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**Subject: -Database Management System (01CE0302)**

**Date:-17/11/2021**

**Total Marks:-100**

**Time: - 03:00 hours**

**Instructions:**

1. All Questions are Compulsory.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

**Question: 1.**

(a) Objective MCQ

[10]

- 1) Which of the following is not a property of transactions?
  - a) Atomicity
  - b) Concurrency
  - c) Isolation
  - d) Durability
- 2) In an E-R diagram double lines indicate
  - a) Total participation
  - b) Multiple participation
  - c) Cardinality N
  - d) None of the above
- 3) In an E-R diagram an entity set is represent by a
  - a) rectangle
  - b) ellipse
  - c) diamond box
  - d) circle
- 4) E-R model uses this symbol to represent weak entity set ?
  - a) Dotted rectangle
  - b) Diamond
  - c) Doubly outlined rectangle
  - d) None of these
- 5) SQL stands for\_\_\_\_\_
  - a) Structured Query Language
  - b) Sequential Query Language
  - c) Structured Question Language
  - d) Sequential Question Language
- 6) Full form of DCL\_\_\_\_
  - a) Data Cancel Loop
  - b) Data Control Language
  - c) Data Control Loop
  - d) None of the above

- 7) Which among the following is not the part of Transaction Life Cycle?
    - a) Failed
    - b) Partially Commit
    - c) Checkpoint
    - d) Abort
  - 8) Which functions provides the total of column values.
    - a) Sum
    - b) Mul
    - c) Div
    - d) Total
  - 9) \_\_\_\_\_ function in SQL capitalize first character of each word
    - a) Upper
    - b) Capital
    - c) MakeCap
    - d) Initcap
  - 10) \_\_\_\_\_ Property of Transaction assures either 0% or 100% execution of Operations
    - a) Atomicity
    - b) Commit
    - c) Prepare
    - d) None of the above
- (b) Short Que. (answer in one sentence) [10]
- 1) DML stands for\_\_\_\_\_
  - 2) An Entity set which does not contain any primary key attribute is known as\_\_\_\_\_
  - 3) List the various Database Models.
  - 4) Write a symbol for selection operation in relational algebra.
  - 5) Define Schema.
  - 6) What is the full form of DBMS?
  - 7) State True or False: Joins can be used to retrieve data from multiple tables.
  - 8) State true or false: Any relation schema that satisfies BCNF also satisfies 3NF.
  - 9) Draw symbols for Derived attribute in E-R diagram.
  - 10) Write a symbol for project operation in relational algebra.

**Question: 2.**

- (a) Draw and explain three level architecture (Abstraction) of DBMS. [8]
  - (b) List all the Relational algebra operators. Explain the working of Cartesian product Operation and the Rename Operation with an appropriate example. [8]
- OR**
- (b) Explain following terms. [8]
    - (1) Primary Key      (2) NOT NULL Constraint
    - (3) Foreign Key      (4) Attributes

**Question: 3.**

- (a) Draw an E-R diagram for University Management System. Assume relevant entities and attributes for the given system. [8]
- (b) Given relation R with attributes A,B,C,D,E,F and set of FDs as **A--> BC, E--> CF, B-->E and CD--> EF.** [4]
- 1) Find out closure {A,B} + of the set of attributes.
- 2) Find out closure {C}+ of the set of attributes.
- (c) Discuss any four aggregate functions with example. [4]

**OR**

- (a) What is Normalization? Explain 1NF,2NF and 3NF in detail. [8]
- (b) Write a note on mapping cardinality in E-R Diagram. [4]
- (c) Explain the working of Select Operation and Project Operation with an appropriate example. [4]

**Question: 4.**

- (a) Write a note on conflict serializability. [8]
- (b) List and discuss ACID properties of transaction. [8]

**OR**

- (a) State the differences between PL/SQL and SQL. Write structure of PL/SQL. [8]
- (b) Define Transaction. Explain transaction states diagram. [8]

**Question: 5.**

- (a) Explain two phase locking protocol in detail. [6]
- (b) Write short note on Log based recovery [6]
- (c) We have following relations [4]
- EMP (emp\_no, ename, jobtitle, manager\_no, hiredate, sal, comm, deptno)
- DEPT (deptno, dname, loc)
- Answer the following queries in SQL.
- i) Find the Employees working in the department 10, 20, 30 only.
- ii) Find Employees whose names start with letter A or letter a.
- iii) Find Employees along with their department name.
- iv) Find the Employees who are working in Smith's department

**OR**

- (a) Write a note on view serializability. [6]
- (b) Write query for the following: [6]
- (1) To create a table.
- (2) To insert values in table.
- (3) To change name of table.
- (4) To drop the table.
- (5) To describe the table
- (6) To display all columns and all rows
- (c) We have following relations [4]
- Account ( acc\_no, name, city, balance, loan\_taken)
- Loan ( loan\_no, acc\_no, loan\_amt, intrest\_rate, loan\_date, remaining\_loan)
- Answer the following queries in SQL.
- i) Display the sum of balance of account holders who's live in same city 'Mehsana' using group by clause.
- ii) Display the information about account where balance is less than total balance of all account holders.
- iii) Displays the information of account holders whose loan amount and balance both are same.
- iv) Display the name of city, remaining loan amount, account, date of loan and loan number of account holders.

**Question: 6.**

- (a) Discuss generalization and specialization in E-R diagram with suitable diagram [8]
- (b) Write a note on 2 phase commit protocol. [4]
- (c) Briefly explain applications of DBMS. [4]

**OR**

- (a) Write short note on database triggers in PL/SQL. [8]
- (b) Explain different types of Outer join [4]
- (c) Write Relational algebra for below: [4]

branch (branch\_name, branch\_city, assets)

customer (customer\_name, customer\_street, customer\_city)

account (account\_number, branch\_name, balance)

loan (loan\_number, branch\_name, amount)

depositor (customer\_name, account\_number)

borrower (customer\_name, loan\_number)

- 1) Find all loans of over \$1200
- 2) Find the loan number for each loan of an amount greater than \$1200
- 3) Find the names of all customers who have a loan, an account, or both, from the bank
- 4) Find the names of all customers who have a loan at the Rajkot branch.

**---Best of Luck---**