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

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B. Tech

FEEC 6301

Fifth Semester Regular Examination – 2014

DATABASE MANAGEMENT SYSTEMS

BRANCH(S) : AEIE, EC, EEE, ELECTRICAL, ETC, IEE

QUESTION CODE : H 204

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) Differentiate between Schema, sub schema and Instances.

   (b) What is weak entity type ? How it is represented in an E-R diagram ?

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

   (d) What is minimal cover of a set of functional dependencies ?

   (e) What are the properties of good decomposition of a relation ?

   (f) What are the phases of query processing ?

   (g) Why Armstrong's Axioms are sound and complete ?

   (h) State different actions of a transaction.

   (i) What is uncommitted dependency problem ?

   (j) In the event of failure, what are the two principal effects that happen ?

2. (a) Discuss the concept of data independence and explain its importance in a database environment. 5

   (b) Discuss the different types of keys that are used in relational model. 5

3. Draw an ER diagram for BPUT database and then transform the ERD to relations. 10

P.T.O.

4. Consider the following *Schema :*

Movie (Title, Year, Length, StudioName)

MovieStar (Name, Address, Gender, BirthDate)

StarsIn (Title, Year, StarName)

Studio (Name, Address)

Express the following queries either in relational algebra or in SQL : 10

(a) Get the stars that have appeared in at least three movies.

(b) Get the name and address of studios which have produced movies of Saharukh Khan.

(c) Get the birth date and movie title of female stars who have appeared in movies in 1996.

(d) Get the movies starred by both Amitabh Bachan and Rekha.

5. (a) A relation R (A, B, C, D) is given. For each of the following set of functional dependencies, assuming they are the only dependencies that hold for R, state whether or not the proposed decomposition of R into smaller relations is a good decomposition. 6

(i) $A \rightarrow BC, C \rightarrow AD$ decomposed into R_1 (A, B, C) and R_2 (A, D)

(ii) $A \rightarrow B, B \rightarrow C, C$ ® D decomposed into R_1 (A, B), R_2 (A, D) and R_3 (C, D)

(iii) $A \rightarrow B, B \rightarrow C, C \rightarrow D$ decomposed into R_1 (A, B) and R_2 (A, C, D).

(b) What is the highest normal form of each of the following relations ? 4

$R_1 = (\{A, B, C\}, \{A \rightarrow B, B \rightarrow A, A \rightarrow C\})$

$R_2 = (\{A, B, C\}, \{A \rightarrow B, B \rightarrow A, C \rightarrow A\})$

$R_3 = (\{A, B, C, D\}, \{A \rightarrow C, D \rightarrow B\})$

$R_4 = (\{A, B, C, D\}, \{A \rightarrow C, CD \rightarrow B\})$

6. (a) What do you understand by the term normalization ? Describe the data normalization process. Describe the purpose of normalizing data. 5

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

7. (a) What is concurrency control ? What are its objectives ? State different concurrency control techniques. 5

(b) What is serializability ? Differentiate view serializability and conflict serializability. Prove that 2PL guarantees serializability. 5

8. Write short notes on (any two) : 5×2

(a) Hierarchical and network data model

(b) Heuristic query optimization

(c) Deferred update.