

NEW SCHEME

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Fourth Semester M.C.A Degree Examination, January/February 2005
Master of Computer Applications
Database Concepts & Applications

Time: 3 hrs.]

[Max.Marks : 100

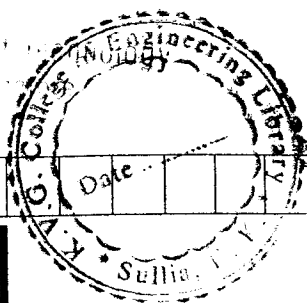
Note: Answer any FIVE full questions.

1. (a) Explain the basic concepts of DBMS. In what way it is advantageous over conventional file processing? (10 Marks)
- (b) What is data independence? Explain the different types of data independence with examples. (6 Marks)
- (c) What is the role of DBA in DBMS. (4 Marks)
2. (a) Explain the following terms with atleast one example : (10 Marks)
 - i) Superkey ii) Foreign key
 - iii) Recursive relationship iv) Weak entity
 - v) Composite and multivalued attributes.
- (b) Construct an ER diagram for company database. The company keeps track of company's employee, project, department. A department controls a number of project and employee can work for any number of projects. The company keeps track of dependents of each employee for insurance company. For the above E-R diagram develop the relation model. (10 Marks)
3. (a) Explain the following relational algebra operation with one example. (8 Marks)
 - i) Select ii) Project
 - iii) Division iv) Cartesian product
- (b) Discuss referential integrity constraints. (4 Marks)
- (c) How are outer join operations different from the join operations? Explain the left outer join, right outer join and full outer join with example. (8 Marks)
4. (a) Based on the given tables, write the queries for the following : (10 Marks)
 - Employee (SSN, Name, Salary, Dno)
 - Dependent (ESSN, Dependent-name, Relationship)
 - Works-on (ESSN, PNO, Hours)
 - Project (Pname, Pnum, Plocation, Dnum)
 - Department (Dname, Dnum)
 - i) For each project, retrieve the project number, project name and number of employees from department 5 who work on project.
 - ii) Retrieve the names of employee who have no dependents.
 - iii) Retrieve the name of each employee who works on all the projects controlled by department number 5.
 - iv) Find the sum of salaries of all employees of research department as well as maximum salary, minimum salary and average salary in-this department. (5 Marks)

- (b) Explain Triggers in SQL. (5 Marks)
- (c) What is functional dependency? List the six rules for functional dependency. (5 Marks)
5. (a) Describe first, second, third normal forms. Explain how does BCNF differ from third normal form. (10 Marks)
- (b) Explain multivalued dependencies in brief. (5 Marks)
- (c) For given set F of functional dependencies, calculate the closure sets with respect to F (5 Marks)
- $$F = \{SSN \rightarrow Ename, \\ Pnumber \rightarrow \{Pname, Plocation\}, \\ \{SSN, Pnumber\} \rightarrow Hours\}$$
6. (a) Describe tree based indexing. (10 Marks)
- (b) Describe the anomalies due to interleaved executions in terms of two transactions T_1 and T_2 (10 Marks)
7. (a) What are objects, subjects, security classes and clearances in mandatory access control? Discuss the Bell-lapadula restrictions in terms of these concepts. (10 Marks)
- (b) Describe the steal and force policies in the context of buffer manager. What functionality does the recovery manger and transaction manager of DBMS provide? (10 Marks)
8. Write short notes on : (20 Marks)
- Query optimization
 - Hash based indexing
 - Strict two phase locking
 - Fixed length and variable length records
 - Views in SQL.

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NEW SCHEME

Fourth Semester M.C.A. Degree Examination, July 2007
DataBase Concepts and Applications

Time: 3 hrs.]

[Max. Marks:100

Note : Answer any FIVE full questions.

- 1
 - a. What is meant by data independence? Explain briefly different types of it. (06 Marks)
 - b. With the help of a diagram, explain the structure of a DBMS. (10 Marks)
 - c. What is an entity? Explain different types of entities. Give examples. (04 Marks)

- 2
 - a. Explain various types of attributes occur in the ER model. Give example for each type. (08 Marks)
 - b. An instructor teaches number of courses. The course uses many text Books. Draw an ER diagram to represent this. Reduce the ER diagram into set of relations. (06 Marks)
 - c. What are Primary and Foreign keys? Give examples. Which constraints exists on these? Explain. (06 Marks)

- 3
 - a. Consider the following schema
 Suppliers (Sid, Sname, Saddress, Sphone)
 Parts (Pid, Pname, Pcolor, Price)
 Supplies (Sid, pid, Qty)
 The key fields are underlined. Write the following queries in relational algebra
 - i) Find the names of suppliers who supply part 214.
 - ii) Find the names and addresses of suppliers who supply "NUTS".
 - iii) Find the names and phone number of suppliers who supply some blue parts.
 - iv) Find the names of suppliers who supply every red part.
 - v) Find the supplier ids of suppliers who supply every part. (10 Marks)
 - b. Explain ON DELETE CASCADE, ON UPDATE CASCADE and CHECK clauses. (06 Marks)
 - c. Which command is available for removing a table from database? Explain with an example. (04 Marks)

- 4
 - a. Consider the following relational schema
 Employee (Emp-id, Emp - name, age, Salary, Phone)
 Works - for (Emp-id, Dept-id, DOJ)
 Dept (Dept-id, Dept-name, Dept-budget, Dept-Mgr-id)
 The key fields are under lined. Write the following queries in SQL.
 - i) Find the names and salaries of employees whose age is less than 30 years.
 - ii) Find the names and phone number of employees who works for "Training" Department.
 - iii) Find department id with minimum budget.
 - iv) Delete an employee with id 3426
 - v) Raise the salary of all employees by 12%. (10 Marks)
 - b. What is a view in SQL? How it is defined? For the schema in Q4(a), create a view containing employee information who draw Rs 8000 per month as salary. (06 Marks)
 - c. What is Embedded SQL? Explain. (04 Marks)

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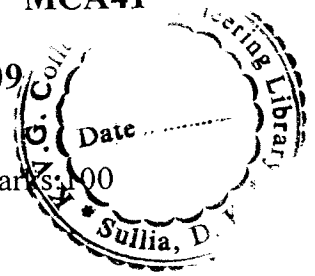
- 5 a. Define functional dependency. List well-known inference rules for functional dependencies. (06 Marks)
b. Explain first, second and third normal forms with the help of examples. (08 Marks)
c. What is a multivalued dependency? Which normal forms are associated with this? (06 Marks)
- 6 a. What are Primary and Secondary indexes? Explain. (04 Marks)
b. Explain briefly the tree – based Indexing. (06 Marks)
c. Explain briefly the techniques used for evaluation of relational operators. (06 Marks)
d. What is an access path? Explain. (04 Marks)
- 7 a. Explain the ACID properties. (04 Marks)
b. What is a lock? Explain the strict 2PL. (08 Marks)
c. Explain briefly the privileges of GRANT command on base tables and views. (08 Marks)
- 8 Write short notes on :
a. Three level architecture of DBMS.
b. ER – to - Relational mapping.
c. Crash recovery.
d. ORACLE. (20 Marks)

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Fourth Semester MCA Degree Examination, Dec 08 / Jan 09

Database Concepts and Applications



Time: 3 hrs.

Max. Marks: 100

Note : Answer any FIVE full questions.

- 1 a. Explain 3 – schema architecture with suitable examples. (06 Marks)
b. Why would you choose database system instead of simply storing data in files? When would it make sense not to use a database system? (10 Marks)
c. Define the following terms with examples i) Recursive relationship ii) Participation constraint. (04 Marks)
- 2 a. Construct an E-R diagram for a car insurance company with a set of customers, each of whom owns a number of cars and record the number of accidents (if any) that each car has made. Identify one attribute, relationship of cardinality ratio. Reduce this into set of relations. (12 Marks)
b. Discuss the relational data model constraints with examples. (08 Marks)
- 3 a. Consider the following schema
EMPLOYEE (SSN, EMP_Name, age, sal, mgrID, DNO)
DEPT(DNum, Dname, mgrSSN)
PROJ (PNO, Pname, Ploc, Dnumber)
WORKS-ON(ESSN, PNO, Hours)
DEPENDENT(ESSN, DID, Dep-name, Sex, Bdate, relationship)
Write the following queries in Relational Algebra.
i) For every project located in 'USA', list the pno, controlling department no, dept managers name, address and birthdate.
ii) Retrieve each dept-no, the no of employee and in the department and their average salary.
iii) Retrieve name and address of all employees who work for the 'Admin' department.
iv) Retrieve the name and salary of the manager of each department.
v) Find which project and location 'siri' is working on. (10 Marks)
b. How to implement the constraints in SQL? (05 Marks)
c. Explain data independence. (05 Marks)
- 4 a. Consider the following relations (10 Marks)
S(SNo, Sname, status, city)
P(PNo, Pname, colour, weight, city)
SP(SNo, PNO, Qty). Write the following queries in SQL.
i) Get PNO for parts, which have more than two shipments.
ii) Get SNO for suppliers who supply at least one part supplied by S2.
iii) Retrieve the details of shipments whose quantity is known.
iv) Retrieve all the parts cities and supplier cities.
v) Create a view to select part name, color and Quantity supplied by the supplier 100.
b. Explain triggers in SQL. (04 Marks)
c. Define BCNF, why it is considered a stronger form of 3NF. (06 Marks)
- 5 a. What are anomalies if the proper design of a database is not carried out? Illustrate them with an example for each type. (06 Marks)

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- b. Employee (Ename, SSN, bdate, address, salary, dno, dname, mgrSSN, dlocation, projname, pno, ploc, prog – size, startdate, end-date). Check whether it is in 2NF and 3NF. If not convert it into 2NF and 3NF. Show the conversion steps. (06 Marks)
- c. Explain the concepts of join dependency and 5NF. Why it is also called as projection NF? (08 Marks)
- 6 a. Explain in detail the three basic file organizations which are for operations. (10 Marks)
- b. Discuss the types of premises at the account level and those at the relation level. (10 Marks)
- 7 a. Why concurrency control and recovery is needed? (10 Marks)
- b. How do you detect dead locks? Discuss all possible methods to overcome dead locks. (10 Marks)
- 8 Write short notes on :
- a. Binary lock
- b. Query optimization.
- c. Types of attributes.
- d. Correlated subquery. (20 Marks)



Fourth Semester MCA Degree Examination, June-July 2009

Database Concepts and Applications

 Srinivas Institute of Technology
 Library, Mangalore

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What are the advantages of database environment? (06 Marks)
- b. With a neat figure explain three schema architecture. (06 Marks)
- c. What are data models? With a suitable example, explain object based model & record based model. (08 Marks)
- 2 a. Write the steps for converting ER model to relational model and explain giving example. (10 Marks)
- b. Write the difference between the following:
 - i) Super key and candidate key.
 - ii) Primary key & Partial key.
 - iii) Database intension & Extension.
 - iv) Multivalued attribute and composite attribute.
 - v) Application programmer & sophisticated user. (10 Marks)
- 3 a. What are integrity constraints? Explain any two update operations & integrity constraints which must be checked for each of them. (10 Marks)
- b. List any five relational algebra operators along with their purpose and syntax of using them. (10 Marks)
- 4 a. Describe the six clauses in the syntax of SQL query. Explain conceptually the execution of SQL query. (10 Marks)
- b. Consider the following relational schema:
 - STUDENT (SSN, Name, Major, Bdate)
 - COURSE (COURSE#, Cname, Dept)
 - ENROL (SSN, COURSE, Quarter, Grade)
 - Adopt (COURSE, Quarter, Book ISBN)
 - TEXT (ISBN, Tittle, Publisher, Author)
 Write the foreign keys for the above schema. Represent the following in SQL:
 - i) Write the DDL statement for creating ENROL with all necessary constraints.
 - ii) Find list of books for courses offered by 'CS', only for courses using more than 2 books.
 - iii) List courses taken by student named Jhon Smith in winter 1999 (Quarter = W99) (10 Marks)
- 5 a. State informal guidelines for relation schema design. Through examples illustrate how the violation of these guidelines can be harmful. (10 Marks)
- b. What is the purpose of normalization? Explain 1NF, 2NF an 3NF. (10 Marks)
- 6 a. What is a minimal set of FD's? Give an algorithm to find a minimal cover for the given set of FD's. (10 Marks)
- b. How is data organized in a hash based index? When do you use hash based index? (10 Marks)
- 7 a. What are ACID properties? Illustrate them with examples. (08 Marks)
- b. When do two actions on same data object conflict? Define the anomalies that can be caused by conflicting actions. (08 Marks)
- c. State two phase locking protocol. (04 Marks)
- 8 Write short notes on the following:
 - a. SQL implementation of entity integrity and referential integrity
 - b. Mandatory Access control
 - c. Pipelined Query Evaluation.
 - d. Multivalued dependencies and 4NF. (20 Marks)

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