

--	--	--	--	--	--	--	--	--	--



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

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Information Science and Engineering

Semester End Examination; Dec. - 2019

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. Describe the characteristics of DBMS approach. 7
- b. Describe the three schema architecture in detail. 6
- c. Explain how you map E-R diagram onto the relational schema with suitable example. 7
- 2 a. Define data independence. Explain its types. 5
- b. The company is organized into departments. Each department has a unique name, unique number and a particular employee who manages the department. We keep track of track of start date when that employee began managing the department. A department may have several locations a department controls number of projects each of which has unique name, number and a single location. We store each employee's name, SSN, address, salary, sex and birth date. An employee is assigned to one department but may work on several projects. Which are not necessary controlled by same department? We keep track of number of hours per week that an employee works on each project. We also keep track of supervisor of each employee. We want to keep track of dependents of each employee for insurance purpose. We keep each dependents name, sex, birth date and relationship the E – R diagram for the above case study. 10
- c. Define recursive relationship with an example of role names. 5

### UNIT - II

- 3 a. Discuss the different clauses of SELECT with an example. Also show the results of SELECT after applying each clause. 10
- b. Consider the following relational schema,  
 SAILORS (SID, SName, Age, Rating)  
 BOATS (BID, Bname, Bcolor)  
 RESERVES (SID, BID, Day)  
 Write SQL queries to implement the following: 10
  - i) Find the colors of boats reserved by 'Narayan'
  - ii) Find the ages of sailors whose name begins with A and end with Z and has at least 5 characters.
  - iii) Find the names of sailors who have reserved a red boat without join operation.
  - iv) Find the names of sailors who are older than oldest sailor with a rating of 10.

- 4 a. Explain the syntax of following commands with an example:
- |           |            |           |    |
|-----------|------------|-----------|----|
| i) Update | ii) DELETE | iii) DROP | 10 |
| iv) Grant | v) Revoke  |           |    |
- b. How referential integrity constraints are handled in SQL? Explain with an example. 6
- c. List and explain briefly any four aggregate functions. 4

### UNIT - III

- 5 a. Define union compatibility of two relations. Explain the set theoretical operations of relational algebra. 7
- b. Explain the Division operation with an example. 5
- c. Explain the different types of JOIN operation in relational algebra with an example. 8
- 6 a. Define normalization. Explain 1NF and 2NF with an example. 12
- b. Explain 3NF with an example. 8

### UNIT - IV

- 7 a. Define a minimal cover function dependency. Find the minimal cover of the following functions dependency set: 10
- $R = (A, B, C, D, E, F)$                        $F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow F\}$
- b. Explain 4NF and 5NF with an example. 10
- 8 a. Define NoSQL. Explain the different types of NoSQL. 10
- b. Explain Sharding in NoSQL. 10

### UNIT - V

- 9 a. Discuss the problems in concurrency control. 8
- b. Explain the STD of a transaction. 7
- c. What do you mean by ACID properties of a transaction? 5
- 10 a. Explain the ARIES recovery algorithm in detail. 10
- b. Discuss the different types of failures in a database environment. 10

\* \* \*