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Thapar Institute of Engineering & Technology, Patiala
Computer Science and Engineering Department
MID-SEMESTER EXAMINATION

Course Code: UCS310	Course Name: Database Management System
B.E. (Second Year), Semester-II	Branch: COE, CSE
March 11, 2024	Monday, 3 PM – 5 PM
Time: 2 Hours, M. Marks: 30	Name of Faculty: RKR, MK, RRN, SKH, CHP, SRO, AAD, VAP

(Note: Answer all the questions with valid points only, which are most appropriate for your answers. Assume the missing information (if any) suitably. All the symbols used here have their usual meaning.)

Q1. Explain the following with suitable examples: **(4 x 1.5 = 6M)**

a) Three levels of data abstractions in DBMS
b) Multi-row sub-query vs. multi-column sub-query
c) Integrity rules of DBMS
d) File System vs. Database System

Q2. Given a relation R (A, B, C, D, E), which holds the functional dependencies F:{AB→ C, C→D, A→E, B→A, AB→A, AB→B, C→E}.

(a) Find attribute closure of $\{AB\}^+$ and $\{BC\}^+$ **(1M)**
(b) Find out candidate key(s) for the relation R using closure property. List down all the non-prime attributes for the relation R. **(2M)**
(c) Given the following relation instance, list down all the non-trivial FDs. **(2M)**

A	B	C
1	4	2
1	5	3
1	6	3
3	2	2
1	5	3
5	3	3

Q3. Given the relational schema below, write the SQL queries for the following: **(5 x 2 = 10M)**

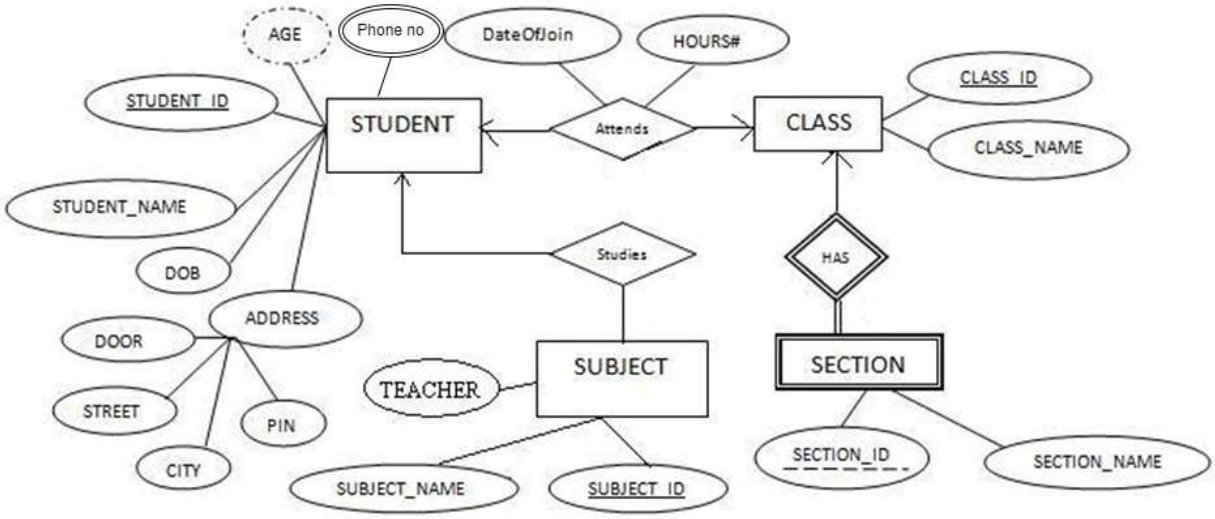
Suppliers (<u>sid</u>: integer, sname: string, address: string)
Parts (<u>pid</u>: integer, pname: string, color: string)
Catalog (<u>sid</u>: integer, <u>pid</u>: integer, cost: real)

a) Find the *sid*s of suppliers who supply some red parts or lives at "221 Packer Street (using subquery).
b) Find names and address of suppliers who supply at least one part (using co-related subquery).
c) Find the list of suppliers who supply red colored parts.
d) Display the details of suppliers whose total supply cost is more than 10000 and supplying less than five parts.
e) Display the names of suppliers except ‘Harish’ and ‘Dinesh’ who supply the lowest priced parts.

Q4. a) Convert the following statements into a **single** ER diagram showing the cardinality for each connectivity from one entity to another entity. **(4M)**

"Each company operates maximum of eight departments, and each department belongs to one company. Each department employs one or more employees, and each employee works for one department. Each employee may or may not have any dependents, and each dependent belongs to one employee, whereas a dependent cannot exist without an employee. An employee can be assigned to multiple projects. A project can belong to multiple departments where many employees can work, and a department can have multiple projects. Every entity has its ID and Name. "

b) Convert the ER diagram to corresponding relational schemas with minimum number of tables. Specify the primary key and foreign key attributes in each relational schema. **(5M)**



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