ROLL NO. _____

Code: DC62 **Subject: DATABASE MANAGEMENT SYSTEMS**

DipIETE – CS (Current Scheme)

Time: 3 Hours **JUNE 2017** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. A set of possible data values is called _____.
(A) Attribute **(B)** Domain
(C) Tuple **(D)** Degree

b. In the _____ normal form, a composite attribute is converted to individual attributes.
(A) Third **(B)** Second
(C) First **(D)** Fourth

c. There are two functional dependencies with the same set of attributes on the left side of the arrow:
$A \rightarrow BC$
$A \rightarrow B$
This can be combined as
(A) $A \rightarrow BC$ **(B)** $A \rightarrow B$
(C) $B \rightarrow C$ **(D)** None of these

d. The minimal set of super key is called _____.
(A) Primary Key **(B)** Secondary Key
(C) Foreign Key **(D)** Candidate Key

e. Key to represent relationship between tables is called _____.
(A) Primary Key **(B)** Secondary Key
(C) Foreign Key **(D)** None of these

f. Which of the normal form is based on multivalued dependencies?
(A) First **(B)** Second
(C) Third **(D)** Fourth

g. Tape storage is referred to as _____ storage.
(A) Direct-access **(B)** Random-access
(C) Sequential-access **(D)** All of these

h. The _____ operation, denoted by -, allows us to find tuples that are in one relation but are not in other.
(A) Union **(B)** Set-difference
(C) Difference **(D)** Intersection

i. Which level of RAID refers to disk mirroring with block striping?
(A) RAID level 0 **(B)** RAID level 1
(C) RAID level 2 **(D)** RAID level 3

j. Procedure of choosing a suitable query out of all queries is classified as _____.
(A) query optimization **(B)** parser optimization
(C) processing optimization **(D)** All of these

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Define **(4)**
(i) Schema (ii) Instance

b. Explain the different types of database users. **(4)**

c. Draw and explain three-schema architecture of DMBS. **(8)**

Q.3 a. Define E-R diagram. Draw an E-R diagram for Library Management System. Assume relevant entities and attributes for the given system. **(6)**

b. Explain following terms [**any two**]: **(2)**
(i) entity set (ii) Domain
(iii) Foreign key (iv) Null Value

c. Draw any four symbols used in E-R Diagram and also write their meanings. **(4)**

d. What is an entity set? Explain the differences among an entity, an entity type, and an entity set. **(4)**

Q.4 a. Explain Select Operation (σ), Project Operation (π) with example. **(6)**

b. Explain binary relational operations: JOIN and DIVISION with example. **(4)**

c. Show, how each ER model construct can be mapped to the relational model? **(6)**

Q.5 a. Consider with EMPLOYEE table and write query for: **(6)**
(i) Get all employees from employee table.
(ii) List the employee who lives in Mumbai.
(iii) List name whose department starts with 'C'.
(iv) Insert the record in a table.
(v) Delete the record whose salary >50000.

Emp_id	Name	Address	Department	salary
E01	Reena	Mumbai	Civil	80000
E02	Meena	Goa	Computer	70000
E03	Tina	Ahmadabad	Civil	60000
E04	Gita	Delhi	EC	70000
E05	Raj	Mumbai	Mechanical	40000

b. List and explain schema change statement in SQL. **(6)**

c. List the data types that are allowed for SQL attributes. **(4)**

Q.6 a. Discuss insertion, deletion, and modification anomalies. Why are they considered bad? Illustrate with examples. **(6)**

b. Explain First and Second Normal Form with example. **(6)**

c. Finding a Minimal Cover F for a Set of following Functional Dependencies. **(4)**
$E = \{ A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C \}$.

Q.7 a. What is a multivalued dependency? Explain Forth Normal Form with example. **(6)**

b. What is the lossless join property of decomposition? Why is it important? Explain join dependency with example. **(6)**

c. Find the highest normal form in R (A, B, C, D, E) under following functional dependencies. **(4)**
$ABC \rightarrow D$
$CD \rightarrow AE$

Q.8 a. What is the difference between primary and secondary storage? **(4)**

b. Discuss basic File Operations in brief. **(4)**

c. Explain multilevel indexes. **(8)**

Q.9 a. Discuss the converting SQL queries into relational algebra queries. **(8)**

b. Discuss heuristic optimization of query trees. **(8)**