# KUMARAGURU
## college of technology
### character is life

**B.E DEGREE EXAMINATIONS: NOV/DEC 2022**

(Regulation 2018)

Third Semester

**INFORMATION SCIENCE AND ENGINEERING**

U18ISI3204**:** Database Management Systems

## COURSE OUTCOMES

**CO1:** Construct ER Model for a given database application

**CO2:** Design relational schema using database design principles

**CO3:** Identify the Key Constraints for relations and devise queries using SQL.

**CO4:** Apply indexing techniques to access and generate user reports for a database.

**CO5:** Building Web Applications using PHP & MySQL.

**CO6:** Illustrate the concepts for transaction processing and concurrency control for RDBMS

**Time: Three Hours**                                                                 **Maximum Mark:100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

| | | | |
|---|---|---|---|
| 1. | Difference between week entity set and strong entity set. | CO1 | [K2] |
| 2. | Define Functional Dependency. | CO2 | [K2] |
| 3. | Summarize the steps in designing an Entity-Relationship schema. | CO2 | [K2] |
| 4. | List out the different types of constraints. | CO3 | [K2] |
| 5. | Consider the following relations: | CO3 | [K3] |

5.  Employee (Empno, Ename, JOB, MGR, Sal, Deptno)

Construct the SQL query to find the departments where the average salary of the employees is more than 5000.

| | | | |
|---|---|---|---|
| 6. | Differentiate between fixed length record representation with variable length record representation. | CO4 | [K2] |
| 7. | Compare sparse index and dense index. | CO5 | [K2] |
| 8. | What is the need for creating views? Give the syntax for creating views. | CO4 | [K2] |
| 9. | List out the benefits of PHP. | CO5 | [K2] |
| 10. | State ACID property of the transactions. | CO6 | [K2] |

**Answer any FIVE Questions:-**
**PART B (5 x 4 = 20 Marks)**
**(Answer not more than 80 words)**

| | | |
|---|---|---|
| 11. Describe about levels of Data abstraction in database systems. | CO1 | [K2] |

12. Identify the candidate key for the relation R=(A, B,C,D,E,F) with the following dependencies    CO2   [K3]

$C \rightarrow F$
$E \rightarrow A$
$EC \rightarrow D$
$A \rightarrow B$

| | | |
|---|---|---|
| 13. How to create the check constraint? Explain with an example. | CO3 | [K2] |
| 14. Define hashing and its types. | CO4 | [K2] |

15. InfoTech Systems is creating an online application for automating the task of job search between   CO5   [K4] employer and job seekers.
     a) Write the SQL queries to create tables as per information provided below:

**Users**

| Column Name | Type | Size | Description |
|---|---|---|---|
| EmailId | Varchar2 | 20 | Primary key |
| Password | Varchar2 | 20 | Must be min 5 to max 12 characters |

**Employer**

| Column Name | Type | Size | Description |
|---|---|---|---|
| CompanyID | Varchar2 | 5 | Primary key eg: C1001 |
| CompanyName | Varchar2 | 30 | Not Null |
| EmailId | Varchar2 | 20 | Foreign Key referring to Users table |
| Mobile | Number | 10 | Must be 10 digit UNIQUE |
| City | Varchar2 | 20 | |
| IndustryType | Varchar2 | 20 | |
| FunctionalArea | Varchar2 | 20 | |
| MembershipPlan | Varchar2 | 20 | Either Trial or Premium Monthly or Premium Yearly |
| DateofSignup | Date | | Must be greater or equal to current date. Current Date as Default Value |
| DateofRenewal | Date | | Must be based on Membership plan |
| Renewal status | Varchar2 | 20 | Active or Expired |

b) Write the Query to modify the description of IndustryType from NULL to "IT or

Manufacturing or Engineering or Banking and finance" in the Employer table.

| | | |
|---|---|---|
| 16. Illustrate about deadlock detection and recovery methods. | CO6 | [K2] |

**Answer any FIVE Questions:-**
**PART C (5 x 12 = 60 Marks)**
**(Answer not more than 300 words)**

| | | | | |
|---|---|---|---|---|
| 17. | Draw the architecture of a database system. Illustrate the functionality of various components of a database system and the connections among them. | 12 | CO2 | [K$_2$] |

18. a) Construct the ER model for Insurance Management System and identify the list of related Entity with attributes and its relationship sets.    7   CO1   [K$_3$]

   b) Check whether the following relation is in Third Normal form. If it is not in 3NF, Convert to 3NF.    5   CO2   [K$_3$]

Student (StudentNo, StudentName, Major)

StudentCourse (StudentNo, CourseNo, CourseName, InstructorNo, InstructorName, InstructorLocation, Grade)

19. a) Consider the following relational database, where the primary keys are underlined    12   CO3   [K$_3$]

Department (deptno, dname, location)

Employee (Empno, Ename, Manager_name, JOB, Sal, Deptno)

SalaryGrade(Grade, DA, HRA)

Formulate an expression in SQL for each of the following queries
     a) Create the table for above scenario
     b) Insert the values into each tables
     c) Display the employee name and department name, department location in which they are working
     d) List any departments that do not contain any employees
     e) Which employees have a salary that is less than the average salary?
     f) List all employees whose salary is less than the average salary of their department.

20. a) With suitable diagrams, infer the characteristics of several variations that have been proposed to RAID schemes. Also, give its significance.    8   CO4   [K$_3$]

| | | | | | |
|---|---|---|---|---|---|
| | b) | Consider the following relation | 4 | CO5 | [K₃] |

b) Consider the following relation                                             4     CO5   [K$_3$]

Books(id,title, type, author_id,editor_id,translator_id)

Authors(id,first_name, last_name)

Editors(id, first_name, last_name)

Translators(id, first_name, last_name)

Develop the SQL query for the following operations

a) Create the table to show book titles along with their authors

b) Create the table to display information about each book's author and translator and also keep the basic information about each book (i.e, id, title and type).

21. a) Briefly explain the B+ tree and construct the B+ tree of your own examples to perform insertion and deletion of the node.     12    CO4   [K$_2$]

22. a) Define the concurrency control mechanism. Specify the types of schemes used in concurrency control. Demonstrate about the two-phase Locking protocol with examples     12    CO6   [K$_3$]

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