(Time: 3 Hrs)   **Marks: 80**

N.B. : 1. Question no. 1 is **Compulsory**.

     2. Solve any **Three** questions out of remaining **Five** questions.

Qu-1	a)	Justify the term Data Independence.	**5**
	b)	Explain Weak Entity with example.	**5**
	c)	Explain programming with JDBC.	**5**
	d)	List aggregate functions and justify the need of any two aggregate functions.	**5**
Qu-2	a)	With reference to figure-1 list and explain the Attributes, Keys, Relationship types.	**10**
	b)	Explain Illustrate relational algebra with example.	**10**
Qu-3	a)	Explain Functions and Procedures in SQL with suitable example.	**10**
	b)	Illustrate sparse and dense indexing with suitable example.	**10**
Qu-4	a)	Describe/list the steps/rules of ER-to-relational mapping and use the same to map the ER diagram shown in figure-1 to relational database schema.	**10**
	b)	Use the relational database schema of Qu-4 a) and write the following queries.	**10**

                 i) Retrieve the birthdate and address of the employee(s) whose name is 'Vaidehi Chavan'.

                 ii) Retrieve the name and address of all employees who work for the 'Research' department.

                 iii) For every project located in 'Mumbai', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.

                 iv) Retrieve a list of employees and the projects they are working on, ordered by department and, within each department, ordered alphabetically by last name, first name.

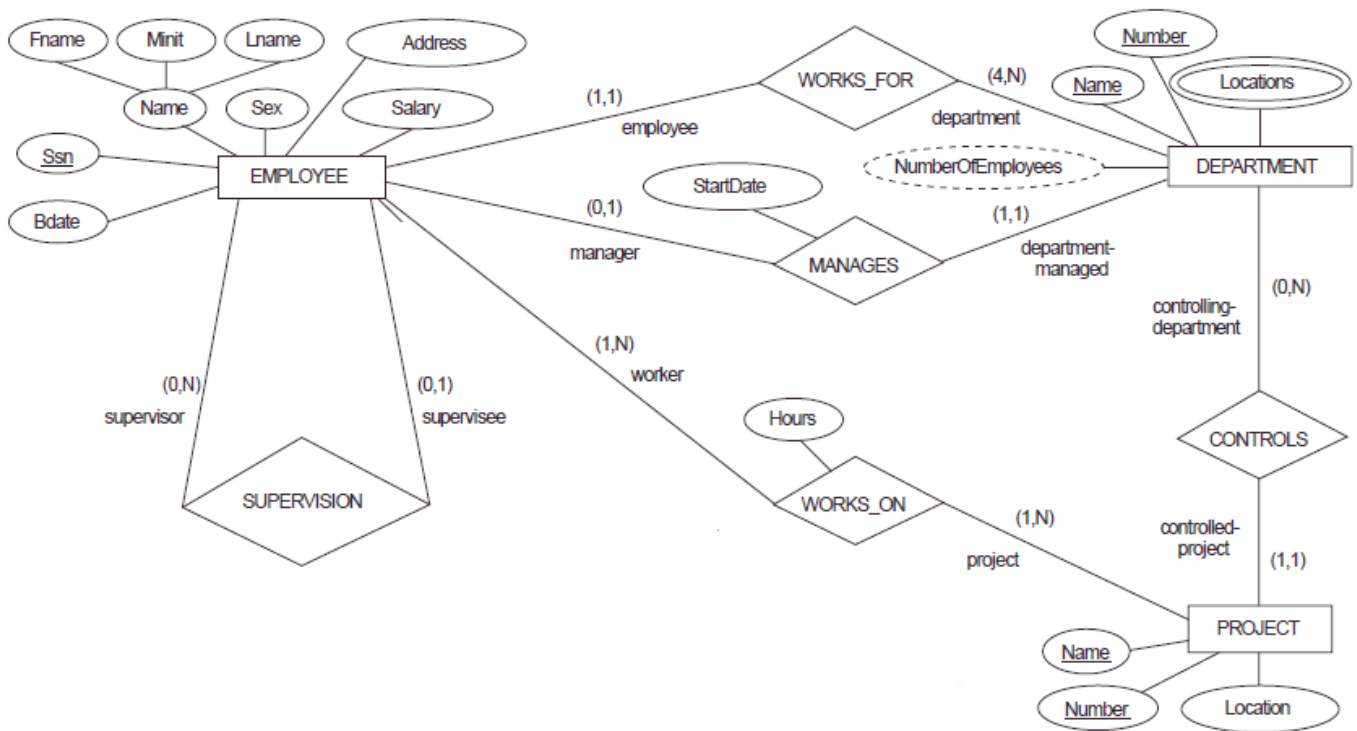|			
Qu-5	a)	Explain Event Condition Action (ECA) model with suitable example.	**10**
	b)	Illustrate the need of normalization? explain all forms with an example.	**10**
Qu-6		Attempt the following.	
	a)	Functional Dependencies	**5**
	b)	Operation on Files	**5**
	c)	Foreign Key	**5**
	d)	Views in SQL	**5**

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Figure-1 ER diagram for the COMPANY schema, with all role names and constraints on relationships.