Code No: 155DY **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, July/August - 2023
ARTIFICIAL INTELLIGENCE
(Common to CE(SE), CSE(CS), CSE(DS))

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

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Define the terms: state, state space, search tree.	[2]
b)	What is heuristic function? What is its role in AI?	[3]
c)	What is Node consistency?	[2]
d)	What is a knowledge-based agent?	[3]
e)	What is binary resolution rule?	[2]
f)	Write short notes on Truth maintenance systems.	[3]
g)	Brief about Contingent plans.	[2]
h)	Define classical planning.	[3]
i)	Define conditional probability	[2]
j)	What are deterministic node and a leak node?	[3]

PART – B

(50 Marks)

2.a) Explain about a simple reflex agent with a neat schematic diagram.
b) Write an algorithm for A^* search and explain it by considering an example. [5+5]

OR

3.a) Write an algorithm for Breadth First Search and explain how it is used in searching for a solution.
b) "Bidirectional search can enormously reduce time complexity, but it is not always applicable and may require too much space". Justify your answer. [5+5]

4.a) Explain how alpha–beta pruning decrease the search space.
b) Distinguish between Forward and Backward chaining. [5+5]

OR

5.a) Solve the following cryptarithmetic puzzle.

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  CROSS
 +ROADS
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 DANGER
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b) Explain about "Proof by resolution" with a suitable example. [5+5]

6.a) List and explain the steps of Knowledge engineering projects.
b) Write about backward chaining algorithm in FOL. [5+5]

OR

7.a) Write down logical representations for the following sentences.
i) Horses, cows, and pigs are mammals.
ii) An offspring of a horse is a horse.
iii) Bluebeard is a horse.
iv) Bluebeard is Charlie's parent.
b) Describe the following.
i) Circumscription
ii) Default logic. [4+6]

8.a) Explain about Forward (progression) state-space search.
b) Write the PDDL description of an air cargo transportation planning problem. [5+5]

OR

9.a) What is Multi agent planning? Explain.
b) How to translate a PDDL description into a form that can be processed by SATPLAN? [5+5]

10.a) Using full joint distribution, calculate the following:
i) P(toothache).
ii) P(Cavity).
iii) P(Toothache | cavity).
iv) P(Cavity | toothache ∨ catch).

	toothache		*¬toothache*	
	catch	*¬catch*	*catch*	*¬catch*
cavity	0.108	0.012	0.072	0.008
¬cavity	0.016	0.064	0.144	0.576

b) Explain the terms:
i) Supervised learning
ii) Unsupervised learning
iii) Reinforcement learning. [4+6]

OR

11.a) Explain about Rejection sampling in Bayesian networks.
b) Write an algorithm to construct decision tree and explain with an example. [5+5]

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