

DiplETE – CS

Time: 3 Hours

JUNE 2014

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. Cartesian product in relational algebra is

- (A) a Unary operator (B) a Binary operator
(C) a Ternary operator (D) not defined

b. The following are functions of a DBMS except

- (A) creating and processing forms (B) creating databases
(C) processing data (D) administrating databases

c. Architecture of the database can be viewed as

- (A) two levels (B) four levels
(C) three levels (D) one level

d. In an E-R diagram attributes are represented by

- (A) rectangle (B) square
(C) ellipse (D) triangle

e. The statement in SQL which allows to change the definition of a table is

- (A) Alter (B) Update
(C) Create (D) Select

f. Which of the following database object does not physically exist?

- (A) base table (B) index
(C) view (D) none of these

- g. The different classes of relations created by the technique for preventing modification anomalies are called:
- (A) normal forms (B) referential integrity constraints
(C) functional dependencies (D) none of these
- h. When the values in one or more attributes being used as a foreign key must exist in another set of one or more attributes in another table, we have created a(n):
- (A) transitive dependency
(B) insertion anomaly
(C) referential integrity constraint
(D) normal form
- i. One solution to the multivalued dependency constraint problem is to:
- (A) split the relation into two relations, each with a single theme
(B) change the theme
(C) create a new theme
(D) add a composite key
- j. ON UPDATE CASCADE ensures which of the following?
- (A) Normalization (B) Data Integrity
(C) Materialized Views (D) All of these

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

- Q.2** a. List main responsibilities of Database Administrator? (8)
- b. What are the advantages of DBMS? Explain the difference between physical and logical data independence. (8)
- Q.3** a. Define and explain "Mapping Cardinalities". List various types of Mapping Cardinalities. (8)
- b. Define and explain the data constraints. What are various types of data constraints? (8)
- Q.4** a. Differentiate between Relational Algebra and Relational Calculus. (8)
- b. Explain basic operators of relational algebra. (8)
- Q.5** Discuss the following SQL commands with example:- (8)
- (i) Create Table (ii) Describe
(iii) Delete (iv) Select

- b. Consider the following Supplier-Part-Shipment(S-P-SP) database (keys are underlined)
S (sno,sname,status,city)
P(pno,pname,colour,weight)
SP(sno,pno,qty)

Write the SQL queries for the following statements:-

- (i) Get the supplier names of the suppliers who are supplying red colour part.
(ii) Get the total quantity supplied by all suppliers. (8)

Q.6 a. Describe the guidelines for relation schemas. (8)

b. Differentiate 2nd and 3rd normal forms with example. (8)

Q.7 a. Define and explain Multivalued Dependencies. (8)

b. Find the canonical cover for the following relation with the given functional dependencies: (8)

$$\begin{aligned}R &= (A, B, C) \\F &= \{A \rightarrow BC \\ &\quad B \rightarrow C \\ &\quad A \rightarrow B \\ &\quad AB \rightarrow C\}\end{aligned}$$

Q.8 a. Describe the static hash file with buckets and chaining and show how insertion, deletion and modification of a record can be performed. (8)

b. Explain the types of multi-level ordered indexes. (8)

Q.9 a. Explain sort-merge algorithm for external sorting. (8)

b. Explain various cost components that are the constituents of a Query Execution. (8)