

Roll No. \_\_\_\_\_

Total No of Pages: 4

5E5044

**5E5044**

**B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015**

**Electrical Engineering**

**5EE4A Database Management System**

**Common with EX (Electrical & Electronics)**

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks Main: 26**

**Min. Passing Marks Back: 24**

*Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

1. NIL

2. NIL

### UNIT-I

Q.1 (a) What are the advantages of using DBMS in comparison to the traditional file Approach? Explain. [8]

(b) The Honest Bank Ltd receives Fixed Deposit from customers. The minimum amount that can be deposited is ₹ 1000/-. Additional amount may be deposited in the multiples of ₹ 500/-. Minimum duration is 6months. After that, duration must be in multiples of 3 months. Interest rates change from time to time & depend only on duration. Interest is compounded on quarterly basis. If the amount is withdrawn prematurely then interest is given at a lower rate that is fixed & changes from time to time for amounts over ₹ 50,000/-. PAN is supplied by customers. Loans may be taken against FD for 80% of the deposited amount and the interest charged will be 0.5% more than the interest received by the customers. The Bank would like to keep deposit & loan information for decision making & usual report printings. Develop an ERD for above requirement. Also reduce the ERD into a set of tables. [8]

**OR**

- Q.1 (a) Explain the following: [4×2=8]
- (i) Key and its types
  - (ii) Database users
  - (iii) Aggregation and Ternary Relationships
  - (iv) Specialization and Generalization
- (b) You are required to design the database for an institute. The database should cover the following information – students enroll for courses at the institute and the courses are conducted in batches. A batch has one or more modules conducted in it. A student may register for one or modules in one or more batches. Course material is distributed to the students depending on the batch they have enrolled in i.e., course material for a module is specific to a batch. Books are purchased from suppliers by placing orders. A bill from the supplier may include books from one or more orders. Develop an ERD for the institute. Also reduce the ERD into a set of tables. [8]

**UNIT-II**

- Q.2 (a) Consider the following schemas- [2×4=8]
- employee (person – name, street, city)
  - works (person – name, company – name, salary)
  - company (company – name, city)
  - managers (person – name, manager – name)
- Write the following queries in Relational Algebra-
- (i) Find the names of all employees who live in the same city and on the same street as do their managers.
  - (ii) Find the names of all employees who do not work for “First Bank Corporation”.
  - (iii) Find the names of all employees who earn more than every employee of “Small Bank Corporation”.
  - (iv) Assume the companies may be located in several cities. Find all companies located in every city in which “Small Bank Corporation” is located.
- (b) Explain various anomalies of a bad database design. Define Normalization and its need with examples. [8]



**OR**

- Q.2 (a) Explain the following- [4×2=8]
- (i) Relational Calculus
  - (ii) Safety of expressions in Relational Calculus
- (b) What is meant by Dependency Preservation Property of a Decomposition? Differentiate between 3NF and BCNF with examples. [8]

**UNIT-III**

- Q.3 (a) Write a note on Embedded SQL and its need. [8]
- (b) What are Integrity Constraints? Explain various types of Integrity Constraints that can be applied on a database. [8]

**OR**

- Q.3 (a) Differentiate between a Correlated and a Nested Query with examples. What is a view? Give syntax of creating a view in SQL. [8]
- (b) Discuss the following: [2×4=8]
- (i) Triggers
  - (ii) Assertions
  - (iii) Stored Procedure
  - (iv) JDBC.

**UNIT-IV**

- Q.4 (a) (i) Construct a B tree the following set of key values (3, 9, 11, 13, 26, 35, 41, 50, 52) under the assumption that the number of search key values that fit in one node is 3. [4]
- (ii) Show steps involved in the following tasks: [4]
- 1. Insert 10
  - 2. Insert 10
  - 3. Delete 41
  - 4. Insert 43
- (b) Explain what is an index and its need. What are the various type of indexes? [8]

**OR**

- Q.4 (a) Consider a B<sup>+</sup> tree with 3 pointers to form a primary index structure.
- (i) Show the tree after insertion of the following key items in the order given- 12, 2, 15, 4, 123, 45, 6, 7, 9, 1, 3 [4]
  - (ii) Show the structure of the tree after deleting items with key value = 7 and then deleting items with key value = 6. [4]
- (b) What is Hashing? Give an example of a Hash function. Compare Hashing and Indexing. [8]

**UNIT-V**

- Q.5 (a) Explain Serializability and its need. What are its types? Discuss. [8]
- (b) What is meant by Recovery? Explain Log-based Recovery Techniques. [8]

**OR**

- Q.5 (a) (i) Examine whether the following schedule is view serializable or not: [4]

T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
		write (y)
read (y)		
		read (x)
	read (z)	
write (y)		
read (x)		
		write (z)
write (x)		
	write (y)	

- (ii) Show that the Two-Phase Locking Protocol ensures conflict serializability. [4]
- (b) What is a Deadlock? Explain the reasons of Deadlock and various techniques to handle Deadlocks. [8]