VIT UNIVERSITY
(Estd. u/s 3 of UGC Act 1956)

Term End Examination - November 2012

Course : ITE302 - Database Systems **Slot: C1**

Class NBR : 1003

Time : Three Hours **Max.Marks:100**

PART – A (8 X 5 = 40 Marks)
Answer ALL Questions

1. What are the responsibilities of the DBA and the database designers?
2. List out the advantages of DBMS.
3. Explain the main concepts used in object-oriented database.
4. Define lossless join and dependency preservation property.
5. How multi-valued attribute and M:N ratio relationships are mapped using ER-to-Relational mapping algorithm? Explain with suitable example.
6. Differentiate parallel processing and interleaved concurrency.
7. Compare binary locks to exclusive/shared locks. Why is the latter type of locks preferable?
8. What are the differences between primary and secondary storage?

PART – B (6 X 10 = 60 Marks)
Answer any SIX Questions

9. a) Discuss the different types of user-friendly interfaces and the type of users who typically use each. **[5]**

   b) What is the difference between database schema and database state. **[5]**

10. A large organization that does automobile repairs must keep track of its repair facilities or garages, the mechanics, and their qualifications in terms of the courses they have taken, the dates they took the courses, and the grade each earned for each course. Descriptions of these items are as follows:

    • Garage: Garage's identification number and manager's name

    • Mechanic: Employee number and name

    • Course: Number, name, and duration (in weeks)

Describe this situation using an E-R model by making some assumptions on your own to represent ratio and constraints.

11. Based on the given relation schema, convert the following queries into relational algebric expression.

EMPLOYEE(NAME,SSN,BDATE,ADDRESS,SEX,SALARY,SUPERSSN,DNO)
DEPARTMENT(DNAME,DNUMBER,MGRSSN,MGRSTARTDATE)
DEPT_LOCATIONS(DNUMBER,DLOCATION)
PROJECT(PNAME,PNUMBER,PLOCATION,DNUM)
WORKS_ON(ESSN,PNO,HOURS)
DEPENDENT(ESSN,DEPENDENT-NAME,SEX,BDATE,RELATIONSHIP)

a. Retrieve the name and address of all employees who work for the 'Research' department.

b. Retrieve the names of all employees who do not work on any project.

c. For each department, retrieve the department name and the average salary of all employees working in that department.

12. a) Why are duplicate tuples not allowed in a relation? **[5]**

b) Explain various SQL constraints with one example for each. **[5]**

13. Consider the relation R, which has attributes that hold schedules of courses and sections at a university; R = {CourseNo, SecNo, OfferingDept, Credit-Hours, CourseLevel, InstructorSSN, Semester, Year, Days_Hours, RoomNo, NoOfStudents}. Suppose that the following functional dependencies hold on R:

{CourseNo} ⟶ {OfferingDept, CreditHours, CourseLevel}

{CourseNo, SecNo, Semester, Year} ⟶ {Days_Hours, RoomNo, NoOfStudents,InstructorSSN}

{RoomNo, Days_Hours, Semester, Year} ⟶ {Instructorssn, CourseNo, SecNo}

Try to determine which sets of attributes form keys of R. How would you normalize this relation?

14. What is meant by the term heuristic optimization? Explain the optimization techniques followed step by step for the given query:

SELECT LNAME FROM EMPLOYEE,WORK_ON,PROJECT WHERE PNAME='AQUARIUS' AND PNUMBER=PNO AND ESSN=SSN AND BDATE>'1957-12-31';

15. a) Discuss the different types of failures. What is meant by catastrophic failure? **[5]**

b) Discuss the actions taken by the read_item and write_item operations on a database. **[5]**

16. Discuss the techniques for allowing a hash file to expand and shrink dynamically. What are the advantages and disadvantages of each?

⇔⇔⇔