



Time: 03 Hours

Marks: 80

- Note: 1. Question 1 is compulsory  
2. Answer any three out of remaining questions.

Q1 A) Consider following dimensions for a Supermarket chain: Product, Store, Time and Promotion. With respect to this business scenario, answer the following questions. Clearly state any reasonable assumptions you make. [10]

(a) Design an information package diagram for this business scenario.

(b) Design a snowflake schema for the data warehouse, clearly depicting the fact table(s), Dimension table(s), their attributes and measures.

B) Consider the 5 transactions given below. If minimum support is 30% and minimum confidence is 80%, determine the frequent itemsets and association rules using Apriori algorithm. [10]

Transaction	Items
T1	Milk, Jam, Butter
T2	Milk, Butter
T3	Milk, Cheese, Butter
T4	Biscuit, Milk,
T5	Biscuit, Cheese

Q2 A) Consider a Data Warehouse for a sport manufacturing company storing sales details of various sports equipments sold, and the time of the sale. Using this example describe the following OLAP operations: [10]

(i) Slice (ii) Dice (iii) Rollup (iv) Drill Down (v) Pivot

B) What is data mining? Describe the steps involved in the data mining when viewed as a process of knowledge discovery. Present an example where data mining is crucial to success of business. [10]

Q3 A) What is Dimension Modeling? What is slowly changing dimensions? How this problem is solved? Give example. [10]

B) Given is the training data for height classification, classify the tuple  $t = \langle \text{Arvish}, M, 1.97 \rangle$  using Bayesian classification. [10]

Name	Gender	Height	Output
Reena	F	1.6 m	Short
Mahesh	M	2 m	Tall
Tina	F	1.9 m	Medium
Meeta	F	1.88 m	Medium

Siya	F	1.7 m	Short
Vikram	M	1.85 m	Medium
Lakshmi	F	1.6 m	Short
Andrew	M	1.7 m	Short
Henry	M	2.2 m	Tall
Akhil	M	2.1 m	Tall
Lata	F	1.8 m	Medium
Siraj	M	1.95 m	Medium
Rita	F	1.9 m	Medium
Kriti	F	1.8 m	Medium
Srishti	F	1.75 m	Medium

- Q4 A) Differentiate between top-down and bottom-up approaches for building data warehouse. Discuss the merits and limitations of each approach. Also explain the practical approach for designing a data warehouse. [10]
- B) What is clustering? Explain K means clustering algorithm. [10]  
Suppose the data for clustering is {2, 4, 10, 12, 3, 20, 30, 11, 25, 5, 36, 41, 14}. Assuming number of clusters to be 2 i.e.  $K = 2$ , cluster the given data using above algorithm.
- Q5 A) Describe different steps of ETL (Extraction, Transformation and Loading) cycle in Data Warehousing for a pharmaceutical company. [10]
- B) What is Web Mining? Explain Web Usage Mining. [10]
- Q6 Write short note on the following (Answer any **FOUR**) [20]
- Hierarchical Clustering Algorithms
  - Metadata in Data Warehouse
  - Decision tree Classification Model
  - Snapshot and Transaction tables
  - Data Exploration

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