(Time : 3 Hours) **(Total Marks: 80)**

NB. 1. Question number one is compulsory
2. Attempt any three out of remaining five questions
3. Assume suitable data
4. Figures to the right indicate the maximum marks

Q.1 **Attempt any FOUR:** **(20)**

a) Differentiate between Database Management System and File System. **05**

b) Explain aggregate functions with syntax and suitable example. **05**

c) Explain type of functional dependency with suitable example. **05**

d) Describe types of Entities with example. **05**

e) Explain Log based recovery. **05**

Q.2 a) Explain overall architecture of DBMS in detail with appropriate diagram. **(10)**

b) Explain Relational Algebra-operators given below: **(10)**
1. Select
2. Project
3. Union
4. Rename

Q.3 a) Draw EER Diagram for Hospital Management system and Map it to Relational Model **(10)**

b) Discuss types of Joins in sql with syntax and example.. **(10)**

Q.4 a) Write SQl queries for given database. **(10)**

employee (eno, ename, bdate, title, salary, dno)
project (pno, pname, budget, dno)
department (dno, dname, mgreno)
works (eno, pno, resp, hours)

1) Find the project number and name for projects with a budget greater than 100,000.
2) Find the employees (name only) in department 'D1' ordered by descending salary.
3) Find all works records where hours worked is less than 10 and the responsibility is 'Manager'.
4) Find name of employees that are ending with letter ‘ s’.
5) Find total number of employee.
6) Write the query to in increase salary of the employees by 10%.
7) Find Employee name with maximum salary.

b) Explain all types of integrity constraints with an example? **(10)**

Q.5 a) Define Normalization. Explain 1NF ,2NF ,3NF and BCNF with examples. **(10)**

b) Write note on **(10)**
i) Log based protocol
ii) Timestamp-based protocols

Q.6 a) What is deadlock? Give deadlock prevention and detection with suitable example **(10)**

b) Explain concept of Serializability along with Conflict Serializability and View Serializability **(10)**

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