

MCA (Revised)/BCA (Revised)

Term-End Examination

June, 2014

12374

**MCS-023 : INTRODUCTION TO DATABASE
MANAGEMENT SYSTEMS**

Time : 3 hours

*Maximum Marks : 100
(Weightage 75%)*

Note : Question number 1 is compulsory. Attempt any three questions from the rest.

1. (a) What is a join in DBMS ? Explain three types of join with the help of an example for each. 7
- (b) What is data independence ? Explain two types of data independence with the help of an example for each. 7
- (c) What is DDL ? How it is different from DML ? Briefly explain guidelines for creation of table. 6
- (d) Explain distributed transaction with the help of an example. 5
- (e) What are integrity constraints ? Explain two types of integrity constraint with the help of an example. 5

- (f) What is Functional Dependency (FD) ? Find the valid FD's in the following relation : 5

A	B	C
i	1	2
i	1	3
j	1	4
j	1	3
k	2	5
l	4	7

- (g) Explain briefly advantages and disadvantages of Distributed Database Management Systems. 5
2. (a) Draw an ER diagram for the situation given below : 8

Library consists of many books in different subject areas where books are written by different authors and are published by different publishers. A book is published by only one publisher. There are inside - members and outside - members who gets books issued for their uses. The issuing and return operation of the books are managed by the librarian.

- (b) What is database recovery ? Explain with an example, how system log is used for database recovery. 5
- (c) Explain 3NF. Also justify the statement "BCNF is stronger than 3NF" with the help of an example. 7
3. (a) Explain ANSI SPARC 3 - Level Architecture of DBMS, with the details of languages associated at different levels and the type of data independence involved in between different levels. 6
- (b) What is the need of Indexing in DBMS ? Explain the significance of primary Index with the help of an example. 7
- (c) What is data redundancy in DBMS ? How data redundancies are removed ? Explain whether the following relation named student is in 2NF or not with proper justification. 7

STUDENT (Name, Course, Age, Sex)

4. (a) What is Data Fragmentation ? Explain differences between Horizontal Fragmentation and vertical Fragmentation with the help of suitable example of each. 7
- (b) What are nested queries ? explain with the help of an example. 5
- (c) Consider the following relations 8
- STUDENT (Name, Roll_Number, Teacher_ID, Programme, Semester, Subject)
- DEPARTMENT (Dep_ID, Programme, Teacher_ID)
- TEACHER (Teacher_ID, Dep_ID, Name, Subject)

Write the following queries using SQL :

- (i) List name of all the teachers who belong to Dep_ID = '4' and take "Graph Theory", subject.
- (ii) List names of all the students who study in Semester-II of BCA programme and are taught by Teacher_ID = '1'.
- (iii) Find the name of all the teachers who teaches to the student whose ROLL_Number = '101'.
- (iv) Find the name of all the students who are in Ist semester of MCA programme and are taught by Prof. Ajay.

5. (a) A file has $r = 10,000$ Bank Account records of fixed length. Each record has the following fields : 10
- Name (20 bytes), Account_No(8 bytes), address (40 bytes), Balance (15 bytes) and Branch-Code (5 bytes).
- The file is stored on a disk with the following characteristics :
- Block Size = 512 bytes, Inter Block Gap = 128 bytes, number of block per track = 15, Number of tracks per sector = 300.
- A disk pack consist of 15 double side disks.
- (i) Calculate record size R in bytes.
 - (ii) Calculate the blocking factor (bfr) and the number of file blocks b , assuming an unspanned organization.
 - (iii) Calculate the average time it takes to find a record doing a linear search on the file , in which file blocks are not stored contiguously.
 - (iv) Assume that the file is ordered by "Branch-Code", calculate the time it takes to search for a record given its "Branch_Code", by using a binary search.
- (b) Write short note on the following : 10
- (i) Concurrency Control
 - (ii) Database Views
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