

Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

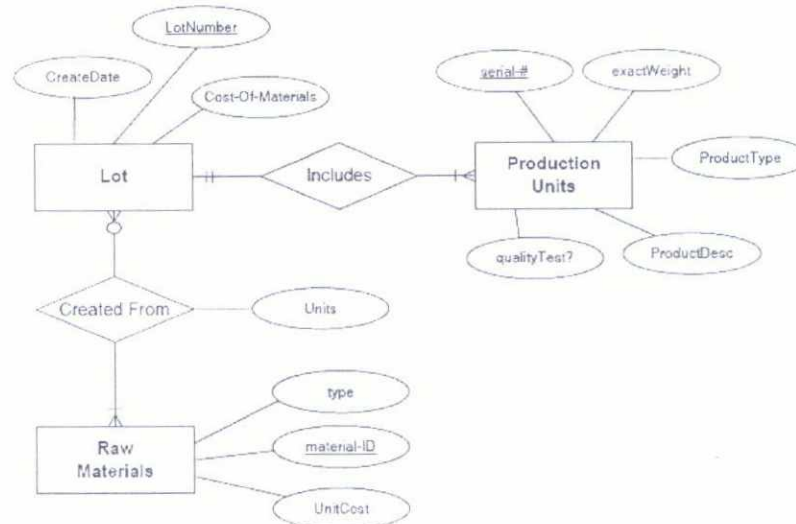
Department of Electrical and Instrumentation Engineering

END SEMESTER EXAMINATION

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| BME (7th Semester) | Course Code: UCS312 |
| | Course Name: Database Management System |
| Dec 12, 2023 | Thursday, 2:00 – 05.00 pm |
| Time: 3 Hours, M. Marks: 70 | Name of Faculty: Dr. Ravinder Kaur |

Note: Attempt any 5 questions. Assume any missing data if required.

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|---------|---|-------|
| Q.1 (a) | What is canonical cover of functional dependency? Find the canonical cover by considering the following set F of functional dependencies: $F = \{ X \rightarrow YZ, Y \rightarrow Z, X \rightarrow Y, XY \rightarrow Z \}$ | (1+3) |
| (b) | Elaborate the significance of using normalization in database system. Also, highlight the differences between 3NF and BCNF. | (2+3) |
| (c) | Consider a relation $R(A, B, C, D, E)$ with following set of functional dependencies as $\{ BC \rightarrow D, AC \rightarrow BE, B \rightarrow E \}$ Determine given relation R is in which normal form (check up to 3NF)? | (5) |
| Q.2 (a) | Explain with suitable examples the difference/s between following terms by considering SQL syntax i) Primary key and Foreign key ii) Delete and Truncate iii) Alter and Update iv) Inner and outer Join v) Composite and Multivalued attributes | (10) |
| (b) | Briefly discuss with the help of adequate examples about the requirements of triggers in PL/SQL. | (4) |
| Q.3 (a) | Why Concurrency control is required in DBMS? Discuss with examples | (4) |
| (b) | Consider the following schedules $S : r_1(A); r_2(A); r_1(B); r_2(B); r_3(B); w_1(A); w_2(B)$ Check whether the given schedule is conflict serializable or not and explain why? | (3) |
| (c) | What is two phase locking (2PL) protocol? How does 2PL ensures conflict serializability? Explain with appropriate example. | (3+4) |
| Q.4 (a) | Discuss the different types of anomalies in DBMS with suitable example. | (5) |
| (b) | Outline the differences between generalization, specialization and aggregation with suitable examples. | (5) |
| (c) | Consider an owner of small grocery shop. He wants to keep record of its inventory and sale. What type of data management solution you wish to provide to him - file based system or RDBMS? justify your answer. | (4) |
| Q5 | Production tracking is important in many manufacturing environments (e.g., the pharmaceuticals industry, children's toys, etc.). The following ER diagram captures important information in the tracking of production. Specifically, the ER diagram captures relationships between production lots (or batches), individual production units, and raw materials. | |
| (a) | Convert the given ER diagram into a relational database schema. Be certain to indicate primary keys and referential integrity constraints. | (10) |
| (b) | Identify an attribute in the above ER diagram that might represent a composite attribute, and explain why/how it might represent a composite attribute. | (4) |



Q6 (a)

Consider the following tables EMP and SALGRADE, Write the suitable SQL queries for (i) to (vi) and possible output for (vii) to (x)

(10)

TABLE: EMPLOYEE

| ECODE | NAME | DESIG | SGRADE | DOJ | DOB |
|-------|--------------|--------------|--------|------------|------------|
| 101 | Vikrant | Executive | S03 | 2003-03-23 | 1980-01-13 |
| 102 | Ravi | Head-IT | S02 | 2010-02-12 | 1987-07-22 |
| 103 | John Cena | Receptionist | S03 | 2009-06-24 | 1983-02-24 |
| 105 | Azhar Ansari | GM | S02 | 2009-08-11 | 1984-03-03 |
| 108 | Priyam Sen | CEO | S01 | 2004-12-29 | 1982-01-19 |

TABLE: SALGRADE

| SGRADE | SALARY | HRA |
|--------|--------|-------|
| S01 | 56000 | 18000 |
| S02 | 32000 | 12000 |
| S03 | 24000 | 8000 |

- To display details of all employee in descending order of their DOJ
- To display NAME AND DESIG of those employees whose sgrade is either "S02" or "S03"
- To display NAME, DESIG, SGRADE of those employee who joined in the year 2009
- To display all SGRADE, ANNUAL_SALARY from table SALGRADE [where ANNUAL_SALARY = SALARY*12]
- To display number of employee working in each SALGRADE from table EMPLOYEE
- To display NAME, DESIG, SALARY, HRA from tables EMPLOYEE and SALGRADE where SALARY is less than 50000
- Select MIN(DOJ), MAX(DOB) from employee;
- Select SGrade,Salary+HRA from SalGrade where Sgrade="S02"
- Select count(distinct sgrade) from employee
- Select sum(salary), avg(salary) from salgrade.

(b)

Briefly discuss about the concept of view in DBMS with adequate examples

(4)

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Note: The students can view their Answer sheets on 15th December 2023 at 1:30 pm.