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

DiplETE – CS (Current Scheme)

Time: 3 Hours   **DECEMBER 2015**   **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. Goals for the design of the logical schema includes
   (A) Avoiding data inconsistency   **(B)** Being able to construct queries easily
   (C) None of **(A)** & **(B)**   **(D)** Both **(A)** & **(B)**

b. Which of these is critical in formulating database design?
   (A) row column order   **(B)** number of tables
   (C) functional dependency   **(D)** normalizing

c. A primary key if combined with a foreign key creates
   (A) Parent-Child relationship between the tables that connect them
   (B) Many to many relationship between the tables that connect them
   (C) Network model between the tables that connect them
   (D) None of the above

d. What type of relationship exists between a Student table and Fees table?
   (A) One to one   **(B)** One to many
   (C) Many to many   **(D)** One to many and many to many

e. Which can be used to delete all the rows of a table?
   (A) Delete * from table_name   **(B)** Delete from table_name
   (C) Delete table_name   **(D)** all rows cannot be deleted at a time.

f. The main task of which normal form is to remove repeating attributes to separate tables.
   (A) First Normal Form   **(B)** Second Normal Form
   (C) Third Normal Form   **(D)** Fourth Normal Form

g. The view of total database content is
   (A) Conceptual view   **(B)** Internal view
   (C) External view   **(D)** Physical view

h. Which of these is true regarding Null Value?
   (A) Null=0   **(B)** Null < 0
   (C) Null>0   **(D)** Null $< >0$

i. This refers to the way data is organized in and accessible from DBMS.
   (A) database hierarchy   **(B)** data organization
   (C) data sharing   **(D)** data model

j. Which of these represents the number of entities to which another entity can be associated
   (A) mapping cardinality   **(B)** table
   (C) schema   **(D)** information

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

Q.2 a. In large organizations many people are involved in design, use and maintenance of large databases with hundreds of users. Describe in detail the actors on the scene and workers behind the scene. **(8)**

b. What is three-schema architecture? Discuss its role in data independence. **(8)**

Q.3 Being a database administrator, you are given the following requirements for a simple database of the National Hockey League (NHL): the NHL has many teams, each team has a name, a city, a coach, a captain, and a set of players, each player belongs to only one team, each player has a name, a position, a skill level, and a set of injury records, a team captain is also a player, a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 2016) and a score (such as 2 to 4).

Construct an ER diagram for the NHL database and clearly indicate the cardinality mappings as well as role indicators in your ER diagram. **(16)**

Q.4 a. Discuss the binary relational operations JOIN and DIVISION with examples. **(12)**

b. Outline the approaches used for mapping of binary 1:1 relationship in ER to relational database schema. **(4)**

Q.5 a. Explain with an example, how SQL implement the entity integrity and referential integrity constraints of the relational data model. **(8)**

b. Discuss with example how GROUP BY clause works. What is the difference between the WHERE and HAVING clause? **(8)**

Q.6 An invoice management system stores the invoice details as follows:

Invoice No.	Invoice date	Order no	Challan no	Cust no	Cust name	Item no	Item desc.	QTY sold	rate	Discount	Invoice value
112	12/8/2014	1	1	C1	SRIKANT	I1	PEPSI	2	25	NIL	75
112	12/8/2014	2	1	C1	SRIKANT	I2	BUTTER	1	60	NIL	75
113	16/8/2014	1	1	C4	KAVITA	I4	BREAD	1	22	NIL	22
114	16/8/2014	1	1	C1	SRIKANT	I8	BISCUIT	2	60	NIL	92
114	16/8/2014	2	1	C1	SRIKANT	I2	PEPSI	4	25	NIL	92

Apply normalization until you cannot decompose the invoice relational table further. State reasons behind each decomposition. **(16)**

Q.7 a. What is multivalued dependency? When does it arise and what type of constraints does it specify? Explain with example. **(8)**

b. Define Join dependencies. Explain fifth normal form with the help of an example. **(8)**

Q.8 a. Discuss the techniques that allow a hash file to expand and shrink dynamically. Highlight advantages and disadvantages of each. **(8)**

b. Explain how does a B-tree differ from a B^+ tree with the help of an example? Why is a B^+ tree usually preferred as an access structure to a data file? **(8)**

Q.9 a. What is meant by the term heuristic optimization? Discuss the main heuristics that are applied during query optimization. **(6)**

b. Discuss the cost components for a cost function that is used to estimate query execution cost. Which cost components are used most often as the basis for cost functions? Discuss the use of cost function with the help of an example. **(10)**