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10CS54

**Fifth Semester B.E. Degree Examination, July/August 2021**  
**Database Management System**

Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions.*

- 1 a. Discuss any six advantages of DBMS over file systems. (06 Marks)  
 b. With a neat block diagram, explain the various components of DBMS. (06 Marks)  
 c. Explain the three-schema architecture with the help of a diagram and also explain logical data independence and physical data independence. (08 Marks)
- 2 Explain the following with appropriate examples:  
 a. Strong and weak entity  
 b. Cardinality of relationship and their types  
 c. Degree of relationship and their types  
 d. Attribute types (20 Marks)
- 3 a. Explain briefly the need of :  
 (i) Primary integrity constraint  
 (ii) Referential integrity constraint  
 in relations. (Explain with appropriate examples) (04 Marks)  
 b. Explain the following with examples:  
 (i) Selection operator  
 (ii) Projection operator  
 (iii) Union compatibility condition of relational algebra (06 Marks)  
 c. Consider the following relation:  
 PERSON (Driver\_ID, Driver\_name, Driver\_address, DOB)  
 CAR (Registration\_number, model, and year\_of\_manufacture)  
 OWNS (Driver\_ID, Registration\_number)  
 ACCIDENTS (Report\_number, Date\_of\_accident, location\_of\_accident)  
 PARTICIPATED (Driver\_ID, Registration\_number, Report\_num)  
 Write the Relational Algebraic expressions for the following queries:  
 (i) Retrieve the Driver\_ID and Registration\_number details where the damage amount claimed is more than 10,000.  
 (ii) List the report numbers for accidents that took place in the year 2014.  
 (iii) Retrieve the name person and registration number of cars not involved in accident.  
 (iv) Retrieve the name of person not owning any cars  
 (v) List the details of drivers aged over 18 years. (10 Marks)
- 4 a. (i) Differentiate between where clause and HAVING clause in SQL statements. (02 Marks)  
 (ii) Explain with example the various types of JOIN operations. (06 Marks)  
 (iii) Explain the order of execution of the following SQL commands:  
 SELECT, FROM, GROUP-BY, HAVING, WHERE, ORDER-BY (02 Marks)  
 b. Consider the following relations for a database:  
 DEPENDENT (ENO, DEP\_NAME, DOB, RELATIONSHIP)  
 EMP (ENO, ENAME, SAL, EMP\_SUPERSSM, DNO)  
 PROJECT (PNO, PNAME, PLOC)  
 WORKS ON (PNO, ENO, NUM\_OF\_HOURS)  
 DEPT (DNO, DNAME, DEPT\_MGR)

Write the SQL queries for retrieving:

- (i) Retrieve the name and salary of manager of each department.
- (ii) SQL query for creating WORKS\_ON table by specifying appropriate primary and foreign keys.
- (iii) List the employees who work on the same project as that of JONES.
- (iv) Retrieve the employee number and name of all employees who either work in department number 3 or surprise employees working for department number 3.
- (v) List the employees who do not have any dependents. (10 Marks)

5 Write short notes on:

- a. Embedded SQL
- b. Views
- c. Triggers and Assertions
- d. Database Stored Procedures (20 Marks)

- 6 a. Explain with example the four informal guidelines of database design for relation schemas. (06 Marks)
- b. Explain briefly 1NF, 2NF, 3NF and BCNF with example for normalizing a relation. (08 Marks)
- c. Explain the six Armstrong AXIOMS with appropriate examples. (06 Marks)

- 7 a. Consider the relation R(A, B, C, G, H, I) with a set of functional dependencies  $F = \{A \rightarrow BC, CG \rightarrow HI, B \rightarrow H\}$ . Find the candidate keys of Relation R. (06 Marks)
- b. Explain lossless join decomposition with appropriate algorithm. (06 Marks)
- c. Explain briefly:  
(i) Multi-valued dependency and 4NF  
(ii) JOIN dependency and 5 NF. (08 Marks)

- 8 a. Explain the ACID properties of transaction. (06 Marks)
- b. List the problems associated with concurrent transactions and explain the temporary update problem by considering an appropriate schedule. (06 Marks)
- c. Explain the ARIES Recovery Algorithm. (08 Marks)

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