

Time: 03 Hours

Marks: 80

Note: 1. Question 1 is compulsory

2. Answer any three out of remaining five questions.
3. Assume any suitable data wherever required and justify the same.

- Q1 a) Why is data integration required in a data warehouse, more so than in an operational application? [5]
- b) Describe the steps involved in Data Mining when viewed as a process of knowledge Discovery. [5]
- c) A dimension table is wide, the fact table is deep. Explain [5]
- d) Elucidate Market Basket Analysis with an example. [5]
- Q2 a) Suppose that a data warehouse consists of the three dimensions time, doctor and patient, and the two measures count and charge, where charge is the fee that a doctor charges a patient for a visit. [10]
- (i) Draw a star schema diagram for the above data warehouse.
 - (ii) Starting with the base cuboid [day, doctor, patient], what specific OLAP operations should be performed in order to list the total fee collected by each doctor in 2010?
 - (iii) To obtain the same list, write an SQL query assuming the data are stored in a relational database with the schema fee (day, month, year, doctor, hospital, patient, count, charge).
- b) Develop a model to predict the salary of college graduates with 10 years of work experience using linear regression. [10]

Years of experience (x)	Salary in \$100 (y)
3	30
8	57
9	64
13	72
3	36
6	43
11	59
21	90
1	20
16	83

- Q3 a) Suppose that the data for analysis includes the attribute salary. We have the following values for salary (in thousands of dollars), shown in increasing order: 30, 36, 47, 50, 52, 52, 56, 60, 63, 70, 70, 110. [10]
- (i) What are the *mean*, *median*, *mode* and *midrange* of the data?
 - (ii) Find the *first quartile* (Q1) and the *third quartile* (Q3) of the data.
 - (iii) Show a *boxplot* of the data.

- b) Why is entity-relationship modeling technique not suitable for the data warehouse? [10]
How is dimensional modeling different?

- Q4 a) Why is tree pruning useful in decision tree induction? What is a drawback of using a separate set of tuples to evaluate pruning? [10]

- b) Consider the transaction database given below, [10]

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

Use Apriori Algorithm with min-support count = 2 and min-confidence = 60% to find all frequent itemsets and strong association rules.

- Q5 a) Show the dendrogram created by the complete link clustering algorithm for the given set of points. [10]

	A	B
P1	2	4
P2	8	2
P3	9	3
P4	1	5
P5	8.5	1

- b) What is spatial data? Explain CLARANS Extension. [10]

- Q6 a) Demonstrate Multidimensional and Multilevel Association Rule Mining with suitable examples. [10]

- b) What is Web Structure Mining? List the approaches used to structure the web pages to improve on the effectiveness of search engines and crawlers. Explain Page Rank technique in detail. [10]
