(*Please write your Exam Roll No.*) *Exam Roll No* ……

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Paper Code: MCA – 108	**Subject: Database Management Systems**
Time: 2 Hours	**Maximum Marks: 45**

Note: Attempt all questions

1. Answer all the following questions briefly:- (15)
   (a) **.....** provide a way for your program to select multiple rows of data from the database and then process each row individually. 1
   (b) An association between two attributes of the same table is known as **……** 1
   (c) In order to perform Union operation on two relations, both operands and relations must be **……..** 1
   (d) A table with 50 rows and 5 columns has cardinality =**……** and degree = …… 1
   (e) The logical tables of data extracted from existing tables are known as **……** 1
   (f) What are data anomalies? 2
   (g) Define referential integrity. 2
   (h) What do you mean by functional dependency? 2
   (i) What is domain of an attribute? 2
   (j) What is a data dictionary? 2

UNIT - I

2. Attempt any **two**:
   (a) What is a Data Model? Discuss in brief the advantages of relational model. 5
   (b) What is the concept of subclass and superclass? Why these concepts are needed in data modeling? Explain by giving relevant example. 5
   (c) Consider the following business rules for a patient appointment system: A doctor can be scheduled for many appointments, but may not have any scheduled at all. Each appointment is scheduled with exactly 1 doctor. A patient can schedule 1 or more appointments. One appointment is scheduled with exactly 1 patient. An appointment must generate exactly 1 bill, a bill is generated by only 1 appointment. One payment is applied to exactly 1 bill, and 1 bill can be paid off over time by several payments. A bill can be outstanding, having nothing yet paid on it at all. One patient can make many payments, but a single payment is made by only 1 patient. Some patients are insured by an insurance company. If they are insured, they can only carry insurance with one company. An insurance company can have many patients carry their policies. For patients that carry insurance, the insurance company will make payments, each single payment is made by exactly 1 insurance company. 5
   Draw ER Diagram and create conceptual schema with assumptions and necessary

constraints.

UNIT – II

3. Attempt any **two**:

(a) I.) Consider the following table structure and answer the queries in relational algebra expression: 2+3

S_PERSON (s_no, s_name, commision)
PRODUCT(p_id, description)
SALE(sdate, customer_no, s_no, p_id, Qty)
CUSTOMER(customer_no, name, c_address)

i. Get names of the salesman who sold product no. 48.
ii. Get the names of those customers who bought table lamps (in addition to other products)

II.) Consider the following database:
EMPLOYEE(emp_code, emp_name, designation, DOJ, basic, dept_code)
DEPARTMENT(dept_code, dept_name, floor)

i. List the different position (i.e. designation) available in the EMPLOYEE table.
ii. List department names and their locations of all the managers.
iii. List the names and designations of those employees who work on 2nd floor of the building.

(b) Write down SQL syntax for following: 5

i. INSERT
ii. ALTER TABLE
iii. To define table level primary key
iv. GROUP BY
v. To create composite index

(c) Enlist the advantages of normalizing database. Consider the universal relation R={A,B,C,D,E,F,G,H,I,J} and the set of FDs={AB→C, BD→EF, AD→GH, A→I, H→J}. Decompose R into 2NF, then 3NF relations. 2+3

UNIT – III

4. Attempt any **two**:

(a) Find canonical cover for R={A,B,C,D,E,F,G,H} and FDs={A→BC, CD→E, E→C, D→AEH, ABH→ BD, DH→BC } 5

(b) Write a PL/SQL block to increase salary of employees by 20% if salary is less than 50000 otherwise by 12%. 5

(c) Write down desired properties of a good decomposition. Consider R (A,B,C,D,E,F) and FDs {A→BC, C→A, D→E, F→ A, E→D}. Is the decomposition of R into R1(A,C,D), R2(B,C,D) and R3(E,F,D) is lossless? 2+3