ENGINEERING & MANAGEMENT EXAMINATIONS, DECEMBER – 2008

DATABASE MANAGEMENT SYSTEMS

SEMESTER – 5

Time : 3 Hours] [Full Marks : 70

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) Entity Integrity represents that

a) there must have a primary key for each relation

b) the primary key must be not null

c) there may exist a foreign key in each relation

d) none of these.

ii) Serilizability of concurrent transactions are ensured by

a) Locking b) Time stamping

c) Both of these d) None of these.

iii) In a pre-commit state a transaction may be

a) Aborted b) Committed

c) Either (a) or (b) d) None of these.

iv) Check-pointing is associated with

a) log based recovery b) non-log based recovery

c) both (a) and (b) d) none of these.

v) Conversion of locking mode from sharable to exclusive is called

a) upgradation b) down gradation

c) unlock d) none of these.

vi) Which one of the following is a trivial dependency ?

a) AB → A b) A → A

c) Both of these d) None of these.

vii) Cardinality ratio means

a) number of attributes associated with an entity

b) number of entity related with other entity via a relationship

c) both of these

d) none of these.

viii) Which one is an odd member ?

a) Lost update b) Dirty read

c) Phantom deadlock d) Incorrect summary.

ix) Usually commercial RDBMS application use for recovery technique is

a) immediate update b) deferred update

c) check-point based update d) all of these.

x) Blocking factor is

a) blocks fetched per sec. b) blocks fit into sector

c) tuples fit per block d) blocks for storing a relation.

xi) PJ/NF is also called

a) 3NF b) BCNF

c) 5th. NF d) 4NF.

xii) Lock point in 2 phase locking protocol denotes

a) start of growing phase b) end of growing phase

c) end of shrinking phase d) anywhere in phase.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) Distinguish between File Management System and Database Management System.

   b) Discuss the role of DBA. 3 + 2

3. What is foreign key ? Why is it called referential integrity ? Make an example of self-referencing table. 1 + 2 + 2

4. a) Explain why the relational databases theory requires that the relations should be in first normal form. Give an example to show that in representing some entity relationship we may not prefer to design a 1NF scheme.

   b) Show that BCNF implies 3 NF. 3 + 2

5. Describe the concept of specialization and generalization in context of E-R data model. Write rules for converting them into table. 4 + 1

6. Discuss the ACID properties of transaction. 5

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following questions. $3 \times 15 = 45$

7. a) Prove that a relation with primary key of single attribute is always in 2NF.

   b) Describe strict two-phase locking protocol and also comment about the advantage(s) and disadvantage(s) (if any) of this protocol.

   c) Why is cascadelessness of schedules desirable ? Are there any circumstances under which it would be desirable to allow non-cascadeless schedules ? Explain. 3 + 6 + 6

8. a) Why is the optimization of an query needed ? What do you mean by heuristic based optimization ?

   b) Why we can have at most one primary but several secondary indexes on a file ? Is it possible for secondary index to be sparse ? Explain your answer.

   c) Discuss the strength and weakness (if any) of the 'Trigger mechanism'.

   (3 + 2) + (4 + 2) + 4

9. Consider the following two schemas :

EMP (EMP#, ENAME, JOB, HIREDATE, MANAGER#, SALARY, COMM, DEPT#)

DEPT (DEPT#, DNAME, LOCATION)

Perform the following queries on the tables (Write appropriate SQL statement) : 5 × 3

a) List the name, salary and PF amounts of all employees (PF is calculated as 10% of the basic)

b) List the number of employees and average salary in DEPT# 20

c) List the department number and total salary payable in each department

d) List the names of the employees who are more than twenty years old in the company

e) List the name of the employee whose name either start or ends with S

10. a) Consider the schedule shown below :

i) Show that it is not Conflict Serializable.

ii) Is it view serializable ? Explain you answer.

T_1	T_2	T_3
		Write (Y)
Read (Y)		Read (X)
Write (Y)	Read (Z)	
Read (X)		Write (Z)
Write (X)		
	Write (Y)	

b) What is meant by Granularity of Locking ?

c) Briefly discuss different Deadlock avoidance techniques in concurrent transactions. (4 + 3) + 2 + 6

11. Write short notes on any *three* of the following : 3 × 5

a) Shadow paging

b) Data independence

c) Lossless and Lossy Decompositions

d) Multi-valued Dependency and 4NF

e) B-tree organization.

END