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Paper Code : BCA-401

DATABASE MANAGEMENT SYSTEMS

Time Allotted : 3 Hours | *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Relational algebra is a ..... language.

   a) non-procedural b) procedural

   c) programming d) none of these.

   ii) Which of the following clauses is used to enforce a condition on a SQL statement containing "group by" clause ?

   a) Where b) Having

   c) Order by d) none of these.

CS/BC

c

iii) What is the cardinality of a table with 100 rows and 100 colums ?

a) 1000 b) 100

c) 10 d) 10000.

iv) The main goal of indexing is to

10.

a) search an item faster from a table

b) insert an item faster into a table

c) delete an item faster from a table

d) none of these.

v) The collection of information stored in a database at a particular moment is called as

11.

a) Schema

b) instance of the database

c) data domain

d) independence.

vi) Grant and revoke are ..... statements.

a) DDL b) TCL

c) DCL d) DML.

vii) Referential integrity is directly related to

a) relational key b) Foreign key

c) Primary key d) Candidate key.

viii) Generalization is a ..... approach.

a) bottom up b) top down

c) both (a) & (b) d) none of these.

ix) Any relation that is not part of the logical model, but is made visible to a user as a virtual relation, is called as

a) relation b) view

c) tuple d) none of these

x) Normalization removes

a) dependency of data

b) uniqueness of data

c) redundancy of data

d) none of these.

xi) Which is the SQL command to remove rows from a table ?

a) REMOVE

b) DELETE

c) TRUNCATE

d) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Explain the different levels of abstraction of the data-base management system.

3. What is contraint ? Explain domain constraint and Entity Integrity constraint.

10.

4. What is Relationship ? Explain different degrees of relationship.

5. "All primary keys are the superkeys but converse is not true." — Clarify. Define multi-valued attribute and composite attribute with suitable example.

11.

6. Consider the following tables with their functional dependencies :

   Professor (Professor_code) → (Head_of_dept, Percent_time)

   (Department, Professor code) → (Head_of_dept, Percent_time)

   (Department) → (Head_of_dept)

   (Head_of_dept, Professor_code) → (Department, Percent_time)

It is assumed that –

i) A Professor can work in more than one department

ii) The percentage of the time he spends in each department is given

iii) Each department has one one head_of_dept.

Normalize the table up to BCNF.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain the ACID properties for a transaction.

   b) Explain all the states of a transaction with example for each state.

   c) What is a schedule ? Give an example of a serial schedule with two transactions. 5 + 5 + 5

8. Consider the following two schemas :

   EMPLOYEE (EMP#, ENAME, JOB, HIREDATE, MANAGER#, SALARY, COMM, DEPT#).

   DEPARTMENT (DEPT#, DNAME, LOCATION)

   Perform the following queries on the tables (Write appropriate SQL statement) :

CS,

i) List the name, salary and PF amounts of all employees (PF is calculated at 10% of the basic).

ii) List the number of employees and average salary in DEPT#20.

iii) List the department number and total salary payable in each department.

iv) List the names of the employees who are more than 20 years old in the company.

10.

v) List the names of the employee whose name either starts or ends with 'S'. 3 + 3+ 3 + 3 + 3

9. a) Differentiate between hierarchical, network and relational model.

11.

b) Draw an E-R Diagram for a library management system.

c) Explain the following terms with example: Aggregation, Specialization, Generalization, Derived Attribute, Unary Relationship. 5 + 5 + 5

10. a) Proof with an example that a relation in BCNF is in 3NF, but the converse is not true.

b) Find out the candidate keys for the following relation R :

R (A, B, C, D, E, H) , F = { A → B, BC → D, E → C, D → A }

c) For relation R (L, M, N, O, P), the following FD's hold:

$M \rightarrow O$, $NO \rightarrow P$, $P \rightarrow L$, $L \rightarrow MN$

R is decomposed into R1 = (L, M, N, P) and R2 = (M,O).

i) Is the above decomposition lossless-join decomposition ? Explain.

ii) Is the above decomposition dependency preserving ? Explain. 5 + 5 + 5

11. Write short notes on any *three* of the following : 3 × 5

a) Primary Indexing

b) Database approach and the file based approach

c) Natural join and Equi join

d) B-Tree

e) Strong entity and weak entity.