Paper Code: CS-502	Roll No.									

B.Tech.
(SEM V) ODD SEMESTER EXAMINATION 2015-16
DATABASE MANAGEMENT SYSTEM

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- ***Attempt All Questions. All Questions carry equal marks*:-**

1. Attempt any four parts of the following: [5x4]

a) Discuss the three level architecture of database system.

b) Draw an ER diagram showing the cardinality for the following:
An operator can work on many machines and each machine has many operators. Each machine belongs to one department but a department can have many machines.

c) Explain the types of relational constraints.

d) What is the need of normalization?

e) Consider the given schedule:

T1	T2	T3
R(Q)		
	W(Q)	
W(Q)		
		W(Q)

Check whether the given schedule is view serializable or not. Justify your answer.

f) Consider a relation r that is to be stored in the database. Explain the possible approaches for storing this relation in distributed database.

2. Attempt any four parts of the following: [5x4]

a) List significant differences between file processing system and a DBMS.

b) Consider the given schema : Student(Roll_no, F_name, L_name, Dept_ID, Semester, Gender)

Dept(Dept_ID, Dept_name)

Write the query in SQL for answering the following question:

i) Give the name and roll number of student of IT department.
ii) Display names of department whose students are enrolled.
iii) Display names of department for which no students are enrolled.
iv) Find the number of students of Electrical department who are enrolled.
v) Display all details of male students.

c) List and explain the transaction states with the help of diagram.

d) Define ACID property with the help of example.

e) Explain the following:

i) Multiple Granularity
ii) Multi version two-phase locking protocol

f) Define the given terms:

i) Starvation
ii) Blind write
iii) Fragmentation
iv) Timestamp
v) Cascading Rollback

3. Attempt any two parts of the following: [2x10]

a) Emp(Fname, Lname, Ssn, salary, super_ssn, Dno)
Department(Dname, Dno, Mgr_ssn)
Dept_Location(Dno, Dlocation)
Works_on(Ssn, Pno, Hours)
Project(Paname, P_no, Plocation, Dno)
Dependent(Ssn, D_name, relationship)

Write relational algebra for the following questuins:

i) Retrieve Ssn of all employees who either work in department 5 or directly supervise an employee who works in department 5.
ii) Retrieve a list of names of each female employee's dependent.
iii) For every project located in 'Stafford', retrieve the project number, controlling department number and the department manager's name.
iv) Retrieve the name of all employees who work for 'Research' department.
v) Find the names of employees who work on all the projects controlled by department number 5.

b) BCNF is stricter than 3NF, describe through an example.
c) List and explain all the aggregate functions of SQL.

4. Attempt any two parts of the following: [2x10]

a) Consider the following schedules:

i) The given schedule is view equal or not. Justify your answer.

T1	T2	T3
	R(A)	
	R(B)	
W(A)		
		R(A)
		W(A)
	W(B)	
W(B)		
		W(B)

T1	T2	T3
	R(A)	
W(A)		
	R(B)	
	W(B)	
		R(A)
W(B)		
		W(A)
		W(B)

ii) The given schedule is conflict serializable or not. Justify your answer.
R1(X); R3(X); W3(X); W1(X); R2(X)

b) Which of the following schedule is conflict serializable? Solve with the help of precedence graph.
i) R1(X); R2(X); W1(X); R2(X); W3(X)
ii) R1(X); R2(X); W3(X); W1(X); R2(X)
iii) R3(X); R2(X); W3(X); R1(X); W1(X)

c) Consider the given description:

- Patients are identified by an SSN, and their names, addresses, and ages must be recorded.
- Doctors are identified by an SSN. For each doctor, the name, specialty, and years of experience must be recorded.
- Each pharmaceutical company is identified by name and has a phone number.

- For each drug, the trade name and formula must be recorded. Each drug is sold by a given pharmaceutical company, and the trade name identifies a drug uniquely from among the products of that company. If a pharmaceutical company is deleted, you need not keep track of its products any longer.
- Each pharmacy has a name, address, and phone number.
- Every patient has a primary physician. Every doctor has at least one patient.
- Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another.
- Doctors prescribe drugs for patients. A doctor could prescribe one or more drugs for several patients, and a patient could obtain prescriptions from several doctors. Each prescription has a date and quantity associated with it. You can assume that if a doctor prescribes the same drug for the same patient more than once, only the last such prescription needs to be stored.
- Pharmaceutical companies have long-term contracts with pharmacies. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several pharmaceutical companies. For each contract, you have to store a start date, an end date, and the text of the contract.
- Pharmacies appoint a supervisor for each contract. There must always be a supervisor
- For each contract, but the contract supervisor can change over the lifetime of the contract.

  Draw an ER diagram that captures the above information. Identify any constraints that are not captured by the ER diagram.

5. Attempt any two parts of the following: [2x10]

a) Describe two-phase (2PL) technique for concurrency control. How do two phase locking technique guarantee serializability?

b) Define the given terms:
   i) Specialization
   ii) Generalization
   iii) Functional Dependency
   iv) Homogeneous and heterogeneous database
   v) Deadlock

c) What do you understand by concurrent execution of transaction and what are the benefits of concurrent transactions.