

**CERTIFICATE IN MOBILE
APPLICATION DEVELOPMENT
(CMAD)**

Term-End Examination

December, 2024

BCS-092 : INTRODUCTION TO DATABASES

Time : 3 Hours

Maximum Marks : 75

Note : *Question No. 1 is compulsory. Attempt any
three questions from the rest.*

1. (a) What is a database ? Explain the features of relational database with the help of an example. 4

(b) Let $R = (a, b, c, d, e, f)$ be a relation schema with the following dependencies : 4

$c \rightarrow f, e \rightarrow a, a \rightarrow b$ and $ec \rightarrow d$

Find out the key for Relation R.

- (c) A car insurance company keeps details as per the following schema : 5

PERSON (driver_id, name, address)

CAR (Registration_no, year, model)

ACCIDENT (Report_no, date, location)

ACC_REPORT (driver_id, registration_no, report_no, damage_amount)

Draw an E-R diagram from which the above schema can be derived. Also mention primary keys and cardinality.

- (d) Normalize the relation : 10

EMP (emp_name, address, gender, rank, salary) to 3rd NF.

Specify the primary keys in the normalized relations.

Note : (i) An employee can have separate present and permanent address (ii) salary depends only on the rank.

- (e) Explain any **four** data types in SQL. 4
- (f) Explain the changes required in Waterfall model to accommodate database design. 3

2. (a) Consider the following relation :

EMPLOYEE

FieldName	DataType	Size	Constraint
EMP_No	Var char	6	Start with 'e'
EMP_Name	Var char	30	
Address	Var char	30	
Date_Of_ Birth	Date		
Basic_Salary	Number	6, 2	
Dept_No	Var char	5	dependent on dept_no. of DEPT table.
Designation	Var char	6	Default value is 'mstaff'. Also it can have values 'VP', 'mgr', 'slman' and 'mstaff'.

Write SQL queries :

- (i) Create EMPLOYEE table with constraints as mentioned. 6
- (ii) List employee number and employee name all the employees who were born in year '1982'. 2
- (iii) Determine the total number of employees working in department number 20. 2
- (b) Explain the following with the help of examples : 5
 - (i) Armstrong's inference rules
 - (ii) Relationship types
- 3. (a) Distinguish between centralized and distributed databases. 5
- (b) Explain the difference between external, internal and conceptual schemas. How are these different schema layers related to data independence ? 10
- 4. (a) Differentiate between the following : 8
 - (i) Hierarchical database model and Network database model
 - (ii) File based system and Database approach

- (b) Consider the following database schema : 7
Bank (amount_no, customer_name,
date_of_birth_of_customer,
Branch, Branch_Address, Branch_Assets)
List and explain the data anomalies that
can occur in the schema given above.

5. Explain the following terms with the help of
diagram/examples : $3 \times 5 = 15$

- (a) Generalization
- (b) Outer-join
- (c) LIKE and IN operators
- (d) GROUP BY clause
- (e) Multivalued and Derived attribute

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