command respectively. Discuss the types of problem may be encountered when transactions run concurrently.

(b) (i) Draw a state diagram and discuss the typical states that a transaction goes during execution.

(ii) Write an algorithm for testing Conflict Serializability of a Schedule.

(c) What is schedule give an example? What is a complete schedule? Explain by taking example the characterizing of Schedules based on Recoverability?

5. Attempt any two parts of the following: (10x2=20)

(a) What is a lock? How does two-phase locking guarantee serializability? Compare binary locks to exclusive / shared locks.

(b) What is a timestamp? What do you mean by time stamping protocols for concurrency control? Discuss multiversion techniques for concurrency control?

(c) What is phantom record? Discuss the problem that a phantom record can cause for concurrency control?

KNIT Sultanpur

(Paper code and roll No. to be filled in your answer book)

Paper code: KCS-301 Roll No. 1 3 2 9 5

B. Tech.

Third Semester Examination, 2014-15

Data Base Management System

Time: 3 Hours **Total Marks: 100**

Note: Attempt all the questions. Each question carries equal marks.

1. Attempt any four parts of the following: (5x4=20)

(a) What is Data Base Management System (DBMS)? What are the advantages of using DBMS? List any five applications of DBMS.

(b) Draw the overall structure of DBMS and briefly explain its various components?

(c) Define the following terms:

(i) DML
(ii) Schema
(iii) DDL
(iv) Meta Data
(v) Database Instance.

(d) State the important steps of converting an ER diagram to tables.

(e) Define the following with suitable example.

(i) Super Key
(ii) Candidate Key
(iii) Primary Key
(iv) Foreign Key

(f) Differentiate between the following by using suitable example.

(i) Single valued and multi-valued Attributes.
(ii) Derived and Composite Attributes.

2. Attempt any two parts of the following: (10x2=20)

(a) A schema describing theatres, cities where they are located and shows is defined as follows:

City (Name, State, Country)
THEATRE (Name, City, State, Capacity)

SHOW(Title, Artist, Hall, Attendance)

Write the following queries in SQL.

(i) Find names of artists who performed before at least 5000 people, together with cities where those performances took place.

(ii) Find all states in India where Mr. X has performed

(iii) List all artists who never played in Delhi.

(iv) Find the name of theatres in Bombay whose capacity exceeds 5000.

(v) List all the artists who played only outside India.

(b) Complete the table, where, in first column name of the operations of Relational Algebra are given:

Sr. No.	OPERATION	PURPOSE	EXAMPLE
1	SELECT		
2	PROJECT		
3	NATURAL JOIN		
4	PRODUCT		
5	DIVISION		

(c)Show how you may specify the following relational algebra operations in both type and domain relational calculus.

(i) $\pi_{<A,B>}(R(A,B,C))$

(ii) R(A,B)÷S(A)

(iii) R(A,B,C) ∩ S(A,B,C)

(iv) R(A,B,C)*S(C,D,E)

(v) $\sigma_{A<C}(R(A,B,C))$

3. Attempt any two parts of the following: (10x2=20)

(a)Solve the following problems:

(i) Suppose relation R(A, B, C, D, E) has functional dependencies:

{AB→ C, D → A, AE→ B, CD→ E, BE→ D}

Find all the candidate keys of R.

(ii) Given the relation R shown in fig.1. State whether or not the following: FD's

- A →B
- C→A
- AB→ C
- BC→ A
- AC→ B

A	B	C
1	4	2
3	5	6
3	4	6
7	3	8
9	1	0

are satisfied by the relation. Fig. 1.

(b) Solve the following problems:

(i) Find the canonical cover for the set, F = {A →BC, B→C, D→AEF, ABF→ BD}.

(ii) Consider the relation R (X,Y,Z,W,Q), the set F = {X→Z ,Y→Z, Z→W,WQ→Z,ZQ→X} and the decomposition of R into relations R_1(X,W), R_2(X,Y), R_3(Y,Q), R_4(Z,W,Q) and R_5(X,Q). Determine if the decomposition is lossless or lossy.

(c)Answer the following:

(i) Define the following terms:

- Functional Dependencies
- Partial Dependencies
- Transitive Dependencies
- Multi-Valued Dependencies
- Join Dependencies

(ii) Consider the relation R(A, B, C, D, E, F), the set F= {A→ BCDEF, BC→ADEF, B→F, D→E}. Normalize the relation R into 3NF.

4. Attempt any two parts of the following: (10x2=20)

(a)What is a Transaction? Write the steps involved in the execution of each read item (X) command and write item(X)