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MCS-023

MCA (Revised) / BCA (Revised)

Term-End Examination

December, 2018

06693

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) For the relations given below, check whether the given functional dependencies hold or not. Give proper justification. *5*

J :	X	X	Y	Y	Z	P
K :	1	1	1	1	2	4
L :	2	3	4	3	5	7

(i) $J \rightarrow K$

(ii) $J, K \rightarrow L$

(b) Verify the statement, "Any relation in BCNF is in 3NF but converse is not true." Give suitable example. *5*

(c) Explain the term data replication and data fragmentation with suitable example. 5

(d) What are integrity constraints ? Explain the various types of integrity constraints with suitable examples. 5

(e) How do you implement a hierarchical data model ? Explain through an illustration. 5

(f) Define Data Manipulation Language (DML) of SQL. List and explain various DML commands. 5

(g) How do B-tree indexes differ from Binary search tree indexes ? 5

(h) Differentiate between the concepts of Logical data independence and Physical data independence in DBMS. 5

2. (a) Draw an ER diagram for an open university system covering all the functionalities and also derive corresponding relational schema. 10

Note : Assumptions can be made wherever necessary. However, state them.

(b) What do you understand by the term closure of a relation (R) with functional dependency set (F) ? Compute the closure for relation R(l, m, n, o, p) with functional dependency set F as given below :

F{$l \rightarrow$ mn; no $\rightarrow$ p; m $\rightarrow$ o; p $\rightarrow l$}

Identify the candidate keys for the relation (R). *10*

3. (a) What do you understand by the term Query Optimization ? Discuss the role of relational algebra in Query Optimization. List the operators used in relational algebra and discuss the operation of each, with suitable example. *10*

(b) What is the need of indexes in DBMS ? Compare primary, secondary and clustering indexes. Which of these indexes are dense ? Give steps to perform implementation of clustering indexes. *10*

4. (a) Explain the following with the help of an example : *8*

(i) Integrity constraints and its types

(ii) Deadlock and its prevention in DBMS

(b) What are checkpoints ? How does this technique of checkpoints contribute to database recovery ? Give suitable example. *5*

(c) What do you understand by the terms Lossless decomposition and Dependency Preserving decomposition ? Is it always true that a lossless decomposition is dependency preserving too ? Give suitable example in support of your answer. 7

5. Write short notes on the following : *5×4=20*

(a) Wait-for Graph

(b) Wait and Wound Protocol

(c) Two-Phase Locking Protocol

(d) Two-Phase Commit Protocol

(e) Data Replication in DDBMS