

DiplETE – CS (Current Scheme)

Time: 3 Hours

JUNE 2016

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)

- DBMS is a collection of _____ that enables user to create and maintain a database.
(A) Keys (B) Translators
(C) Program (D) Language Activity
- DBMS helps to achieve
(A) Data independence (B) Centralized control of data
(C) Neither (A) nor (B) (D) Both (A) and (B)
- _____ command can be used to modify a column in a table
(A) alter (B) update
(C) set (D) create
- The rule that a value of a foreign key must appear as a value of some specific table is called a
(A) Referential constraint (B) Index
(C) Integrity constraint (D) Functional dependency
- In E-R diagram total participation is represented by
(A) double lines (B) Dashed lines
(C) single line (D) Triangle
- Relational calculus is a
(A) Procedural language (B) Non-Procedural language
(C) Data definition language (D) High level language
- Tree structures are used to store data in
(A) Network model (B) Relational model
(C) Hierarchical model (D) File based system
- Which of the following relational algebra operations do not require the participating tables to be union-compatible?
(A) Union (B) Intersection
(C) Difference (D) Join

- i. A trigger is
 (A) A statement that enables to start DBMS
 (B) A program that is executed by the user when debugging an application program
 (C) A condition the system tests for validity of the database user
 (D) A statement that is executed automatically by the system as a side effect of modification to the database.
- j. A locked file can be _____
 (A) Accessed by only one user
 (B) Modified by users with correct password
 (C) Is used to hide sensitive information
 (D) None of these

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

- Q.2** a. Define data independence. Explain two types of data independence (4)
 b. What are the characteristics that distinguish the database approach from the traditional approach of programming with the files? (6)
 c. What is a data model? What are the different categories of data models? (6)
- Q.3** a. What impact constraints can have on relationship types? Describe the different types of relationship constraints. (6)
 b. Describe the different types of attributes that occur in the ER model. (10)
- Q.4** a. How domain relational calculus differs from tuple calculus? (4)
 b. Define relational algebra and relational calculus. Why relational algebra is important for the relational model? (8)
 c. Briefly explain various types of Join. (4)
- Q.5** a. What is the significance of the schema evolution commands in SQL? Describe the various schema evolution commands in SQL. (4)
 b. Describe the basic constraints that can be specified in SQL as part of table creation. (8)
 c. Briefly explain UPDATE and DELETE command. (4)
- Q.6** a. What is Normalization? Explain First and Second normal form with example. (10)
 b. Suppose you are given a relation $R = (A,B,C,D,E)$ with the following functional dependencies: $\{CE \rightarrow D, D \rightarrow B, C \rightarrow A\}$. (6)
 (i) Find all candidate keys.
 (ii) Identify the best normal form that R satisfies (1NF, 2NF, 3NF, or BCNF).
 (iii) If the relation is not in BCNF, decompose it until it becomes BCNF. At each step, identify a new relation, decompose and re-compute the keys and the normal forms they satisfy.
- Q.7** a. What are the properties that the relational schemas should possess, the existences of which are confirmed by the process of normalization through decomposition? (4)

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- b. When a relation is said to be in BCNF? Explain with the help of an example. (8)
- c. What is multivalued dependency? When does it arise? (4)
- Q.8** a. What are disk blocks? Why are they important? (4)
- b. Differentiate between fixed length and variable-length records. (4)
- c. What do you understand by Hashing? How can hashing be used to construct an index? (8)
- Q.9** a. What is the significance of sorting in DBMS? Explain two-way external merge sorting. (8)
- b. What does Oracle provide for query optimization? (8)