

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

**Term-End Examination**

**December, 2023**

**BCS-092 : INTRODUCTION TO DATABASES**

*Time : 3 Hours*

*Maximum Marks : 75*

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**Note :** *There are five questions in this paper.*

*Question No. 1 is compulsory. Attempt any*

*three questions from the rest.*

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1. (a) Explain the difference between a 'relation' and a 'relational schema'. 4
- (b) Explain the data abstraction levels of a database. 4
- (c) A railway reservation system facilitates the passengers to enquire about the trains available on basis of source and destination, booking/cancellation of tickets and enquiring about status of tickets

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booked. This system records the dates for which tickets can be booked and total no. of seats booked.

Answer the following for this system :

- (i) List out possible entities and corresponding attributes. 2
- (ii) Identify cardinality among entities. 2
- (iii) Make E-R diagram for the mentioned system. 3
- (iv) List out possible keys for the system. 3
- (d) Consider the following relations : 8

EMPLOYEE (empno, ename, job, salary  
manager\_empno, deptno, hire date)  
DEPARTMENT (deptno, dname, location)

Write SQL queries for the following :

- (i) List all employees who are working for manager '1001'.
- (ii) List all employees who are earning more than ₹ 5,000 and are not working in department 10 or 20.
- (iii) Count the employees working in each department for each job.
- (iv) List employees who are working for more than 2 years and are in 'MARKETING' department.

- (e) Explain the important tasks involved during implementation stage of database life cycle. 4
2. (a) Explain *five* integrity constraints defined in SQL with the help of an example for each. 5
- (b) Explain the terms Attribute domain, Relation degree, Axiom of augmentation, Determinant and Functional dependency. 5
- (c) Explain the various types of database users. 5
3. (a) What is the difference between centralized and distributed database systems ? 5
- (b) Define database model and list the categories of database models. 5
- (c) Write SQL commands for the following :
- (i) Create a table : 1
- COURSE (Course\_id, dept\_id, description)
- Assign proper data types to the attributes.
- (ii) Add foreign key constraint in COURSE relation on dept\_id. The dept\_id is primary key of table DEPT. 2
- (iii) Add a constraint :  
 Course\_id (can only be BCS-09 or BCS-12 or BCS-16) 2

4. (a) Explain GROUP BY and ORDER BY clauses with an example for each. 5
- (b) Consider a relation :
- R1 (student\_id, Course\_code, Email, Grade)
- The FDs are :
- Student\_id  $\rightarrow$  Email,
- Student\_id, Course\_code  $\rightarrow$  Grade
- Email  $\rightarrow$  Student\_id
- Answer the following depending on above information : 5
- (i) What are the possible alternate keys of the relation ?
- (ii) Is it in BCNF ? If not, then normalize it.
- (c) Explain the need and types of OUTER JOIN with the help of an example. 5
5. Explain the following with the help of examples/diagram : 5 $\times$ 3=15
- (a) Database Anomalies
- (b) Need of Normalization
- (c) Relationship Types
- (d) INNER JOIN
- (e) Iterative steps w. r. t. database design