3504

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MCS-023

MCA (Revised) / BCA (Revised)

Term-End Examination, 2019

MCS-023 : INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours] [Maximum Marks : 100

Weightage 75%

Note : Question No. one is **compulsory**. Attempt **any three** questions from the rest.

1. (a) Define 2NF. How would you normalize the emp-project relational scheme into 2NF. Emp-Project (SSN, P_number, hours, e_name, P-name, P_location). [6]

where :

$$[SSN, p\_number] \rightarrow hours$$

$$SSN \rightarrow e\_name$$

$$p\_number \rightarrow [p\_name, p\_location]$$

(b) XYZ bank manages four types of accounts : Loan, Current/Saving, Recurring and Deposits. It operates number of branches and a customer of the bank can have any number of accounts :

(i) Identify entities of your interest, attributes, relationship, cardinalities and draw a complete E-R diagram. [5]

(ii) Convert the E-R diagram into tables and show relationship among the tables as per the diagram. [5]

(c) Explain the two integrity rules with the help of an example for each. [5]

(d) Define a serializable schedule. For the following schedule (schedule A). Determine whether "schedule A" is serializable or not. [5]

Schedule A	
T_1	T_2
Read (x)	-
-	Read (x)
Write (y)	-
-	Write y
Commit	-
-	Commit

(e) Explain database recovery using a system log with the help of an example. [6]

(f) What is a hashed file organization ? What are its advantages and disadvantages ? [5]

(g) For what reasons is '2-phase' locking protocol required ? [3]

2. (a) What types of constraints violation take place during insert operation ? Explain with an example. [5]

(b) What is the difference between a key and a super key ? Define primary key, candidate key and foreign key. [5]

(c) Violation of which property of a transaction leads to lost-update problem ? Explain with a suitable example. [6]

(d) Explain the meanings of the following clauses with appropriate example for each : [4]

(i) Group by clause

(ii) Having clause

3. (a) What is a binary lock ? How does it solve a concurrency related problem ? Explain through an example. [7]

(b) What are the reasons for fragmenting a relation ? What are the rules to be applied for fragmenting a relation ? [5]

(c) What is a weak-entity ? What are the restrictions on weak entity ? Explain through an example. [5]

(d) Differentiate between data security and data integrity. [3]

4. (a) Compare the shadow-page recovery technique with log-based recovery technique with respect to ease of implementation and overhead cost. [6]

(b) What is a data dictionary ? What should be included in data dictionary ? [5]

(c) What do you mean by ALTER TABLE command ? Write its syntax in any four possible situations where it is used. [5]

(d) What is a B^+ tree ? Why is a B^+ tree better structure than a B-Tree for implementation of an index sequential file ? [4]

5. (a) What is a precedence graph ? Why it is used ? Write all the steps for constructing a precedence graph. [6]

(b) (i) Differentiate between backward recovery and forward recovery. [4]

(ii) What is a key advantage of checkpoint recovery mechanism ? [2]

(c) With the help of a suitable example, explain inverted file organisation. [4]

(d) Discuss any two levels of security mechanisms to protect database. [4]

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