Paper / Subject Code: 48813 / Artificial Intelligence

TE(AI&DS/sem-V/c-schene/R-2019/Qpcode-14546/Date-28/11/22

[3 hrs] **[80 Marks]**

Note: 1. Question 1 is compulsory
2. Answer any three out of remaining question
3. Assume suitable data where required.

Q1

A. What is PEAS descriptor? Give PEAS descriptor for robot maid for cleaning the house. **[5]**

B. Discuss different applications of AI. **[5]**

C. Draw and explain architecture of Expert System. **[5]**

D. In a class, there are 80% of the students who like English and 30% of the students who likes English and Mathematics, and then what is the percentage of students those who like Math, also like English? Solve it using Conditional probability. **[5]**

Q2

A. Define chromosome, selection, fitness function, cross over and mutation as used in Genetic Algorithm. Explain how Genetic Algorithm in works. **[10]**

B. Draw and describe the architecture of Utility based agent. How is it different from Model based agent? **[10]**

Q3

A. Explain A* algorithm in detail. **[10]**

B. Define belief Network. Describe the steps of constructing belief network with an example. **[10]**

Q4

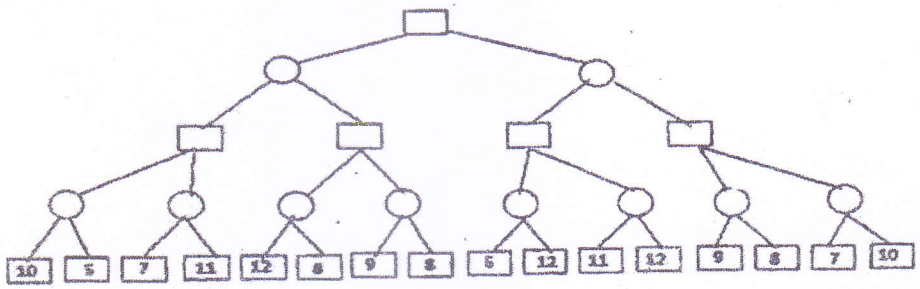
A. Illustrate forward chaining and backward chaining in propositional logic with example. **[10]**

B. Explain different types of learning in AI. **[10]**

Q5

A. Consider the following axioms **[10]**
All people who are graduating are happy.
All happy people smile.
Someone is graduating.
Prove that "Is someone Smiling?" using resolution technique. Draw resolution tree.

B. Explain Alpha-beta pruning algorithm. Apply alpha beta pruning on following example considering first node as MAX. **[10]**



Q.6

A. Explain hill climbing algorithm with example. Explain the problems faced by hill climbing algorithm. **[10]**

B. Explain total order planning and partial order planning in detail with example. **[10]**

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Time: 3 hours **Max. Marks: 80**

N.B. (1) Question one is Compulsory.
(2) Attempt any 3 questions out of the remaining.
(3) Assume suitable data if required.

Q. 1 (a) Explain features of data warehouse. 05
(b) Demonstrate with diagram the process of KDD. 05
(c) What is Market basket analysis? 05
(d) Explain with example confusion matrix, accuracy and precision. 05

Q. 2 a) Suppose that a data warehouse for Big_University consists of the four dimensions Student, Course, Semester and Instructor, and two measures count and avg_grade, where count is the number of students and average grade is the course grade of the student.
Perform following tasks:
i. Design the star schema for the Big_University.
ii. Create a base cuboid for the Big_university database and apply different OLAP operations. 10

b) What is clustering? Explain K-mean clustering algorithm.Suppose that the data mining task is to cluster the following items into two clusters.
{2, 4, 10, 12, 3, 20, 30, 11, 25}. Apply k-means algorithm. 10

Q. 3 a) Explain ETL process in detail. 10
b) Consider the transaction database given below:
Use Apriori Algorithm with min-support count= 2 and min-confidence = 60%, to find frequent itemset andstrong association rules. 10

TID	Items
10	1, 3, 4
20	2, 3, 5
30	1, 2, 3, 5
40	2 , 5
50	1, 3, 5

Q. 4 a) Illustrate any one classification technique for the following dataset.
Show how we can classify new tuple **(Homeowner=YES, Status=Employed, Income= Average).** 10

Sr. No	Homeowner	Status	Income	Defaulted
1	Yes	Employed	High	No
2	No	Business	Average	No
3	No	Employed	Low	No
4	Yes	Business	High	No
5	No	Unemployed	Average	Yes
6	No	Business	Low	No
7	Yes	Unemployed	High	No
8	No	Employed	Average	Yes
9	No	Business	Low	No
10	No	Employed	Average	Yes

b) What is web mining? Explain web content mining in detail 10

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Q. 5 a) Explain different data cleaning techniques. 10
b) Clearly explain the working of DBSCAN algorithm using appropriate diagram 10

Q.6 a) Explain Multidimensional and multilevel rule mining with example. 10
b) Explain with example different data sampling techniques. 10

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