

FACULTY OF INFORMATICS**B.E. 3/4 (IT) I – Semester (Old) Examination, May 2013****Subject : Database Systems****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A and answer any FIVE questions from Part-B.****PART – A (25 Marks)**

1. Illustrate the difference between schema and instances. 2
2. Distinguish between weak and strong entity set by taking an example. 3
3. State the reasons why NULL values might be introduced into the database. 2
4. Write the basic structure of SQL queries. 3
5. "Many current generation database applications need to store attributes that can be large". Mention the feature(s) in SQL which supports. 2
6. Compare BCNF and 3NF. 3
7. Mention the different states in which a transaction can be. 2
8. What is the role of precedence graph in serializability? 3
9. State the issues that should be addressed in designing a remote backup system. 3
10. Explain why "stable storage cannot be implemented". 2

PART – B (50 Marks)

- 11.a) Discuss major advantages of a database system. 7
- b) Explain the concept of generalization and specification in extended ER model. 3
12. Consider the following relational schema 10

employee (empno, name, office, age)
 books (isbn, title, authors, publisher)
 loan (empno, isbn, date)

write the below queries in SQL.

- a) Find the name of employees who have borrowed all books published by MCG.
- b) Find the names of employees who have borrowed more than five different books published by PHI.
- c) For each publisher, find the names of employees who have borrowed the maximum no. of books of that publisher.

- 13.a) Describe the circumstances in which embedded SQL is used rather than SQL alone or only a general purpose programming language. 5
- b) Explain the main design goals of relation databases. 5
14. Construct a B+ - tree for the following set of key values :
(2, 3, 5, 7, 11, 17, 19, 23, 29, 31). Assume that the tree is initially empty and values are added in ascending order. Construct B ± tree for the cases where the no. of pointers that will fit in one node is as follows : 10
- a) Four b) Six c) Eight
15. Show that two-phase locking protocol ensures conflict serializability, and that transactions can be serialized according to their lock points. 10
- 16.a) State Armstrong's axioms along with three additional rules. 3
- b) Justify, "concurrent execution of transactions is more important when data must be fetched from (slow) disk or when transactions are long, and is less important when data is in memory and transactions are very short". 7
- 17.a) Draw the database architecture which depicts the various components of a database system with connections. 5
- b) Write about the fundamental relational algebra operations. 5
