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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 110402 **Roll No.** 1 2 0 3 2 1 0 2 3 4

B.Tech.

(SEM. IV) THEORY EXAMINATION 2013-14

DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours *Total Marks : 100*

Note :– Attempt **all** Sections.

SECTION–A

1. Attempt **all** parts : **(10×2=20)**

(a) What is Multimedia Database ? Explain.

(b) Explain the purpose of foreign key.

(c) Differentiate between full functional dependency and partial functional dependency.

(d) What do you mean by the terms, Generalization and Specialization ?

(e) What is Union Compatibility ? Give an example.

(f) What are the advantages of file processing system which were removed by DBMS ?

(g) Consider a relation R(A, B, C) with the FDs :

$A \rightarrow B$ $B \rightarrow C$

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Is the decomposition of R into R1(B, C) and R2(A, B) lossless ?

(h) Write Armstrong's axioms.

(i) What are the various anomalies associated with RDBMS ?

(j) What do you understand by DML and DDL ?

SECTION–B

2. Attempt any **three** parts : **(3×10=30)**

(a) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient, a log of the various tests and examinations conducted.

(b) Consider the relations given below :

Dealer (Dealer-no, DealerName, address)

Part (Part-no, Part-name, color)

Assigned-to (Dealer-no, Part-no, cost)

Give an expression in relational algebra the following queries :

(i) Find the name of all dealers who supply 'Red' Parts.

(ii) Find the name of the dealers who supply both Yellow and Green Parts.

(iii) Find the name of the dealers who supply all the Parts.

(iv) Calculate total costs involved in purchasing all parts.

(v) List all dealer names.

(c) Consider the following schema :

EMPLOYE (EID, EmployeeName, Street, City, Deptt, CompanyName)

COMPANY (CompanyName, City)

WORKS (EmployeeName, CompanyName, Salary)

MANAGES (EmployeeName, ManagerName)

Write SQL queries for the following :

(i) Find out the names of all employees that have 'A' anywhere in their name and are in department 'IT'.

(ii) List the names of departments in ascending order and their employees in descending order.

(iii) Find the names, city, deptt of all employees who work for 'TCS'.

(iv) Find the name of employee who earns salary more than 30000.

(v) List all manager names.

(d) Give two sets F1 and F2 of FDs for a relation (A, B, C, D, E).

F1 : A → B, AB → C, D → AC, D → E

F2 : A → BC, D → AE

Are F1 and F2 equivalent ? Explain.

(e) Explain how the following differ :

(i) Fragmentation, Replication Transparency

(ii) Shadow paging.

SECTION–C

Note :– Attempt **all** questions. **(5×10=50)**

3. Attempt any **two** parts :

(a) Explain the difference between external, internal and conceptual schemas. How are these different layers related to the concepts of logical and physical data independence ?

(b) Define 3NF. What are the differences between 3NF and BCNF ?

(c) Write the syntax and purpose of following SQL commands : sysdate, to_date(), dual table, to_number, substr() and initcap().

4. Attempt any **two** parts :

(a) What is Cursor ? What is the difference between implicit cursor and explicit cursor ?

(b) Given the relation schemas R = (A, B, C) and S = (D, E, F) and relation instance r(R) and s(S). Give an expression in SQL to each of the following queries :

(i) $\Pi_B(r)$

(ii) $\sigma_{A>20}(r)$

(iii) $r \times s$

(iv) $\Pi_{A,F}(\sigma_{c=E}(r \times s))$.

(c) Consider the relations given below :

Person (Driver-id, name, address)

Car (License, Model, Year)

Accident (Report-no, Date, Location)

Owns (Driver-id, License)

Participated (Driver-id, License, Report-no, Damage-Amount)

Give an expression in SQL with output for each of the following queries :

(i) Find the total number of persons who owned cars that met with accidents in 2010.

(ii) Find the total number of accidents in which the cars belonging to 'Abhay' were involved.

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(iii) Add a new accident to the Database with report-number = 'AR101', current data & location 'Noida'.

(iv) Find the damage amount for the Driver-id 'D001'.

5. Attempt any **two** parts :

(a) Define closure of a FD set. Consider the relation schema R(A, B, C, D, G) with following FDs {AB → C, C → A, BC → D, ACD → D, D → EG, BE → C, CG → BD, CE → AG}

Compute the closure of (B, D) and (C, A).

(b) Consider the relation R = (A, B, C, D, E, F, G, H) with following FDs :

F = {AC → G, D → EG, BC → D, CG → BD, ACD → B, CE → AG}

Find the canonical cover of F.

(c) Define multi valued dependencies. Explain the fourth normal forms algorithm to remove it.

6. Attempt any **two** parts :

(a) What do you mean by Serializability ? Discuss the conflict and view serializability with suitable example.

(b) What do you mean by multiple granularities ? How is it implemented in transaction system ?

(c) Explain the working of various time stamping protocols for concurreny control.

7. Attempt any **two** parts :

(a) Which of the following schedules are conflict serializable ? For each serializable schedule, determine the equivalent serial schedule :

r1(x); r3(x); w3(x); w1(x); r2(x);

r3(x); r2(x); w3(x); r1(x); w1(x);

r3(x); r3(x); r1(x); w3(x); w1(x);

(b) What is Log ? How is it maintained ? Discuss the salient features of deferred database modification and immediate database modification strategies in brief.

(c) What is recoverable schedule ? Why is recoverability of schedules desirable ? Are there any circumstances under which it would be desirable to allow non-recoverable schedules ? Explain your answer.