

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

**Term-End Examination**

**December, 2022**

**BCS-92 : 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 and carries 30 marks. Attempt any **three** questions from the rest (question no. 2 to question no. 5).*

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1. (a) Define the following characteristics of a database system : 5
- (i) Transaction processing
  - (ii) Data sharing
  - (iii) Self-describing nature
  - (iv) Backup and recovery facilities
  - (v) Restricting unauthorised access

- (b) Explain data independence in the context of database management system. What is logical data independence ? How is it different from physical data independence ?

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- (c) A university maintains the records of publications made by its faculty. The following two tables are used to store this data :

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Faculty (Teacher\_id, name, designation, area of expertise)

Paper (Paper\_id, Teacher\_id, title of publication)

Write the following queries using SQL :

- (i) Find the Teacher\_id and name of all faculty having the designation as 'Assistant Professor'.
- (ii) Find the teacher\_id, name and designation of teacher's whose area of expertise is either 'DBMS' or 'Data Science'.

- (iii) Find the list of papers published by the teacher whose id is 'Tool'.
  - (iv) Count the number of teachers in each area of expertise.
  - (v) List the teacher id, name and title of publications for all the teachers.
- (d) A company keeps the list of its computers and the user of computers. Any computer can be used by a user. The company maintains the record of each computer and its users. The details of a computer that are stored by the company are – computer's unique id, make, date of purchase and size of memory of the computer. For each user company stores the user id, name of the user, designation of the user and date of employment of the user. In addition, company records the date and time of use of a computer by a specific user.

Answer the following questions for the description given above : 3+2+3+2

- (i) List all the entities and their attributes for the description given above.
  - (ii) Identify the relationships among/between the entities, along with attributes of relationships, if any.
  - (iii) Make the E-R diagram for the company.
  - (iv) List the primary and foreign keys for the proposed system.
2. (a) Explain the data abstraction layers of a database system with the help of a diagram. 4
- (b) Briefly explain the following database models : 9
- (i) Hierarchical database model
  - (ii) Network Database model
  - (iii) Object oriented database model
- (c) Define the term 'relation' in the context of a DBMS. 2
3. (a) Explain the following terms with the help of an example : 8
- (i) Weak entity

- (ii) Multi-valued attributes
- (iii) Derived attribute
- (iv) Unary relationship
- (b) Define the term 'Integrity' in the context of a database system. Explain the entity integrity and referential integrity with the help of an example for each. 5
- (c) Define the terms cardinality and connectivity in the context of database management system. 2
4. (a) Use the create table command to create the following table with the specified constraints : 6

Table name : Book

Attributes :

<b>Name of attribute</b>	<b>Data type</b>	<b>Size</b>
Book_id	Character	10
Book_title	Character	50
Price	Number	5
Publisher	Character	50

- Book\_id is the primary key of the table.
  - Book\_title should not be NULL.
  - The price should be more than ` 100 but less than ` 20,000.
- (b) Identify the primary key and functional dependencies of the attributes of the following relation and normalise it into 3NF : 6

<b>Account No.</b>	<b>Name of Account-holder</b>	<b>ID of Account-holder</b>	<b>Balance</b>
A001	ABC	P01	2000
A001	XYZ	P02	2000
A002	CDE	P03	7000
A003	XYZ	P02	8000

Please note that an account can be a joint account.

- (c) What are the problems that can be caused by data redundancy in a database ? Explain with the help of an example. 3

5. Explain the following with the help of an example or a diagram : 5×3=15

- (a) Many-to-one relationship
- (b) Left outer join
- (c) Testing and maintenance phases of database development
- (d) Candidate key and Alternate key
- (e) INSERT command of SQL