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Code No. : 15258 N

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (CSE & AIML) V-Semester Main Examinations, Jan./Feb.-2024

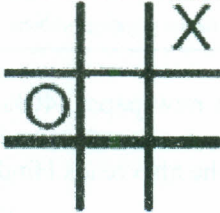
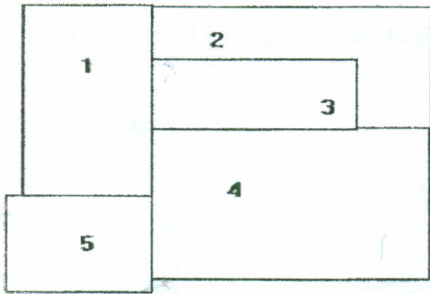
Artificial Intelligence

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Write the PEAS description for the automatic taxi	2	1	1	1
2.	Write the any heuristic function that can be used in solving 8-puzzle problem with example	2	1	1	1,2
3.	What is the static evaluation function for the following 	2	2	2	1
4.	Write the Backus_Naur form for the Propositional logic sentences	2	1	2	1,2
5.	What is unification ? Give example.	2	1	3	1,2
6.	For each pair of atomic sentences, give the most general unifier if it exists I. Older(Father (y), y), Older (Father (x), John). II. Knows(Father (y), y), Knows(x, x). III. P(A,B,B), P(x, y, z). IV. Q(y,G(A,B)), Q(G(x, x), y).	2	2	3	1,2
7.	Is it possible to colour the map using only 3 colors Red Blue and Green such that no two adjacent regions have the same colour. ?Justify your answer 	2	2	4	1

Contd... 2

8.

Given the action schemas and initial state from given figure, what are all the applicable concrete instances of Fly(p, from,to) in the state described by $At(P1, JFK) \wedge At(P2, SFO) \wedge Plane(P1) \wedge Plane(P2) \wedge Airport(JFK) \wedge Airport(SFO)$?

2 2 4 1,2

Init($At(C_1, SFO) \wedge At(C_2, JFK) \wedge At(P_1, SFO) \wedge At(P_2, JFK)$
 $\wedge Cargo(C_1) \wedge Cargo(C_2) \wedge Plane(P_1) \wedge Plane(P_2)$
 $\wedge Airport(JFK) \wedge Airport(SFO)$)
Goal($At(C_1, JFK) \wedge At(C_2, SFO)$)
Action(*Load*(c, p, a),
 PRECOND: $At(c, a) \wedge At(p, a) \wedge Cargo(c) \wedge Plane(p) \wedge Airport(a)$
 EFFECT: $\neg At(c, a) \wedge In(c, p)$)
Action(*Unload*(c, p, a),
 PRECOND: $In(c, p) \wedge At(p, a) \wedge Cargo(c) \wedge Plane(p) \wedge Airport(a)$
 EFFECT: $At(c, a) \wedge \neg In(c, p)$)
Action(*Fly*(p, from, to),
 PRECOND: $At(p, from) \wedge Plane(p) \wedge Airport(from) \wedge Airport(to)$
 EFFECT: $\neg At(p, from) \wedge At(p, to)$)

Figure A PDDL description of an air cargo transportation planning problem.

9.

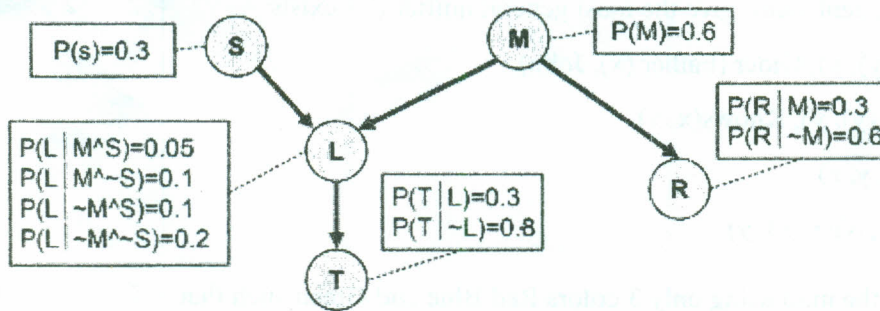
In a survey among few people, 60% read Hindi newspaper, 40% read English newspaper and 20% read both. If a person is chosen at random and if he already reads English newspaper find the probability that he also reads Hindi newspaper

2 2 5 1,2

10.

Given Bayes Net where T: The lecture started by 10:35 L: The lecturer arrives late R: The lecture concerns robots M: The lecturer is Manuela S: It is sunny Find the value of $P(S \wedge \sim M \wedge L \wedge \sim R \wedge T)$?

2 2 5 1,2



Part-B (5×8 = 40 Marks)

11. a)

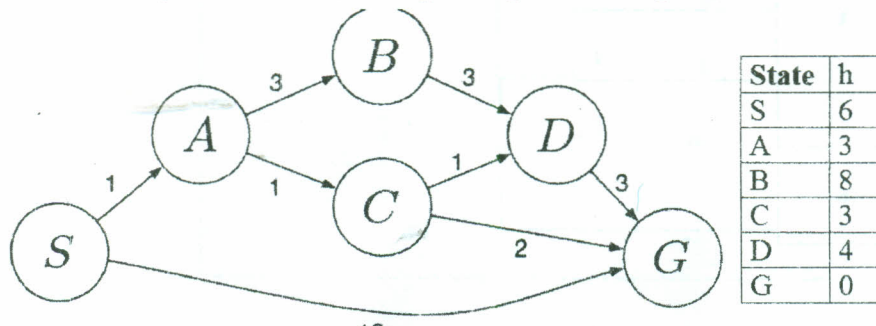
Explain the goal based agent with neat diagram

4 1 1 1

b)

Find the best path from S to G using A* algorithm using h as heuristic function

4 3 1 1,2



<p>12. a)</p>	<p>Find which all nodes are not generated by the Alpha Beta Procedure in the following case.</p> <div style="text-align: center;"> </div>	<p>4 3 2 1,2</p>
<p>b)</p>	<p>Decide whether the following sentence is valid and satisfiable</p> <p>a) $\text{Smoke} \Rightarrow \text{Fire} \Rightarrow ((\text{Smoke} \wedge \text{Heat}) \Rightarrow \text{Fire})$</p> <p>$((\text{Smoke} \wedge \text{Heat}) \Rightarrow \text{Fire}) \Leftrightarrow ((\text{Smoke} \Rightarrow \text{Fire}) \vee (\text{Heat} \Rightarrow \text{Fire}))$</p>	<p>4 3 2 1,2</p>
<p>13. a)</p>	<p>Represent the given sentences into FOPL and convert them into clausal form</p> <p>(a) Marcus was a man. (b) Marcus was a Roman. (c) All men are people. (d) Caesar was a ruler. (e) All Romans were either loyal to Caesar or hated him (or both). (f) Everyone is loyal to someone. (g) People only try to assassinate rulers they are not loyal to. (h) Marcus tried to assassinate Caesar.</p>	<p>4 3 3 1,2</p>
<p>b)</p>	<p>Explain the Knowledge Engineering process</p>	<p>4 1 3 1,2</p>
<p>14. a)</p>	<p>Explain the heuristics used in backtracking algorithm for solving CSP with example</p>	<p>4 2 4 1,2</p>
<p>b)</p>	<p>Write the PDDL description for the given block world problem</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p><i>Initial State</i></p> </div> <div style="text-align: center;"> <p><i>Goal State</i></p> </div> </div>	<p>4 3 4 1,2</p>
<p>15. a)</p>	<p>Explain the variable elimination Algorithm used for inference in Bayesian Networks with example.</p>	<p>4 2 5 1,2</p>