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

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 **Attempt any FOUR** **[20]**

a Compare File Processing System with Database Management system **05**

b **05**

T1	T2
read(A) A := A − 50	
	read(A) temp := A ∗ 0.1 A := A − temp write(A) read(B)
write(A) read(B) B := B + 50 write(B) commit	
	B := B + temp write(B) commit

Draw the precedence graph for above schedule?

c Define with an example different type of Entities in ER diagram **05**

d Define Triggers. Write syntax and example of trigger. **05**

e Explain five aggregate functions of SQL with example? **05**

2 a Design an EER diagram for Hospital Management System. And map it into relational model. Assume Suitable data. **[10]**

b Brief overall database architecture with suitable diagram. **[10]**

3 a Consider the following employee database. **[10]**

Employee (empname, street, city, date_of_joining)
Works (empname, company_name,salary)
Company (company_name, city)
Manages (empname, manager_name)

Write the SQL queries for each of the statements given below

a) Modify the database so that 'John' now lives in 'Mumbai'.
b) Find all employees who joined in the month of October.
c) Give all employees of 'ABC Corporation' a 10% raise.
d) Find all employees in the database who live in the same cities as the companies for which they work
e) Find all employees who earn more than average salary of all employees of their company

b Explain following relational algebra operators with example **[10]**
a) Selection operator b) Union operator
c) Rename operator d) Cartesian product

4 a Explain concurrency control and explain time Stamp based protocol of concurrency control. **[10]**

b Why there is need of normalization? Explain 1NF,2NF,3NF and BCNF with examples. **[10]**

5 a Describe ACID properties with examples and explain state transition diagram of transaction. **[10]**

b What is Deadlock. Explain wait-die and wound-wait methods with suitable example. **[10]**

6 **Attempt any two**

a Explain in detail with example of conflict and view serializability . **[10]**

b Explain following Integrity constraints: **[10]**
a) Key Constraints.
b) Domain Constraints (Null & Default Constraints).
c) Referential Constraints.
d) Check Constraints.

c Write short note on Log based recovery mechanism **[10]**

Q4. Drawback of traditional file processing system. Or explain disadvantages of conventional file-based system compared to database management system.

Q5. Explain advantages and disadvantages of DBMS.

Q6. List out the difference between file processing and DBMS.

Q7. Write in detail about applications of DBMS.

Q10. Explain data independence.

Q11. Write about DBMS system architecture and components of DBMS.

Q12. Write about Database Administrator and functions of database administrations.

Q2. Explain E-R model and its components. Explain weak and strong entity set.

Q3. Explain relationships and its degree.

Q4. List symbols used in ER diagram and its representations.

Q5. Explain mapping cardinality in ER diagram and participation constraints & its types.

Q7. Define attributes and its types. Explain relationship attributes.

Q9. Explain all keys used in DBMS.

Q11. Explain generalization, specialization, aggregation and constraints on generalization.

Q4. Explain tuple, table, attribute, domain, and properties of relational database.

Q5. Explain CODD's rule (All 12 rules) in detail.

Q6. Explain relational schema.

Q7. Explain types of keys in DBMS with suitable example.

Q9. Explain selection and projection operators in relational algebra with suitable example.

Q10. Explain all types of join operator with suitable example in relational algebra.