

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX, BCT	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

**Subject:** - Database Management System (*Elective II*) (CT76506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. Why data independence is importance in data modeling? Differentiate between schema and instances. [4]
  
2. a) Define a) Entity b) Derived Attribute c) Weak Entity d) Recursive relationship [4]  
 b) What do you mean by degree of relationship set? Draw an ER diagram for a banking system. Bank have customer. Banks are identified by a name, code, address of main office. It has many branches. Each branch consist of Employees. Customers are identified by name, cust-id, phone number, address and DOB. One Bank Manager manages many Accounts, Loans and Employees. Branches are identified by a branch\_no., branch\_name, address. customer can have one or more accounts and also may or may not have loan at the branch. Accounts are identified by account\_no., acc\_type, balance. Loans are identified by loan\_id, loan\_type and amount. Amounts may be of saving or checking type. [2+6]
  
3. Consider the following relational schema.  
 Suppliers (Sid, Sname, Address)  
 Parts (Pid, Pname, color)  
 Catalog (Sid, Pid, Cost)  
 Perform operations as indicated within parenthesis. [2×7]
  - a) Display parts name and cost of those parts which are colored “RED”. (Relational Algebra)
  - b) Create tables Supplier and Catalog with required key constraints. (SQL)
  - c) Find the suppliers name starting with alphabet ‘R’ and parts cost exceeding 25000. (SQL)
  - d) Display total number of parts color wise. (SQL)
  - e) Provide 25% discount on cost for the parts with ‘BLUE’ color. (SQL)
  - f) Display Names of Suppliers who live in ‘LALITPUR’. (Relational Algebra)
  - g) Find the supplier name whose address is ‘KATHMANDU’ and supplies the parts costing less than 1000. (QBE)
  
4. a) Write the importance of normalization. Differentiate between 3NF and BCNF. [5]  
 b) Define trivial and non-trivial dependency. Explain third normal form with an example. [2+3]
  
5. Describe the basic steps in query processing. How heuristic optimization improves the execution performance? [4+3]
  
6. a) Why RAIDS are used? Which RAID level is considered good for most of the applications? Justify your answer. [4]  
 b) Define file organization in database. Distinguish between dense and sparse ordered index. [2+2]
  
7. a) What is transaction? Write about ACID properties with example. [2+4]  
 b) Explain serial and serializable schedules with examples. Explain the two phase locking protocol. [3+4]
  
8. Explain the failures that may arise during execution of transaction. Describe the log based recovery mechanism. [2+4]
  
9. Write short notes on: [2×3]
  - a) Data fragmentation in Distributed database model
  - b) Features of Object Oriented database model