SPRING END SEMESTER EXAMINATION-2018
4th Semester B.Tech & B.Tech Dual Degree

DATABASE MANAGEMENT SYSTEM
CS-2004

[For 2017(L.E.), 2016 & Previous Admitted Batches]

Time: 3 Hours   Full Marks: 60

Answer any SIX questions including question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable
and all parts of a question should be answered at one place only.

1.   Answer in brief.   [2 × 10]

    (a)   Draw an entity set having one multivalued attribute and one composite attribute and then translate the entity set into relations.

    (b)   Why self join is required? Explain with suitable example.

    (c)   What do you mean by partial dependency? Explain with an example.

    (d)   A relation R(P,Q,R,S) having functional dependencies F: {P-> QR, R->S} is decomposed into R1 (P,Q,R) and R2(R,S). Check whether the decomposition is lossless or lossy. Justify your answer.

    (e)   Discuss the clustering indexing with suitable example.

    (f)   What is timestamp? How the time stamp is assigned to a transaction and to a data item?

    (g)   Discuss the importance of view in relational database system.

(h) Define a schedule. When a schedule is said to be recoverable? Give example to support your answer.

(i) Define 4 NF with suitable example.

(j) What is safe expression? Explain with appropriate example.

2. (a) Differentiate between database systems and file system along with their advantages and disadvantages. [5]

(b) Write the role and responsibilities of database administrator. [3]

3. Consider the following relational schema: [2+2+4]
SUPPLIER (sid, sname, saddress)
PART (pid, pname, color)
CATALOG (sid, pid, cost)

Answer the following queries using relational algebra:

i) Find the name of all suppliers who supply red parts.

ii) Find the name of suppliers who supply parts whose catalog cost is more than 6000.

Answer the following query using tuple relational calculus & domain relational calculus:

iii) Display the pname and pid of all blue color parts whose cost is more than Rs. 1500/-.

4. (a) Construct an ER diagram for course allocation system that keeps details of a particular course. Each course (identified by courseid, coursename, coursesyllabus) offers course_offerings (identified by semester, section, timing). The students (identified by studentid, studentname, studentaddress, studentphone) need to [5]

register for the a number of course_offerings and a course_offering can be registered by more than one student. A course_offering can be taught by more than one faculty member (identified by facultyid, facultyname, facultycontactno) and a faculty can teach more than one course_offering. Each faculty records the number of hours he has taught to the students appropriately. Clearly specify the assumptions you have made for imposing constraints in the ER diagram.

(b) Convert the above ER model into its corresponding relational model and specify the primary keys and foreign keys. [3]

5. (a) Given a relation schema R = (P, Q, R, S, T) and FD set [1+4] F = {PQ → RST, P → R, R→ S}.

i) Find the candidate key.

ii) Check whether the relation is in BCNF or not. If not do BCNF decomposition and check the property of lossless join and dependency preserving decomposition.

(b) Given two sets F1 and F2 of functional dependencies [3] as follows:

F1={A→B, AB→C, D→AC, D→E}

F2={A→BC, D→ AE}

Are F1 and F2 are equivalent? Check it.

6. (a) Find the minimal cover of the given set of functional [4] dependencies, F={ABH→ C, A→D, C→E, BGH→F, F→AD, E→F, BH→E} defined on R=(A, B, C, D, E, F, G, H).

(b) State and prove the decomposition and Pseudo- [4] transitivity rules using Armstrong's Axioms on functional dependencies.

7. (a) Consider the schedule S: r1(X); r2(Z); r1(Z); r3(X);   [4]
          r3(Y); w1(X); w3(Y); r2(Y); w2(Z); w2(Y)

          (i) Check whether the above schedule is conflict
              serializable or not.

          (ii) If serializable, then find all possible equivalent
               serial schedules.

    (b) Why is concurrency control needed? Explain lost update,   [4]
         dirty read problems.

8.   Write Short notes on:(any two).   [4×2]

    (a) Constraints of Generalization/Specializations   with
         suitable example

    (b) Two phase locking protocol

    (c) Indexing with B-tree with example

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