

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

**Subject:** - Database Management System (CT 652)

- ✓ 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. Briefly describe the significant differences between a file processing system to a DBMS. [4]
2. a) Mention the distinctions among the terms Generalization and Specification with appropriate symbolic representation. [4]  
b) Draw the Entity-Relationship Diagram (ERD) with appropriate mapping cardinalities for the MAIL\_ORDER database in which employee take orders for parts. The mail order company has employees, each identified by unique employee number, first name, last name and ZIP code. Employee are categorized as manager, clerk and delivery staff. Each customer of the company is identified by a unique employee number, first and last name and ZIP code. Each part sold by the company is identified by unique part number, part name, price and quantity stock. Each order placed by a customer is taken by clerk and is given a unique order number. Each order contains specified quantities of one or more parts. Each order has a date of receipt as well as an expected ship date. The actual ship date is also recoded. The delivery boy places the order of specified customers. There is a provision of replacing one or many fault parts to the customer but before that it must be verified by manager. [8]
3. a) Consider the following relational data model [2×4]  
*Employee (empid, empname, address, title)*  
*Project (pid, proj\_name, budget, location)*  
*Assignment (empid, pid, responsibility, duration)*  
*Payment (title, salary)*
  - (i) Write an SQL query to find the name and salary of Engineers.
  - (ii) Write an SQL query to find the name of employee working in projects in their own city.
  - (iii) Write a query to create a view named empdetails with empname, address, proj\_name and salary.
  - (iv) Write an SQL to find the names of employees who works in “CAD/CAM” project
- b) Write the relational algebra expressions for the following: [2×4]
  - (i) Find the name of employees working for more than 2 years in “Software” project and earning more than 1000 K.
  - (ii) Find the names of employees working in “PCB Fabrication” project other than John.
  - (iii) Find the salaries of Engineers working in “Fabrication” projects.
  - (iv) Give an expression in QBE to find the employee name and address of “Engineers” who have salary greater than 50K.

4. a) Explain the conditions to be satisfied for lossless decomposition using FD sets. [3]
- b) Define Assertion with its SQL syntax. What is a view in database system? How does materialized view differ from normal view? [2+2+1]
- c) Define Multi Valued Dependency (MVD). Explain Fourth normal form with an example. [2+3]
5. Describe the basic steps in query processing. Discuss the methods used for evaluation of entire expression tree. [4+3]
6. a) What is the difference between ordered indices and hash indices in a database? What are the advantages of using sparse index? [2+2]
- b) What do you mean by RAID? Explain the types of RAID and mention how to select an appropriate level of RAID. [1+3]
7. a) What are the possible transaction states? Which of the following schedule is conflict serializable? For each serializable schedule, determine the equivalent serial schedule. [2+4]
  - (i)  $r_1(X); r_3(X); w_1(X); r_2(X); w_3(X)$
  - (ii)  $r_1(X); r_3(X); w_3(X); w_1(X); r_2(X)$
- b) How do deadlocks arise in transaction processing? [2]
8. a) Explain the architecture of a remote backup system. [3]
- b) What is deferred-database modification technique in context to log based recovery approach? Explain. [3]
9. Write short notes on: [3+3]
  - a) Data Warehousing
  - b) Parallel database architecture

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