Reg No.										

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION –MAY 2016

SUBJECT: DATABASE MANAGEMENT SYSTEMS (CS 246)

(BRANCH: COMPUTER SCIENCE)

23RD MAY, 2016

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**

1A. Consider the relational database given bellow:
Sailors(sid, sname, rating, age)
Boats(bid, bname, color)
Reserves(bid, sid, day)

Write relational algebraic expressions for the following queries.
(i) Find the names of sailors who have reserved boat 103.
(ii) Find the names of sailors who have reserved at least two boats.
(iii) Find the names of sailors who have reserved a red or a green boat.
(iv) Find the sids of sailors with age over 20 and have not reserved a red boat.
(v) Find the names of sailors who have reserved all red colored boats.
(vi) Find the names of sailors who have reserved a red or a green boat.
(vii) Find the colors of boats reserved by Lubber.

1B. Describe briefly the order by clause in SQL ((2+3+3+2+3+2+2)+3)

2. Consider the relational schema as given below and write SQL queries for the following questions:
Branch =(branchNo (primary key), street, city, postcode)
Staff =(staffNo (primary key), fName, lName, position, sex, DOB, salary, branchNo references branchNo(Branch)))
PropertyForRent= (propertyNo, street, city, postcode, type, rooms, rent, ownerNo,staffNo,branchNo)

a) Describe briefly the usage of count in SQL. Find the number of staff working in each branch and the sum of their salaries for each branch office with more than one member of staff
b) Define Outer Join. Explain different types of Outer Join used in SQL. Using the anyone of the join you have explained list all branch offices and any properties that are in the same city.
c) Define a correlated query. Using the same concept write a correlated query to find all staff who work in a London branch office.
d) For each branch, list the numbers and names of staff who manage properties, including the city in which the branch is located and the properties that the staffs manage.
e) Find all staff whose salary is larger than the salary of every member of staff at branch B003.

((2+2)+(1+3+2)+(2+2)+(3)+(3))

3A. Describe the steps involved in the design phase of an ER model.
3B. Explain the two major pitfalls that are to be avoided while designing the Database Schema.
3C. With the aid of proper examples define the following terms
a)Entity b)Entity set c)Attribute d)Relationship (8+8+4)

4A Explain briefly the four different categories of data models of used in data management systems

4B Construct a B+-tree for the following set of key values:(2, 3, 5, 7, 11, 17, 19, 23, 29, 31)
Assume that the tree is initially empty and values are added in ascending order. Construct B+-trees such that there are four pointers in one node ((4x2)+12)

5A For a relation R=(A,B,C,D,EG) with a set of functional dependencies
F={ AB→C, C→D,AD→E. Check whether R is in BCNF or not? If not decompose it into BCNF.

5B Show that the decomposition done in 5A is lossless decomposition.

5C Write an algorithm for performing BCNF decomposition. (10+6+4)

6A Describe in detail the Physical characteristics of Disks.

6B With the help of a diagram explain RAID level 2 in detail

6C State Armstrong's axioms. Explain why they are sound and complete (10+3+(6+1))

7A A file contains records with the following search-key values: 6 , 7 , 8 , 14, 18, 19, 22, 23, 24, 25,27,30,49. Show the extendable hash structure for this file if the hash functions h(x) = x mod 7 and the buckets can hold two records. Also show the result of each of the following steps:
a. insert 21. b. delete 14 c. insert 28 d. delete 49

7B Define a view in SQL. Write its syntax. With the help of an example explain how to create a view in SQL

7C Describe the ACID properties of transactions in database systems. (12+4+4)

8A Explain briefly why concurrency is good in transactions.

8B Define Shared and Exclusive lock modes. With the help of a matrix explain how it is used in the compatibility function.

8C Describe the different types of Log Records used for recovery in database systems. (6+9+5)