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

N.B: (1) Question No.1 is compulsory
(2) Attempt any three of remaining five questions
(3) Assume any suitable data if necessary and justify the same

Q 1	a)	Explain Brute-Force Nested Loop Join algorithm.	5
	b)	What is dead lock, explain wait and die scheme used for deadlock prevention.	5
	c)	What is Temporal Database? What are its characteristics?	5
	d)	Explain roll-up, drill down, slice, dice operations in OLAP.	5
Q 2	a)	Explain basic time stamp ordering protocol and compare it with 2 phase locking protocol in terms of deadlock and rollbacks.	10
	b)	Explain Mandatory Access Control and Discretionary Access Control, also explain access control list and access control entry w.r.t. the same.	10
Q 3	a)	Why fragmentation is required in distributed data bases, Explain Vertical fragmentation with example, comment on completeness , reconstruction and disjointness aspect of it.	10
	b)	Explain 2 Phase commit protocol with proper flow diagram.	10
Q 4	a)	Explain MOLAP, ROLAP and HOLAP Models.	10
	b)	What is the significance of serializability, explain conflict serializability and view serializability with the help of example.	10
Q 5	a)	Explain types of data extraction methods in ETL process	10
	b)	What is basic difference between pessimistic and optimistic concurrency control algorithm. Explain distributed 2PL algorithm.	10
Q 6		Write short notes on **(any two)**	20

a. Role Based Access Control
b. Query Optimization
c. Data Warehouse Architecture
d. Challenges in ETL functions

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