2018

COMPUTER SCIENCE

(Major)

Paper : 4.2

(Database Management System)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Choose the correct option of the following :

    $1 \times 7 = 7$

    (a) A table can have only one

       (i) secondary key

       (ii) alternate key

       (iii) unique key

       (iv) primary key

    (b) The highest level in the hierarchy of data organization is called

       (i) data bank

       (ii) database

       (iii) data file

       (iv) data record

(Turn Over)

(c) The keyword to eliminate duplicate rows from the query results in SQL is

    (i) DISTINCT

    (ii) NO DUPLICATE

    (iii) UNIQUE

    (iv) None of the above

(d) Relational algebra does not have

    (i) selection operator

    (ii) projection operator

    (iii) aggregation operator

    (iv) division operator

(e) DROP is a/an _____ statement in SQL.

    (i) query

    (ii) embedded SQL

    (iii) DDL

    (iv) DCL

(f) In E-R diagram, total participation is represented by

    (i) double lines

    (ii) dashed lines

    (iii) single line

    (iv) triangle

(g) The FD $A \rightarrow B$, $DB \rightarrow C$ implies

    (i) $DA \rightarrow C$

    (ii) $A \rightarrow C$

    (iii) $B \rightarrow A$

    (iv) $DB \rightarrow A$

2. Answer the following questions :　　　　2×4=8

(a) Write four main commands used to modify and retrieve data.

(b) Differentiate between primary key and foreign key.

(c) State the role of outer join in relational algebra.

(d) What is the use of the constraint NOT NULL?

3. Answer any *three* questions :　　　　5×3=15

(a) Let $R = (A, B, C, D)$ and F be the set of functional dependencies for R given by $\{A \rightarrow B, A \rightarrow C, BC \rightarrow D\}$. Prove that $A \rightarrow D$.

(b) What is a record? Differentiate between fixed length records and variable length records.

(c) Explain entity integrity and referential integrity.

(d) Describe the role of a DBA in DBMS.

(e) What is the difference between inner and outer joins? Explain with example.

4. (a) Consider the following relational schemas :

employee (eid, name, address, salary, date_of_joining, dept_id)

department (dept_id, dept_name)

Write SQL statements for the following queries : 2×3=6

(i) Change the name of the employee to 'John Smith' whose ID (employee ID) is 1010.

(ii) Retrieve the name and date_of_joining of those employees who belong to 'Computer Science' department.

(iii) Display the total salary of all the employees belonging to 'Computer Science' department.

(Continued)

(b) Write short notes on the following (any *two*) :   5×2=10

    (i) Group by and order by

    (ii) Equi join and theta join

    (iii) Strong entity and weak entity

    (iv) 3NF and BCNF

5. Answer the following (any *two*) :   7×2=14

(a) Explain the steps required to transform the *E-R* model to relational schema with example.

(b) What is the significance of *E-R* diagram? Explain the meaning of various symbols used in preparing one *E-R* diagram for a relational schema.

(c) What are the set operations possible within a relational model? Explain any one of them with a suitable example.

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