[Time: 3 Hours] **[Marks:80]**

N.B.: 1. Question no. 1 is compulsory.

2. Attempt **any Three** from out of remaining **Five** questions.

3. Assume suitable data wherever necessary.

4. Figures at right indicates full marks.

Q 1	a	Differentiate between data warehouse and data mart.	**5**
	b	Explain data transformation with example.	**5**
	c	Explain Nested loop join algorithm.	**5**
	d	Explain CAP theorem. Compare and contrast ACID and BASE.	**5**
Q 2	a	Explain Discretionary Access Control, Mandatory Access Control and Role-Based Access Control in brief.	**10**
	b	Explain Significance of each step in ETL Process, also explain types of data extraction with examples.	**10**
Q 3	a	Explain Sort-Merge Join and HASH Join with required number of block transfer and seek cost.	**10**
	b	Compare NOSQL data architectural patterns with examples	**10**
Q 4	a	What is general purpose of data warehouse architecture? Explain in detail data warehouse architecture and draw star schema for hospital management system.	**10**
	b	What is big data? Explain in detail types and characteristics of big data.	**10**
Q 5	a	Consider a data warehouse storing sales details of various products sold at different stores, and the time of the sales. For this example analyze the following OLAP operations 1)slice 2)dice 3)rollup 4)drill down 5)pivot.	**10**
	b	Explain Primary Horizontal, Derived Horizontal and Vertical Fragmentation with example. Comment on Completeness, Reconstruction and Disjointness Properties.	**10**
Q 6		Write Short Note on:	
	a	Snowflake schema with example	**10**
	b	Temporal and Spatial Databases	**10**