

CBCS SCHEME

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17CS53

Fifth Semester B.E. Degree Examination, June/July 2023 Database Management System

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain the characteristics of the Database approach. (08 Marks)
b. Discuss any three advantages of using an DBMS approach. (06 Marks)
c. Explain Three Schema Architecture. Why do we need mappings between Schema levels? (06 Marks)

OR

- 2 a. List and explain the various notations used in an ER diagram. (08 Marks)
b. Discuss the various cases where use of a NULL Value would be appropriate. (06 Marks)
c. Define the following with an example for each :
i) Value set ii) Multivalued Attributes iii) Database iv) Total participation
v) Partial Participation vi) Cardinality Ratio. (06 Marks)

Module-2

- 3 a. From the tables "R" and "S", find the following : i) $R \cup S$ ii) $R \cap S$ iii) $S - R$
iv) $R \bowtie_{R.SNo = S.SNo} S$ v) $R \bowtie_{R.SNo = S.SNo} S$ vi) $R \bowtie_{R.Dept = S.Dept} S$ (06 Marks)

R		S	
S.No.	Dept	S.No	Dept
S1	CSE	S10	Maths
S2	ISE	S3	Chemistry
S3	Chemistry	S15	PSy
S4	Electronics	S16	Eng

- b. Explain SELECT and PROJECT Operations in relational Algebra. (06 Marks)
c. What are the basic data types available for attributes in SQL? Explain each of them. (08 Marks)

OR

- 4 a. Consider the following schema :
SUPPLIERS (Sid, Sname, address)
PARTS (Pid, Pname, color)
CATALOG (Sid, Pid, cost)
Write the following SQL Queries :
i) Find the Sids of the Suppliers who supply some red part or are at "Belagavi".
ii) Find the Sids of Suppliers who supply some red and some green part.
iii) Find pairs of Sids such that Supplier with the first Sid charges more for some part than the Supplier with the second Sid. (06 Marks)
b. Discuss Entity integrity and referential integrity constraints. (06 Marks)
c. Explain the steps to convert the basic ER model to relational database schema. (08 Marks)

Module-3

- 5 a. Define the term Stored Procedure. Explain creating and calling of Stored procedures with suitable notations. (10 Marks)
b. Explain Impedence Mismatch problem. (05 Marks)
c. What are views in SQL? Explain. (05 Marks)

OR

- 6 a. What are the components of JDBC Architecture? Describe four different alternatives for JDBC drivers. (10 Marks)
- b. Explain the concepts of SQLJ. (05 Marks)
- c. Explain the advantages of three tier application architecture. (05 Marks)

Module-4

- 7 a. Write an algorithm for finding minimal cover F for a set of Functional Dependencies E. (05 Marks)
- b. Explain 1NF, 2NF and 3NF Normal Forms. (09 Marks)
- c. Given a relation $R = \{A, B, C, D, E, H\}$ and having the following FDs.
 $F = \{ \{A \rightarrow BC\}, \{C, D \rightarrow E\}, \{E \rightarrow C\}, \{D \rightarrow A, E, H\}, \{A, B, H \rightarrow B, D\}, \{D, H \rightarrow B, C\} \}$. Find the key for relation R with FD F. Normalize upto 3NF. (06 Marks)

OR

- 8 a. Explain Informal Design Guidelines for Relational Schemas. (08 Marks)
- b. Explain BCNF Normal Form. (06 Marks)
- c. A set of FDs for relation $R\{A, B, C, D, E, F\}$ are $AB \rightarrow C, C \rightarrow A, BC \rightarrow D, ACD \rightarrow B, BE \rightarrow C, EC \rightarrow FA, CF \rightarrow BD, D \rightarrow E$. Find an irreducible cover for this set of FD's. (06 Marks)

Module-5

- 9 a. Explain ACID properties of transactions. (04 Marks)
- b. Explain Transaction support in SQL. (06 Marks)
- c. Consider the three transactions T_1, T_2 and T_3 and the schedules S_1 and S_2 given below. Draw the serializability (precedence) graphs for S_1 and S_2 and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule (S).
- $T_1 : r_1(X) ; r_1(Z) ; w_1(X) ;$
 $T_2 : r_2(Z) ; r_2(Y) ; w_2(Z) ; w_2(Y) ;$
 $T_3 : r_3(X) ; r_3(Y) ; w_3(Y) ;$
 $S_1 : r_1(X) ; r_2(Z) ; r_1(Z) ; r_3(X) ; r_3(Y) ; w_1(X) ; w_3(Y) ; r_2(Y) ; w_2(Z) ; w_2(Y) ;$
 $S_2 : r_1(X) ; r_2(Z) ; r_3(X) ; r_1(Z) ; r_2(Y) ; r_3(Y) ; w_1(X) ; w_2(Z) ; w_3(Y) ; w_2(Y) ;$ (10 Marks)

OR

- 10 a. Describe the Shadow Paging recovery technique. (04 Marks)
- b. Explain Strict2PL Protocol. (06 Marks)
- c. Consider the below Figure 1(a) and (b) :

T_1	T_2
read_item (X) ;	read_item (X) ;
$X := X - N ;$	$X := X + M ;$
write_item (X) ;	write_item (X) ;
read_item (Y) ;	
$Y := Y + N ;$	
write_item (Y) ;	

Figure 1 : (a) Transaction T_1 (b) Transaction T_2 .

List all the possible schedules for transaction T_1 and T_2 and determine which are conflict serializable (Correct) and which are not. (10 Marks)
