

DiplETE – CS (Current Scheme)

Time: 3 Hours

JUNE 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. Manipulating a database includes functions such as

- (A) querying the database to retrieve specific data
- (B) updating the database to reflect changes in the miniworld
- (C) generating reports from the data
- (D) All of these

b. A relation schema can have more than one key. In such case, each of the keys is called a

- (A) Foreign key
- (B) Candidate key
- (C) Super key
- (D) Null value key

c. The result of which operation gives a relation that includes all tuples that are in both relation R and S

- (A) UNION
- (B) INTERSECTION
- (C) SET DIFFERENCE
- (D) JOIN

d. In an ER diagram double line indicates

- (A) Total participation
- (B) Multiple participation
- (C) Cardinality N
- (D) external schema

e. Domain constraints and referential-integrity constraints are special forms of

- (A) Triggers
- (B) Cursors
- (C) Assertions
- (D) Views

- f. The metadata is created by the
- (A) DDL compiler (B) DML interpreter
(C) DDL interpreter (D) DML processor
- g. Which of the following is the activity of the coordinating processes that operate in parallel and access shared data?
- (A) Recovery management (B) Concurrency control
(C) Security management (D) Transaction management
- h. The technique involving application of arithmetic or logical function to calculate hash address is called _____.
- (A) Discrete
(B) Folding
(C) Exclusive
(D) Chaining
- i. The graphical representation of a query is
- (A) Query tree (B) Query graph
(C) B tree (D) B⁺ tree
- j. Which of the following are copies of physical database files:
- (A) Transaction log
(B) Physical backup
(C) Logical backup
(D) Main memory

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

- Q.2** a. Discuss the responsibilities of the DBA and Database Designers? (4)
- b. With the help of a diagram, explain the component modules of a DBMS and their interactions? (9)
- c. What does defining, manipulating and protecting of a database mean? (3)
- Q.3** a. Discuss the role of a high-level data model in the database design process? (7)
- b. What do you mean by Entity and Relationship in ER model? Explain how a relationship set is defined? (4)

- c. Discuss the characteristics of relations that make them different from ordinary tables and files? (5)
- Q.4** a. With the help of a suitable example, explain the following Relational Algebra operations with their notations:
(i) SELECT
(ii) PROJECT
(iii) INTERSECTION (3×3)
- b. Outline the steps to convert the basic ER model to relational database schema. (7)
- Q.5** a. What are the basic data types available for attributes in SQL? (8)
- b. List the three main approaches for database programming? What are the advantages and disadvantages of each approach? (8)
- Q.6** a. Discuss insertion, deletion and modification anomalies. Why are they undesirable? Illustrate with examples? (8)
- b. Define minimal cover of a set? Give an algorithm for finding a Minimal Cover F for a Set of Functional Dependencies E. (2+6)
- Q.7** a. Define the following: (2×4)
(i) Multivalued Dependency
(ii) Join Dependency
(iii) Fourth normal form
(iv) Fifth normal form
- b. Describe the two desirable properties of decomposition? (8)
- Q.8** a. Why most databases are stored permanently on magnetic disk? Why are disks used to store online database files and not tapes? (5)
- b. What are the advantages of ordered files over unordered files? (5)
- c. Describe the structure of internal nodes of a B⁺ tree of order p. (6)
- Q.9** a. Discuss the different phases of external sorting? Also give an outline of the algorithm used? (8)
- b. Discuss the cost components for a cost function that is used to estimate query execution cost. What are the different parameters that are used in cost functions? Where is this information kept? (3+3+2)