15CS53

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Database Management System

Time: 3 hrs.   Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What are the responsibilities of the DBA and Database Designer? **(06 Marks)**
   b. With neat diagram, explain "three schema Architecture". **(05 Marks)**
   c. Discuss the different types of user friendly interfaces and the types of user who typically use each. **(05 Marks)**

OR

2 a. Explain with block diagram the different phases of database design. **(08 Marks)**
   b. Draw an ER-Diagram of movie database. Assume your own entities (minimum 4) attributes and relationships. **(08 Marks)**

Module-2

3 a. Discuss the characteristics of relations. **(06 Marks)**
   b. Outline the steps to convert the basic ER Model to relational Database schema. **(06 Marks)**
   c. Define the following:
      i)   Relation state
      ii) Relation schema
      iii) Arity
      iv) Domain. **(04 Marks)**

OR

4 a. Discuss the various types of set theory operations with example. **(08 Marks)**
   b. Consider the two tables, show the results of the following:

T_1		
A	B	C
10	a	5
15	b	8
25	a	6

T_2		
P	Q	R
10	b	6
25	c	3
10	b	5

   i) $T_1 \bowtie_{T_1.B = T_2.Q} T_2$ ii) $T_1 \bowtie_{T_1.A = T_2.P} T_2$

   iii) $T_1 \bowtie_{(T_1.A = T_2.P) \text{ AND } (T_1.C = T_2.R)} T_2$ iv) $T_1 - T_2$

(08 Marks)

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Module-3

5   a.   How does SQL implement the entity integrity constraints of the relational data model? Explain with an example. **(04 Marks)**
    b.   Discuss: i) Shared variables   ii) Communication variables. **(06 Marks)**
    c.   Explain with examples in SQL:
        i)   Drop command
        ii) Delete command
        iii) Update command. **(06 Marks)**

OR

6   a.   With program segment, explain retrieving of tuples with embedded SQL in C. **(06 Marks)**
    b.   Consider the following tables:
        works (Pname, Cname, Salary)
        lives (Pname, Street, City)
        located-In (Cname, City)
        write the following queries in SQL:
        i)   List the names of the people who work for the company 'Wipro' along with the cities they live in.
        ii) Find the names of the persons who do not work for 'Infosys'.
        iii) Find the people whose salaries are more than that of all of the 'oracle' employees.
        iv) Find the persons who works and lives in the same city. **(10 Marks)**

Module-4

7   a.   What do you mean by closure of attribute? Write an algorithm to find closure of attribute. **(06 Marks)**
    b.   Explain any two informal quality measures employed for a relation schema design. **(04 Marks)**
    c.   Given below are two sets of FDs for a relation R (A, B, C, D, E). Are they equivalent?
        i) $A \rightarrow B$, $AB \rightarrow C$, $D \rightarrow AC$, $D \rightarrow E$
        ii) $A \rightarrow BC$, $D \rightarrow AE$ **(06 Marks)**

OR

8   a.   What do you mean by multivalued dependency? Explain the 4NF with example. **(06 Marks)**
    b.   Suggest and explain three different techniques to achieve INF using suitable example. **(04 Marks)**
    c.   Consider the following relation for CARSALE (CAR-NO, Date-Sold, Salesman No, Commission, Discount)
        Assume a car can be sold by multiple salesman and hence primary key is {CAR_No, Salesman_No}.
        Additional dependencies are
        Date_Sold $\rightarrow$ Discount
        Salesman_No $\rightarrow$ Commission
        i)   Is this relation in 1NF, 2NF or 3NF? Why or why not?
        ii) How would you normalize this completely? **(06 Marks)**

Module-5

9   a.   Discuss the ACID properties of a transaction. **(04 Marks)**
    b.   What are the anomalies occur due to interleave execution? Explain them with example. **(06 Marks)**

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c. Consider the three transactions T_1, T_2 and T_3 and schedules S_1 and S_2 given below. Determine whether each schedule is serializable or not? If a schedule is serializable write down the equivalent serial schedule (S).

T_1 : $R_1(x)$; $R_1(z)$; $W_1(x)$;
T_2 : $R_2(x)$; $R_2(y)$; $W_2(z)$; $W_2(y)$;
T_3 : $R_3(x)$; $R_3(y)$; $W_3(y)$;

S1 : $R_1(x)$; $R_2(z)$; $R_1(z)$; $R_3(x)$; $R_3(y)$; $W_1(x)$; $W_3(y)$; $R_2(y)$; $W_2(z)$; $W_2(y)$;
S2 : $R_1(x)$; $R_2(z)$; $R_3(x)$; $R_1(z)$; $R_2(y)$; $R_3(y)$; $W_1(x)$; $W_2(z)$; $W_3(y)$; $W_2(y)$;

(06 Marks)

OR

10 a. Describe the problems that occur when concurrent execution uncontrolled. Give examples.
(06 Marks)

b. What is two phase locking? Describe with the help of an example. **(04 Marks)**

c. What is Deadlock? Consider the following sequences of actions listed in the order they are submitted to the DBMS.
Sequence S1: $R_1(A)$; $W_2(B)$; $R_1(B)$; $R_3(C)$; $W_2(C)$; $W_4(B)$; $W_3(A)$
Draw waits-for graph in case of Deadlock situation. **(06 Marks)**