53 (CS 401) DBMS

2014

DATABASE MANAGEMENT SYSTEM

Paper : CS 401

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(A)* List the main characteristics of Database approach versus File-Processing approach. 8

   (B) Consider following schema {(2×3)×2}=12

   SUPPLIERS (Sid, Sname, address)

   PARTS (Pid, Pname, color)

   CATALOG (Sid, Pid, cost)

   Write the following query in

   (a) Relational algebra

(b) Tuple Relational Calculus

(i) Find the names of suppliers who supply some red part.

(ii) Find the sid of supplier who supply some red part and some green part.

(ii) Find the pids of the most expensive part supplied by supplier name 'SHANKAR'.

2. (A) With the help of example, explain the following briefly : 10

Entity Set, Mapping Cardinality, Participation constraints, Weak entity set.

(B) Describe the functions of Database Administrator (DBA). 8

(C) What do you mean by query Optimization ? 2

3. *(A)* Consider the following relation schema

Movie (title, year, length, incolor, studioName, ProducerC#)

StarIN (movieTitle, movieYear, StarName)

MovieStar (name, address, gender, birthdate)

Movie Exec (name, address, Cert#, networth)

Studio (name, address, presc#)

Write SQL queries for 3+3+3+3=12

(i) The title of movies made by 'MGM' studios that either were made after 1970 or were less than 90 minutes long.

(ii) The names and addresses of all female movie stars that are also movie executives with a networth over $ 10,000,000.

(iii) Finding the producer of 'Star Wars' by using a nested subquery.

(iv) Finding the producer 'Harrison Ford' movie.

(B) Explain the distinctions among the term Primary Key, Candidate Key and Super Key. 6

(C) Differentiate between Data manipulation language (DML) and Data Definition language (DDL). 2

4. Consider the following set F of functional dependencies on Relation Schema

$r(A,B,C,D,E,F)$ 2+2+4+6+6=20

$F = \{ A \rightarrow BCD,$

$BC \rightarrow DE,$

$B \rightarrow D,$

$D \rightarrow A \ \}$

(i) Compute Closure of $B(B+)$.

(ii) Prove that AF is a Super Key.

(iii) Compute a canonical cover for above set of functional dependencies ; give each step of your derivation with an explanation.

(iv) Give a 3NF decomposition of r based on the canonical cover.

(v) Give a BCNF decomposition of r using the original set of functional dependencies.

5. *(A)* What is the difference between a clustering index and secondary index ? 4

(B) Differentiate Between Static hashing and Dynamic hashing. 6

(C) Describe about basic steps of query processing. 10

6. *(A)* Explain about ACID properties of transaction. 10

(B) Explain the distinction between Serial Schedule and Serializable schedule. 5

(C) What is a cascadeless schedule ? Why is cascadeless of schedules desirable ? 5

7. *(A)* What is two phase locking protocol ? What is strict two phase locking protocol ? 4

(B) Define deadlock ? What are necessary *four* conditions for a deadlock to occur ? Discuss the different methods that can be used for deadlock prevention. 10

(C) Describe about multiple Granularity. 6
