Registration No. : | | | | | | | | | | |

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B. Tech

FEEC 6301

Fifth Semester Examination – 2013

DATABASE MANAGEMENT SYSTEMS

BRANCH : IEE, ELECTRICAL, AEIE, EEE, ETC, EC, ICE, EIE

QUESTION CODE : C- 339

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

(a) What is the difference between physical data independence and logical data independence ?

(b) What is the difference between DDL and DML?

(c) What do you mean by recursive relationship type ? Give one example of recursive relationship type.

(d) What are the uses of SUM () and COUNT () ?

(e) A relation R (A, B, C) has FDs AB → C and C → A. Is R in 3NF ? Justify your answer.

(f) What do you mean by dependency preserving decomposition ?

(g) What are the main cost components of query optimization ?

(h) What is 2PL ?

(i) What are ACID properties of a database transaction ?

(j) What are the types of transaction recovery ?

P.T.O.

2. (a) Describe the three-tier ANSI-SPARC architecture. 5

(b) What are integrity constraints ? Explain each of them. 5

3. (a) Compare and contrast the different database models. 5

(b) What are the typical phases of query processing ? 5

4. (a) Construct an E-R diagram for a hotel booking system : 5

Entities	Attributes	Primary key
Hotel	Hotel No., Name, City	Hotel No.
Room	Room No., Type, Price	Room No.
Guest	Guest No., Name, Address	Guest No.

- Every hotel has multiple rooms where each room belongs to exactly one hotel.
- A hotel may be booked by multiple guests and a guest may book multiple hotels. *Date-from* and *Date-to* are the attributes of this relationship.

(b) Construct appropriate tables for the above E-R diagram. 5

5. Consider the following relations : 2.5×4

SUPPLIERS (S-no, S-name, City)

PARTS (P-no, P-name, Color)

CATALOGUE (S-no, P-no, Quantity)

The key fields are underlined. Express the following queries in either relational algebra or in SQL:

(a) Find the name of the suppliers who supply some red part.

(b) Find the name of the suppliers who supply some red or green part.

(c) Find the name of the suppliers who supply some red part and some green parts.

(d) Find the name of the suppliers who supply every part.

6. (a) Consider the relation R (A, B, C, D, E) with a set of functional dependencies $F = \{A \rightarrow C, B \rightarrow C, C \rightarrow D, DE \rightarrow C, CE \rightarrow A\}$. Is the decomposition of R into R_1 (A, D), R_2 (A, B), R_3 (B, E), R_4 (C, D, E) and R_5 (A, E) lossless ? 5

(b) Consider a relation scheme R (A, B, C, D, E) with a set of FDs

$F = \{A \rightarrow B, BC \rightarrow E, ED \rightarrow A\}$.

(i) List all keys of R.

(ii) Is R in 3NF ?

(iii) Is R in BCNF ? 5

7. (a) Draw the state diagram and discuss the typical states that a transaction goes through during execution. 5

(b) Discuss the timestamp ordering technique for concurrency control. 5

8. (a) Discuss the different types of transaction failures that may occur in a database environment. 5

(b) Describe the shadow paging recovery technique. 5