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# P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, Master of Computer Applications (MCA)

Semester End Examination; May/June - 2018

Database Management System

Time: 3 hrs

Max. Marks: 100

Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.

## UNIT - I

- 1 a. Briefly describe the advantages of using DBMS. 10
- b. Write a short note on : 10
  - i) Database administrator
  - ii) Data independence
- 2 a. Explain the component modules of DBMS and their interactions with the help of a diagram. 10
- b. Describe three-tier client/server architecture. 6
- c. Describe the different ways of classifying the DBMS. 4

## UNIT - II

- 3 a. Discuss the roll of a high level data model in the database design process. 10
- b. Briefly explain the different types of attributes of an ER model. 10
- 4 a. Construct an ER-diagram for COMPANY database. The company keeps track of company's employees, project and department. A department controls a numbers of projects and employee can work for any number of projects. The company keeps track of dependents of each employee for Insurance company. For the ER-diagram develop the relational database schema. 10
- b. Define the following terms with an example : 10
  - i) Cardinality ratio
  - ii) Ternary Relationship
  - iii) Participation
  - iv) Recursive Relationship

## UNIT - III

- 5 a. Consider the following relational schema. Write the following Queries using relational algebra: 10

EMPLOYEE(Fname, Lname, SSn, Gender, Super\_SSn, Dno)

DEPARTMENT(Dname, Dnumber, Mgr\_SSn)

DEPT\_LOCATION(Dnumber, Dlocation)

WORKS\_ON(ESSn, Pno, hours)

PROJECT(Pname, Pno, Plocation, Dno)

DEPENDENT(ESSn, Dependent\_name, Sex)

  - i) Retrieve the name and address of all employees who work for the "research" department
  - ii) Find the name of employees who work on all the projects controlled by department number 5
  - iii) Retrieve the names of employees who have no dependents
  - iv) List the names of managers who have atleast one dependent

- b. Explain the following relational algebra operations with example :
- |            |                       |    |
|------------|-----------------------|----|
| i) SELECT  | ii) PROJECT           | 10 |
| iii) UNION | iv) CARTESIAN PRODUCT |    |
- 6 a. Explain Left outer join, Right outer join and Full outer join with example. 10
- b. Explain the ER to relational mapping algorithm. 10

#### UNIT - IV

- 7 a. Consider the following relational schema. Write the queries in SQL.
- AUTHOR(author\_id, name, city, country)
- PUBLISHER(Publisher\_id, name, city, country )
- CATALOG(book\_id, title, author\_id, publisher\_id, category\_id, year, price)
- CATEGORY(category\_id, description) 10
- ORDER\_DETAILS(order\_no, book\_id, quantity)
- i) Find the author of the book which is maximum sales
- ii) Demonstrate how you increase the price of books published by a specific publisher by 10%
- iii) Give the details of the authors who have two or more books in the catalog and the price of the books in the catalog and the year of publication is after 2000
- b. List and explain Aggregation functions in SQL with example. 5
- c. Describe CREATE and ALTER command in SQL with example. 5
- 8 a. Explain all the options of SELECT statements in SQL. Give example for each. 10
- b. Briefly Explain views in SQL. 5
- c. Which command is available for removing table from database? Explain with an example. 5

#### UNIT - V

- 9 a. List and explain the informal guidelines for relational database design. 10
- b. What is functional dependency? Give Armstrong Inferences rules for functional dependencies. 10
- 10 a. Discuss ACID Properties of database transaction. 8
- b. What is LOCK? Explain the strict 2DL. 12

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