

# CBCS SCHEME

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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 <sub>1</sub>		
A	B	C
10	a	5
15	b	8
25	a	6

T <sub>2</sub>		
P	Q	R
10	b	6
25	c	3
10	b	5

i)  $T_1 \bowtie T_2$   
 $T_1 \cdot B = T_2 \cdot Q$

ii)  $T_1 \bowtie T_2$   
 $T_1 \cdot A = T_2 \cdot P$

iii)  $T_1 \bowtie T_2$   
 $(T_1 \cdot A = T_2 \cdot P) \text{ AND } (T_1 \cdot C = T_2 \cdot R)$

iv)  $T_1 - T_2$

(08 Marks)

**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:
- Drop command
  - Delete command
  - 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:
- List the names of the people who work for the company 'Wipro' along with the cities they live in.
  - Find the names of the persons who do not work for 'Infosys'.
  - Find the people whose salaries are more than that of all of the 'oracle' employees.
  - 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?
- $A \rightarrow B$ ,  $AB \rightarrow C$ ,  $D \rightarrow AC$ ,  $D \rightarrow E$
  - $A \rightarrow BC$ ,  $D \rightarrow AE$  (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 4NF 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  
 $Date\_Sold \rightarrow Discount$   
 $Salesman\_No \rightarrow Commission$
- Is this relation in 1NF, 2NF or 3NF? Why or why not?
  - 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 interleaved execution? Explain them with example. (06 Marks)

- 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).

$T_1$  :  $R_1(x)$ ;  $R_1(z)$ ;  $W_1(x)$ ;

$T_2$  :  $R_2(x)$ ;  $R_2(y)$ ;  $W_2(z)$ ;  $W_2(y)$ ;

$T_3$  :  $R_3(x)$ ;  $R_3(y)$ ;  $W_3(y)$ ;

$S_1$  :  $R_1(x)$ ;  $R_2(z)$ ;  $R_1(z)$ ;  $R_3(x)$ ;  $R_3(y)$ ;  $W_1(x)$ ;  $W_3(y)$ ;  $R_2(y)$ ;  $W_2(z)$ ;  $W_2(y)$ ;

$S_2$  :  $R_1(x)$ ;  $R_2(z)$ ;  $R_3(x)$ ;  $R_1(z)$ ;  $R_2(y)$ ;  $R_3(y)$ ;  $W_1(x)$ ;  $W_2(z)$ ;  $W_3(y)$ ;  $W_2(y)$ ;

(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  $S_1$ :  $R_1(A)$ ;  $W_2(B)$ ;  $R_1(B)$ ;  $R_3(C)$ ;  $W_2(C)$ ;  $W_4(B)$ ;  $W_3(A)$

Draw waits-for graph in case of Deadlock situation.

(06 Marks)

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