

Printed Pages : 4

MCA-313

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 7310** Roll No. 

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**M.C.A.**

**(Semester-III) Theory Examination, 2011-12**

**DATABASE MANAGEMENT SYSTEM**

*Time : 3 Hours]*

*[Total Marks : 100*

*Note : Attempt questions from each Section as indicated.*

**Section-A**

1. Attempt *all* parts in this question. Each part carries 2 marks. Define each answer precisely in 50-75 words: 20
  - (a) Differentiate between Database system and File system.
  - (b) What is database schema ? Explain attribute and entity.
  - (c) Explain procedural and non-procedural language.
  - (d) What are the various data types of SQL ?
  - (e) Explain log and its requirements briefly.
  - (f) What do you mean by functional dependency ?
  - (g) Define various properties of transaction.

- (h) Describe the roles of Trigger briefly.
- (i) What is lock ? What are the various types of locks used for concurrency control ?
- (j) What is time stamp ? How a system generates time stamp ?

**Section-B**

2. Attempt any *three* parts in this question. Each parts carries 10 marks. Define each answer in 100–200 words : 30

- (a) Explain the following in detail :
  - (i) Difference between Generalization and Aggregation with diagram.
  - (ii) Describe the various symbols for drawing E-R diagram.
- (b) What is relational algebra ? Explain its various operations.
- (c) What is the purpose of normalization ? Explain 3NF, 4NF and BCNF with suitable example.
- (d) Define serializability of schedule with example.
- (e) What are the various types of Distributed Database Systems ? Explain fragmentation in Distributed Database Systems.

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(2)

**Section-C**

3. Attempt *all* parts in this question. Each parts carries 10 marks. Define each answer in 300–500 words: 50

(a) Draw the E-R diagram for the university system which includes information about students, department, professors, courses, which student are enrolled in which course, which professor are teaching in which courses, student grades, which courses a department offers. Consider suitable assumptions wherever required.

(b) Consider a relational scheme  $R=(A, B, C, D, E)$ . Let  $M$  be the following set of multi valued dependencies :

$$M=(A \twoheadrightarrow BC, B \twoheadrightarrow CD, E \twoheadrightarrow AD).$$

Give a lossless join decomposition of scheme  $R$  into forth normal form.

**Or**

Suppose we decompose the schema  $R=(A, B, C, D, E)$  into  $R_1$  and  $R_2$  defined follows :

$$R_1(A, B, C)$$

$$R_2(C, D, E)$$

Justify whether it is a lossless decomposition or not.

(c) Consider the universal relation :

$$R=(A, B, C, D, E, F, G, H, I, J)$$

and the set of functional dependencies  $F$  as given below :

$$F\{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$$

(i) Determine the key for  $R$

(ii) Decompose  $R$  into second normal form

- (d) Explain the following :
- (i) Multiple Granularity
  - (ii) Multi version two -phase locking protocol.

**Or**

What is two phase locking ? Describe with the help of an example. Will two phase locking result in deadlock ? Justify your answer with the help of an example. Discuss the recovery with concurrent transactions also.

- (e) What do you mean by replication in distributed database system ? Explain the various techniques of replication.

**Or**

Define the role of following in Distributed Database System :

- (i) Concurrency control
- (ii) Recovery.