This question paper contains 3 printed pages.

5583–A

Your Roll No. .....

B.A. (Prog.) / II Sem. **B**

COMPUTER APPLICATIONS

Paper CS–II

(Database Management System)

(Admissions of 2011 and onwards)

Time : 3 hours *Maximum Marks* : 45

(Write your Roll No. on the top immediately on receipt of this question paper.)

Part A (Q. No. 1) is compulsory. Attempt any three questions from Part B (Q. No. 2 to Q. No. 5).

Part – A

Q. 1) a) What is the role of DBMS? List its advantages and disadvantages? 3

b) List and describe different types of databases. 2

c) List the main functions of DBMS and describe any two functions in detail. 2

d) Differentiate between Hierarchical and Network data models. 2

e) What do you mean by connectivity and cardinality in the context of an ER diagram? 2

f) A publisher publishes many books. A book may be written by many authors. Write the SQL commands to create the following tables and establish the relation between them : 4

*Book (**Book identification number**, book title, year of publication, author name1, author name2, publisher code)*

*Publisher (**publisher code**, publisher name, publisher address)*

The underlined key is primary key in the tables. Publisher code in Book table is to be made foreign key to relate the tables.

Turn over

Part – B

Q. 2) b) What are the different types of relationships? How are relationships represented in ER diagram (Crow's foot notation) ? 3

c) An academic institution wants to develop a database to manage the course timetable. For each course, the following information is recorded: an identification number, the name of the course, the number of students attending the course, and the number of credits. For each teacher, the following information is recorded: an identification number, name, department. For each class period, the following information is recorded: period number, starting time, ending time. For each room, the following information is recorded: room number, room type (classroom, office, auditorium, or computer lab), and capacity. 7

A professor teaches one or more courses; however, a course is taught by exactly one professor.

Using this information, list the entities involved and its attributes. Draw an E-R diagram (using Chen's Notation) for this database. Clearly state any assumptions made about other relationships in the diagram.

Q. 3) a) What is the importance of normalization in database design? 3

b) What do you mean by data inconsistency? Illustrate with the help of an example. 2

c) How can we transform a relation from 1NF to 2NF? Illustrate with the help of a suitable example. 5

Q. 4) a) Consider the following relation EMPLOYEE 4

E_ID	E_Name	DOB	Age	Parents	No_of_Dependents

Identify Derived Attribute, Single valued attribute and multivalued attribute in the above relation. Justify your answer.

b) Illustrate the notion of update and insertion anomalies with the help of a suitable example. 4

c) Differentiate between DDL and DML SQL functions? 2

Q. 5) a) What do you mean by entity integrity constraint in relational database? Consider the following relation SHIPMENT (SupplierNo, ProductNo, Quantity). The underlined attributes constitute the primary key of the relation. 5

SupplierNo	ProductNo	Quantity
S1	P1	120
S1	P2	150
S2	NULL	100
S1	P2	200
S2	P2	600

Does the above relation SHIPMENT satisfy the entity integrity constraint? Justify your answer.

a) Consider the following relations R1 and R2 ; 4

R1

Sno	Sname
102	Ram
103	Kamal
105	Krishna

R2

Sno	Sname
103	Shyam
104	Harish
107	Rahim

Show the result of the following operations:

- R1 INTERSECTION R2
- R1 DIFFERENCE R2

b) What is the importance of data dictionary in database? 1

Q. 6) a) Consider the following relational schema. 10

An employee can work in more than one department; the *hoursworked* field of the Works relation shows the number of hours that a given employee works in a given department.

Emp (empid, empname, *age, salary)*

Works (empid, deptid, hoursworked)

Dept (deptid, dname, budget, managerid)

Write the following queries in SQL:

i. Print the name and age of the employee(s) who gets highest salary.
ii. Print the names and ages of the employee(s) who works for more than 25 hours in any department.
iii. Print the name of the department with highest budget.
iv. Print the name of the manager of Software department.
v. Count the number of employees with salary greater than Rs. 10,0000.