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MCS-023

MCA (Revised)

Term-End Examination

December, 2012

04555

MCS-023 : INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

Time : 3 hours *Maximum Marks : 100*

(Weightage 75%)

Note : *Question No. **1** is **compulsory**. Attempt **any three** questions from the rest.*

1. (a) Design ER Diagram for the following statement : **10**

"Each Bank can have multiple branches and each branch can have multiple accounts and loans". Convert the ER diagram into relational model (i.e. tables). Identify the keys and describe the integrity constraints.

(b) How would you normalize EMP-DEPT in to 3NF? EMP-DEPT(ENAME, **SSN,** BDATE, ADDRESS, DNUMBER, DNAME, DMGRSSN) **10**

Where following dependencies are given SSN $\rightarrow$ ENAME, BDATE, ADDRESS, DNUMBER DNUMBER $\rightarrow$ DNAME, DMGRSSN.

(c) Consider the relation R(A,B,C,D) with the following dependencies : **5**

AB $\rightarrow$ C, CD $\rightarrow$ E,DE $\rightarrow$ B is AB a candidate key of this relation ? Explain your answer.

(d) What is a system log? What are the typical kind on entries in a system catalog? 5

(e) Draw diagram to show the states of transaction execution. Briefly discuss each of the states, shown in the diagram. 5

(f) Draw the block diagram to show the components of Database manager. 5

2. (a) Consider the relation R(A,B,C,D,E,F,G,H) with functional dependency set as
FD = {A $\rightarrow$ C; B $\rightarrow$ CG; AD $\rightarrow$ EH; C $\rightarrow$ DF; A $\rightarrow$ H}

On the basis of the given details, perform following tasks. **4+6=10**

(i) Determine key for relation R

(ii) Decompose R into 2NF, 3NF and finally in BCNF.

(b) Compare primary, secondary and clustering Indexes. Which of these indexes are dense and which are not ? How is implementation of clustering indexes performed ? **6+2+2=10**

3. (a) What do you mean by the terms "Loss-Less Decomposition" and "Dependency Preserving Decomposition" ? 5

(b) What problems occur in the database when transactions do not satisfy ACID properties ? Explain explicitly using suitable examples ? 7

(c) Consider the following relations : 2x4=8

P :	Pid	Pname	Q :	Pid	Pname
	001	abc		012	xyz
	012	xyz		014	lmn
	014	lmn		016	SSS
	015	opq		017	SSD
	017	SSD			

Find the following :

(i) $P \cup Q$ (ii) $P - Q$

(iii) $P \cap Q$ (iv) $P \times Q$

4. (a) What do you mean by Integrity constraints ? Briefly discuss, the different type of integrity constraints. 5

(b) What do you mean by the term "database recovery"? Explain any two recovery techniques. 7

(c) Compare and contrast the following (**Any two**) : 8

(i) Wait and die And Wait and wound protocol

(ii) Physical data independence and Logical data independence

(iii) Centralized and Distributed DBMS

5. (a) What are the advantages of DDBMS over centralized DBMS ? Why is data replication and fragmentation performed in DDBMS ? What typical units of data are replicated ? **10**

(b) What is two phase locking protocol ? How does it guarantee serializability? Explain. **5**

(c) Discuss the multiversion technique for concurrency control. **5**