DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
SUBJECT: (IT502) DATABASE MANAGEMENT SYSTEM

Examination	**:Third Sessional**	**Seat No.**	**: _____**
Date	**: 10/10/2017**	**Day**	**: Tuesday**
Time	**: 11:30 to 12:45**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

(a) A special redo-only log record is written to the log, where V1 is the value being restored to data item Xj during the rollback. These log records are sometimes called **[1]**
a)Log records
b) Records
c) Compensation log records
d) Compensation redo records

(b) A heterogeneous distributed database is which of the following? **[1]**
A) The same DBMS is used at each location and data are not distributed across all nodes.
B) The same DBMS is used at each location and data are distributed across all nodes.
C) A different DBMS is used at each location and data are not distributed across all nodes.
D)A different DBMS is used at each location and data are distributed across all nodes.

(c) Which of the following protocols ensures conflict serializability and safety from deadlocks? **[1]**
a) Two-phase locking protocol
b) Time-stamp ordering protocol
c) Graph based protocol
d) Both (a) and (b) above

(d) Explain steps in query processing. Perform materialization for the following expression. **[2]**
π_{ssn} **(Student** $\times$ **Registered** $\times$ **(**$\sigma_{title='Database\ Systems'}$ **Course))** $\cup$
π_{ssn} **(Student** $\times$ **Registered** $\times$ **(**$\sigma_{title='Analysis\ of\ Algorithms'}$ **Course))**

(e) Consider the following two schedules **S1** and **S2**. Which of this is conflict serializable schedule? If so, give its serial order(s) and also draw the precedence graph to prove it. **[3]**
S1: $R_1(X)\ R_1(Y)\ R_2(X)\ R_2(Y)\ W_2(Y)\ W_1(X)$
S2: $R_1(X)\ R_2(X)\ R_2(Y)\ W_2(Y)\ R_1(Y)\ W_1(X)$

(f) What are the issues in concurrent execution of transaction? Explain each with example. **[4]**

Q.2 Attempt *any two* from the following. **[12]**

(a) Explain shadow paging mechanism for recovery. Also compare the shadow paging with the log-based techniques. **[6]**

(b) Explain Multiple Granularity protocol. **[6]**

(c) Consider following **Schedule-3** with several data items. Determine whether this schedule is valid under timestamp ordering protocol or not. **[6]**

T1	T2	T3
R(x)		
	R(y)	
		R(y)
	W(y)	
W(x)		
		W(x)
	R(x)	
	W(x)	

Schedule-3

Q.3 (a) Explain Two-phase locking protocol with example. Differentiate between strict two-phase and rigorous two-phase locking with conversion protocol. **[6]**

(b) (i) Explain distributed database systems architecture. **[2]**
(ii) Explain characteristics of distributed database systems. **[4]**

OR

Q.3 (a) What are deferred modification and immediate modification technique for recovery? How recovery does take place in case of failures in these techniques? **[6]**

(b) What is deadlock? What are the different deadlock prevention techniques in DB systems. **[6]**