the components of planning system.

3. a) A product manufactured in a factory may turn out to be defective because of either a machine malfunction and/or human error during production. The joint probabilities for the outcomes are as follows:

The probability of **Defective**:

- Machine malfunction and Human error :0.05
- Machine malfunction but No Human error :0.03
- No Machine malfunction but Human error :0.02
- Neither Machine malfunction nor Human error :0.01

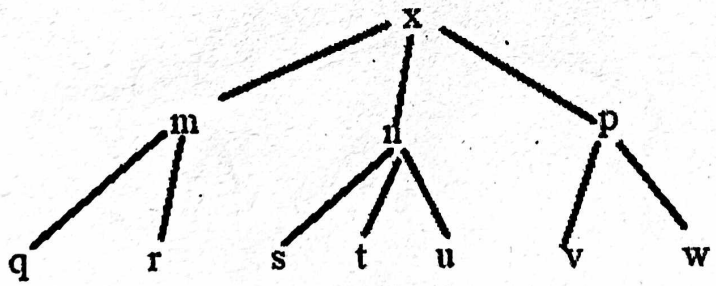
For a **non-defective** product:

- Machine malfunction and Human error :0.02
- Machine malfunction but No Human error :0.01
- No Machine malfunction but Human error :0.04
- Neither Machine malfunction nor Human error :0.82.

Find out probability of defect due to malfunction and the probability that there was no human error given that the product is defective. (10)

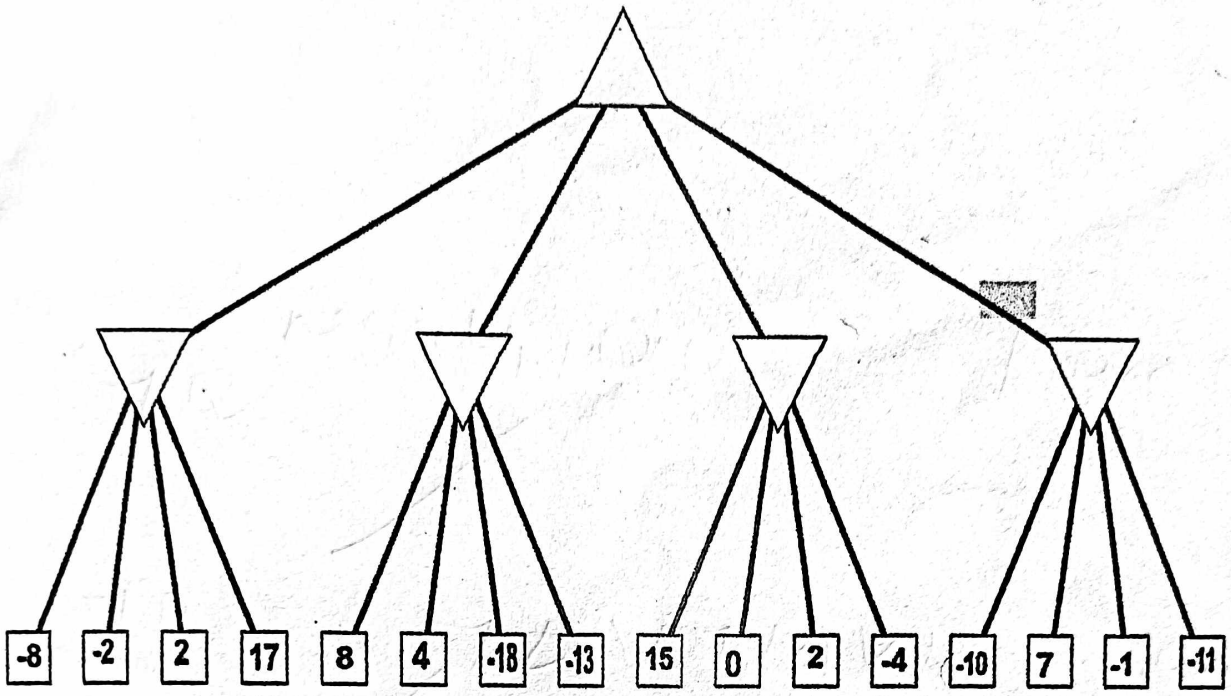
b) Elaborate unification algorithm. (10)

4. a) Apply Depth First Search and analyze the searching process in a table using the order of fringe queue. Goal is 'u'. (10)



b) Sun and Moon are playing Chess game. They have decided to follow the strategy of min-max algorithm. As a friend you need to articulate the steps and the logic behind this algorithm enable them to choose the winning path. Give a part of sample tree. (10)

5. a) Apply alpha beta pruning to the following tree and find the pruned branches along with alpha beta values. (10)



b) Illustrate resolution by refutation steps. (10)

6. a) Illustrate the representation of instant and 'isa' relationship of FOL. (10)

b) Summarize the components of Expert Systems. (10)

PART – B

Answer the following **1 x 20 = 20 Marks**

7. a) The number non-attacking positions for each queen in 8 queen problem are given (for 4 strings of positions.). They are 37,44,26,11. Estimate and Define fitness function. (5)

b) Define Manhattan distance and Calculate Manhattan distance for the following. (5)

Start node.

3		6
8	4	1
5	2	7

Goal node

6	5	3
2	1	4
	7	8

c) Discuss the Action, Precondition and Effect of PDDL with example. (5)

d) Develop FOL axiom for the following sentence. (5)
"Everyone student who is taking AI is cool"
"Rishi takes either Analysis or ML"
"Mr.Max owns two houses"

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