VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
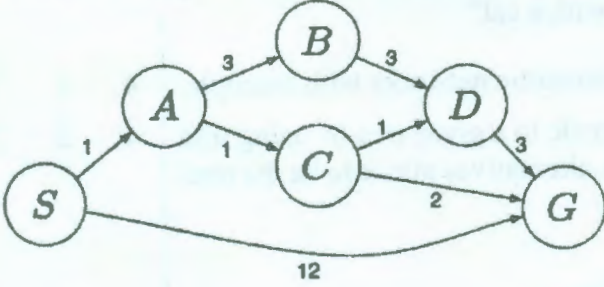### M.Tech. (CSE: CBCS) I-Semester Main Examinations, January-2019
Artificial Intelligence

Time: 3 hours   Max. Marks: 60

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 AI and write its applications.	2	2	1	1
2.	Given a search tree with uniform branching factor of 4. Calculate the maximum number of nodes expanded by a breadth first search for a goal node at depth 5.	2	3	1	1
3.	Draw the frame structure for the vehicle 'CAR'	2	3	2	2
4.	Convert the following into clausal form (PVQ)->R	2	2	2	1
5.	Write the operators used in planning.	2	2	3	1
6.	Given: A and B are Boolean random variables. P(A=True)=0.3,P(A=False)=0.7,P(B=True|A=True)=0.4, P(B=False|A=True)=0.6,P(B=True|A=False)=0.6,P(B=False|A=False)=0.4. Calculate P(A=True|B=False)	2	3	3	1
7.	How attributes are selected while constructing the decision tree when set of examples are given?	2	2	4	1
8.	Draw the neural network for implementing two input Boolean OR operation.	2	3	4	2
9.	Differentiate the crisp set from fuzzy set with example.	2	2	5	1
10.	Specify the different speech acts with examples.	2	2	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	Explain the Hill climbing algorithm and give solution for its drawback .	4	2	1	1
b)	Find the best path from Node S to node G using the Given Heuristic function.	4	3	1	2

State	h1	h2
S	4	3
A	2	2
B	6	5
C	2	1
D	3	2
G	0	0

		M	L	CO	PO
12. a)	Explain the rule based expert system with neat diagram.	4	2	2	1
b)	Assume the following facts	4	3	2	2

1. Whoever can read is literate.
2. Dolphins are not literate.
3. Some dolphins are intelligent.

i) Convert the sentences into clausal form
ii) Prove that 'Some who are not intelligent cannot read' using resolution refutation method.

13. a) What is Sussaman anamoly? Explain with example.	4	2	3	1
b) We want to design a troubleshooting advisor for PCs. Let CF be a Boolean random variable representing whether the computer fails or not. Assume there are two possible causes of failure: Electricity-failure and Malfunction-of-computer, represented using the Boolean random variables EF and MC, respectively.	4	3	3	2

Let $P(EF) = 0.1$, $P(MC) = 0.2$,

$P(CF \mid {\sim}EF, {\sim}MC) = 0.0$, $P(CF \mid {\sim}EF, MC) = 0.5$,

$P(CF \mid EF, {\sim}MC) = 1.0$, and $P(CF \mid EF, MC) = 1.0$.

Draw the Bayesian Network (with conditional probability table) for this problem and compute $P(EF \mid CF)$.

14. a) Explain multilayer feed-forward neural network with neat diagram.	4	2	4	1
b) Find the proposition rules which can be learnt from the following examples.	4	3	4	2

Size	Colour	Shape	Weight	Expensive
Big	Red	Square	Heavy	Yes
Small	Blue	Triangle	Light	Yes
Small	Blue	Square	Light	No
Big	Green	Triangle	Heavy	No
Big	Blue	Square	Light	No
Big	Green	Square	Heavy	Yes
Small	Red	Triangle	Light	Yes

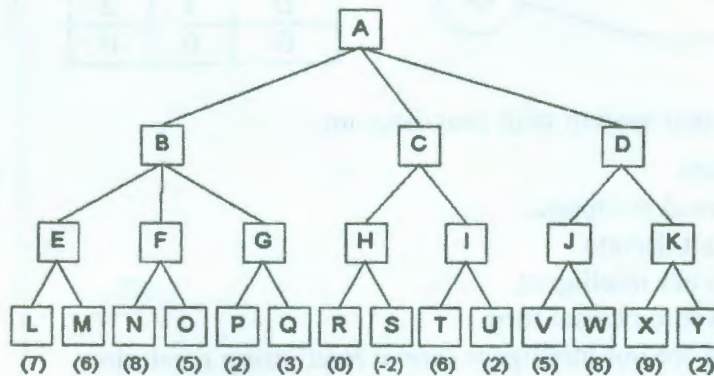|				
15. a) Explain the Sugeno fuzzy inferencing.	4	2	5	1
b) Write the grammar and draw parse tree to parse the following sentence "The beautiful girl saw a man in the park with a cat"	4	2	5	2

16. a) Explain the knowledge representation using semantic networks with example.	4	2	1	1
b) Calculate the Backed-up values for the each node to a given tree by using min max procedure.Consider A starts as max node alternatives min is to be the next node.	4	2	2	2


```
                          A
         _____|_____
        |                   |                   |
        B                   C                   D
    ____|____           ____|____           ____|____
   |    |    |         |         |         |         |
   E    F    G         H         I         J         K
  _|_  _|_  _|_       _|_       _|_       _|_       _|_
 | | | | | | | |     | |       | |       | |       | |
 L M N O P Q R S     T U       V W       X Y
(7)(6)(8)(5)(2)(3)(0)(-2)     (6)(2)     (5)(8)     (9)(2)
```

17. Answer any *two* of the following:				
a) State and prove the Bayes' theorem.	4	2	3	1

b) Consider a Perceptron with 3 inputs and one output unit that uses a linear threshold activation function with threshold 0.7, and initial weights w1 = 0.3, W2 = 0.6, W3 = 0.8.
    i) What is the output of the Perceptron given the inputs I1 = 1, I2 = 0, I3 = 1?
    ii) What are the weights values after applying the Perceptron learning rule with the above input and desired output 0 (learning rate (η) = 0.2)?
	4	2	4	2

c) Write about the ambiguities that may arise in natural language processing.	4	2	5	1

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)	--

ಜಞಜಞಜಞಜಞ