Hall Ticket Number:

Code No. : 16204 N

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CSE: CBCS) VI-Semester Main Examinations, May-2019

Artificial Intelligence

Time: 3 hours Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Q.No.	Stem of the question	M	L	CO	PO
	Part-A (10 × 2 = 20 Marks)				
1.	Define the heuristic function value that can be used in finding the solution for 8-puzzle problem and find the value for the following initial and goal state Initial state: (1 7 6 / 2 4 5 / 3 8) Goal state: (1 2 3 / 4 6 5 / 7 8)	2	3	1	1,2
2.	'AI is viewed as the study and construction of rational agents' What do you mean by the agent here in the context of AI?	2	3	1	1,2
3.	What is static evaluation function? Give example.	2	2	2	1,2
4.	Decide whether the following sentence is valid and unsatisfiable. ((smoke Λ fire)-> fire)<->((smoke->heat)V(heat->fire))	2	2	2	1
5.	Compare the propositional logic with predicate logic.	2	2	3	1
6.	Convert the following into clausal form – (∀x) ((∃y) Q(x, y) <--> ~ ((∃z) P (z) Λ R(x)))	2	3	3	1,2
7.	How you can find the marginal probability from the joint probability? Give example.	2	2	4	1,2
8.	Given that probability of the statement 'John has a viral" is 0.20. Probability of John being observed sneezing when he had viral is 0.8 and probability of John being observed sneezing when he did not have viral is 0.2. Find the probabilities of the following statements. i) John having viral if he is seen sneezing ii) John having viral if he is not sneezing	2	3	4	1,2
9.	What is the meaning of false positive and false negative example in learning?	2	2	5	1
10.	Draw the neural network to implement the Boolean 'OR' operation.	2	3	5	1,2
	Part-B (5 × 10 = 50 Marks)				
11.a)	While driving, which is the best policy? Always put your directional blinker on before turning, Never use your blinker Look in your mirrors and use your blinker only if you observe a car that can observe you? What kind of reasoning did you need to do to arrive at this policy (logical, goal-based, or utility based?- What kind of agent design is necessary to carry out the policy (reflex, goal-based, or utility based?	5	2	1	1,2

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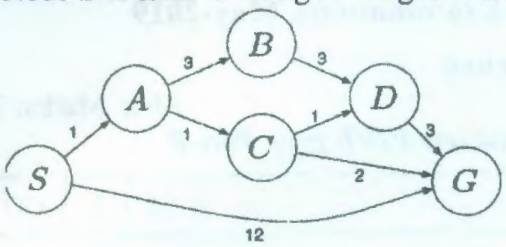
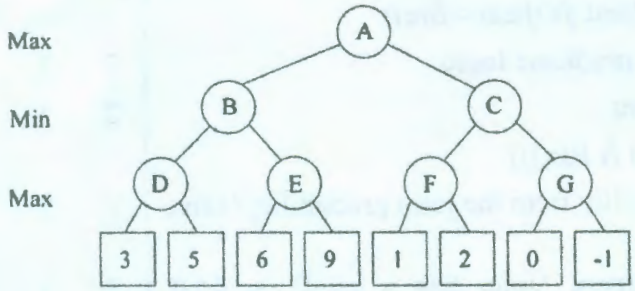
b)	Find the best heuristic function which can be used for finding the path from Node S to node G using A* Algorithm. 		5	3	1	1,2

State	H1	H2
S	3	4
A	1	1
B	6	5
C	3	3
D	4	2
G	0	0

12.a)	Explain forward reasoning and backward reasoning in propositional logic with example.		5	2	2	1,2
b)	Apply the alpha-Beta Pruning for the following graph and find the number of alpha beta cut off for the graph. 		5	2	2	1,2
13.a)	Explain the knowledge engineering process in detail.		5	2	3	1,2
b)	Represent the following sentences in first-order logic, using a consistent vocabulary (which you must use and define) i) Not all students take both History and Biology. ii) Politicians can fool some of the people all of the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time. iii) One's husband is one's male spouse		5	3	3	1,2
14.a)	State and prove the Bayes theorem.		5	2	4	1,2
b)	After your yearly checkup, the doctor has bad news and good news. The bad news is that you tested positive for a serious disease, and that the test is 99% accurate (i.e., the probability of testing positive given that you have the disease is 0.99, as is the probability of testing negative given that you don't have the disease). The good news is that this is a rare disease, strikingonly one in 10,000 people. Why is it good news that the disease is rare? What are the chances that you actually have the disease?		5	3	4	1,2

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15.a)	Construct the decision tree using the following set of examples to decide tree belongs to which class based on density, grain and hardness.	5	3	5	1,2

Density	Grain	Hardness	Class
Heavy	Small	Hard	Oak
Heavy	Large	Hard	Oak
Heavy	Small	Hard	Oak
Light	Large	Soft	Oak
Light	Large	Hard	Pine
Heavy	Small	Soft	Pine
Heavy	Large	Soft	Pine
Heavy	Small	Soft	Pine

b)	Explain the perceptron learning algorithm with diagram.	5	2	5	1,2
16.a)	Describe the properties of task environment.	5	2	1	1
b)	Explain the minmax procedure with example.	5	2	2	1,2
17.	Answer any ***two*** of the following:				
a)	Consider a world in which there are only four propositions, A, B, C, and D. How many models are there for the following sentences? (1) A V B, (2) A ∧ B, (3) A ∧ B ∧ C	5	2	3	1,2
b)	An admission committee for a college is trying to determine the probability that an admitted candidate is really qualified. The relevant probabilities are given in the Bayes network shown below. Calculate P(A/D). where p(A)=1/2, p(B/A)=1, p(B/~A)=1/2, p(C/A)=1, p(C/~A)=1/2, p(D/B,C)=1, p(D/B,~C)=1/2, p(D/~B,C)=1/2, p(D/~B,~C)=0, A= application is qualified, B=Applicant has high grade point average C= Applicant has excellent recommendation D=Applicant is admitted.	5	3	4	1,2
c)	Construct by hand a neural network that computes the XOR function of two inputs. Indicate properly your assumptions.	5	2	5	1,2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	60
2	Knowledge on application and analysis (Level-3 & 4)	40
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	-