

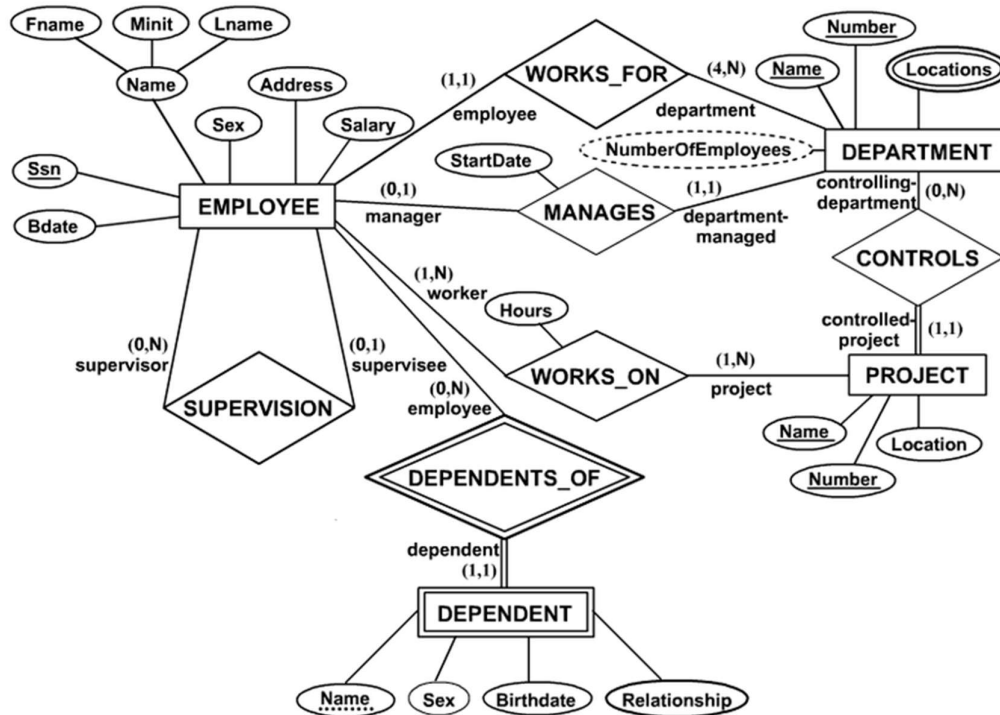
TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

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|--|-----|----|----|
| Q.1(a) Explain the term Abstraction with respect to a Database Management System. | [5] | 1 | 1 |
| Q.1(b) From the ER diagram shown below: | [5] | 1 | 4 |
| i. identify the composite attribute(s) | | | |
| ii. identify a weak entity | | | |
| iii. identify the cardinality of the WORKS_FOR relation | | | |
| iv. identify all entities having total participation in their corresponding relation | | | |



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|--|-----|---|---|
| Q.2(a) Consider the following relational database of a University:
Student(RollNo, StudentName, Gender, Address)
Faculty(FacultyID, FacultyName, Gender, FacultyCourse)
Mentorship(RollNo, FacultyID) | [5] | 2 | 3 |
|--|-----|---|---|

Write an SQL query or Relational Algebra expression to:

- i. Retrieve name of all faculties who teach "Computer Organization" to "John Smith".
- ii. Find how many *female students mentored by female faculty* combinations are there in the University.

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|--|-----|---|---|
| Q.2(b) Explain the advantage of using Join operations on a relation. | [5] | 2 | 2 |
|--|-----|---|---|

Q.3(a) Identify all Functional Dependencies present in the Relation shown in the table below: [5] 3 3

<i>CarReg</i>	<i>hireDate</i>	<i>Make</i>	<i>model</i>	<i>custNo</i>	<i>custName</i>	<i>outletNo</i>	<i>outletLoc</i>
MS34 0GD	14/5/03	Ford	Focus	C100	Smith, J	01	Bearsden
MS34 0GD	15/5/03	Ford	Focus	C201	Hen, P	01	Bearsden
NS34 TPR	16/5/03	Nissan	Sunny	C100	Smith, J	01	Bearsden
MH34 BRP	14/5/03	Ford	Ka	C313	Blatt, O	02	Kelvinbridge
MH34 BRP	20/5/03	Ford	Ka	C100	Smith, J	02	Kelvinbridge
MD510PQ	20/5/03	Nissan	Sunny	C295	Pen, T	02	Kelvinbridge

Q.3(b) Given the Relation R (A, B, C, D, E) and the set of Functional dependencies {AB->CD, D->E, A->C, B->D}, convert R into Boyce Codd Normal Form (BCNF). [5] 3 3

Q.4(a) Explain the working of Secondary Indices and its advantages when searching for a record in the database. [5] 4 2

Q.4(b) Create a *B Tree* having following elements: 5, 3, 21, 9, 13, 22, 7, 10, 11, 14, 8, 16. Clearly show the steps involved in the insertion of each element. [5] 4 4

Q.5(a) What is the need of Lock- Based protocols? Explain the working of Strict two-phase locking protocol. [5] 5 1

Q.5(b) Explain the working of deadlock prevention schemes using timestamps. [5] 5 2

.....22/11/2024 M:.....