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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2016

Course & Branch : B.E. - Computer Science & Engg. **Semester : V**

Subject : Database Systems **Max. Marks : 100**

Subject Code : CS513 **Duration : 3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

1. a) Describe the main Characteristics of database approaches with an Example. CO1 (08)

   b) Define Data Model, Compare Logical data independence and Physical data independence. CO1 (07)

   c) With a diagram, Explain the three schema architecture of database system. CO1 (05)

2. a) Compare the following1.Stored versus Derived attribute 2. Single valued versus multivalued attribute. CO2 (06)

   b) What is meant by weak Entity? Illustrate with an Example. CO2 (06)

   c) A University database contains information about **Instructors** (identified by a social security number) and **Courses** (identified by a course ID). Each of the following situations contains the relationship set between the teacher and the student. Design a ER diagram for each situation(assuming that no further constraints hold) CO2 (08)
   - Instructors can teach the same Course over several semesters and each offering must be recorded.
   - Each Instructor teaches exactly one Course
   - Each Instructor teaches at least one Course and some Instructors may teach multiple courses.
   - Each Instructor teaches at least one course and some Instructors must teach all the courses.

UNIT – II

3. a) Recognize the various restrictions on data that can be specified on a relational database in the form of Constraints. Discuss in detail the Scheme-based Constraints. CO3 (10)

   b) Illustrate the following with notations 1. Binary Relational Operations 2.Aggregate functions and Grouping. CO3 (10)

4. a) How are the OUTER JOIN operations different from INNER JOIN operations? Interpret LEFT OUTER JOIN and RIGHT OUTER JOIN for below Tables.Table:1:STUDENT CO3 (07)

S_ID	Username	Fname	Lname	Dept_ID
1	AB	A	B	1
2	XY	X	Y	1
3	MN	M	N	2
4	PQ	P	Q	NULL

Table:2:DEPT

D_ID	D_name
1	Computer
2	Information
3	Electronics

b) Describe the steps of an algorithm for ER-to-Relational Mapping with an Example. C03 (07)

c) Consider the relational schema, Write Relational Algebra expression for the following Queries. Given the Schema, C03 (06)

EMPLOYEE(Fname,Mnint,Lname,SSn,Bdate,Adress,Sex,Salary,Super_ssn,Dno)
DEPARTMENT(Dname,Dnumber,Mgr_ssn,Mgr_start_date)
DEPT_LOCATION(Dnumber,Dlocation)
PROJECT(Pname,Pnumber,Plocation,Dnum)
WORKS_ON(Essn,Pno,Hours)
DEPENDENT(Essn,Dependent_name,Sex,Bdate,Relationship)

- For every project located in 'Stafford', list the project number, thecontrolling department number, and the department manager's last name,address, and birth date.
- Find the names of employees who work on all the projects controlled by department number 5

UNIT – III

5. a) Consider the University Database: C04 (08)

SECTION(course_id,section_id,sem,year,building,room_no)
INSTROCTOR(Instroctor_id,name,dept_name,salary)
COURSE(course#,title,dept_name,creadits)
DEPARTMENT(Dept_name,building,budget)
STUDENT(Stud_id,name,dept_name)

- Find the name of Instructors with salary amount between $50000 and $100000,use the comparison operator
- Find the set of all Courses taught in Feb-2009 as well as in Sept-2010.
- Find the departments where the average salary of the instructors is more than $42000.
- Delete all tuples in the instructor relation for those instructors associated with a department located in the "Watson" building

b) How triggers and assertions are defined in SQL? Explain with an Example. C04 (08)

c) Describe the basic Constraints that can be Specified in SQL as part of table Creation. C04 (04)

6. a) Summaries the approaches to database programming and Typical sequence of Interactions in Database Programming. C04 (08)

b) Describe the impedance mismatch Problem?. C04 (04)

c) How a view is created and dropped? Explain two approaches of View Implementation. C04 (08)

UNIT – IV

7. a) Briefly discuss informal Design guidelines for Relation schema design. C05 (08)

b) Define Closure in functional dependency. Write an Algorithm to determine X^+ ,the closure of X under F. C05 (05)

c) What is a functional dependency? A set of FDs of the relation **R{W,X,Y,Z}** is **X->YZ,Y->Z,X->Y,XY->Z,XZ->W** find a Minimum cover for this set of Functional Dependencies. C05 (07)

8. a) Why normalization is required? Illustrate 1NF, 2NF and 3NF with suitable example for each. C05 (10)

b) Write an Algorithm for Testing Nonaddiive(Lossless) Join property, With a suitable Example. C05 (10)

UNIT – V

9.	a)	Illustrate ACID properties in Transaction. Draw a state diagram and discuss the typical states that a transaction goes through during execution.	C06	(10)
	b)	Discuss how serializability is used to enforce concurrency control in database system. Explain with an example.	C06	(10)
10.	a)	Briefly explain the two phase locking protocol used in concurrency control.	C06	(10)
	b)	Briefly explain Steps in ARIES recovery algorithm.	C06	(10)

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