SVKM's NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme:MCA Year:I Semester: I

Academic Year: 2013-14 **Batch : 2013-14**

Subject : **Database Management System**

Date : 12/06/2014 Marks: 100

Time : 10.00 am to 1.00 pm

Durations: 3 (hrs)

Re - Examination

N.B.: (1) Question No.1 is Compulsory.
(2) Out of remaining six questions attempt any Four questions.
(3) In all five questions to be attempted.
(4) All questions carry equal marks.
(5) Answer to each new question to be started on fresh page.

Sr.No.	Questions	Marks
1a	A university database stores details about university students, courses, semester and instructor. A student enrolls in a particular course and an instructor who teaches enrolled students consists of identification number, name, department, and course title. ***Consider the following requirements list:*** • The university offers one or more courses • A student must enroll in a course • A course has a name, the total credit points required to graduate, and the year it commenced. • Students have one or more given names, a student identifier, a date of birth, address • Instructor teaches subjects as well as he manages college disciplines **a) Draw ER diagram according to the above requirements.** **b) Convert the ER diagram into equivalent schema**	**10**
1b	**Explain the following terms with example** (i)Strong Entity Set (ii)Select operator in relational algebra (iii)Primary Key (iv)Left outer join (v)DDL	**10**
2a	*person* (*driver-id#*, *name*, *address*) *car* (*license*, *model*, *year*) *accident* (*report-number*, *date*, *location*)	**10**

owns (*driver-id#*, *license*)
participated (*driver-id*, *car*, *report-number*, *damage-amount*)

a) Create relations person and owns
b) Add a new accident to the database; assume any values for required attributes.
c) Delete the SKODA belonging to "Sachin Parkar".
d) Find the total number of people who owned cars that were involved in accidents in 1999.
e) Find the person names whose name starts with 'S' and arrange it in decreasing order of *driver-id#*

2b Explain the three level database architecture . **10**

3a **10**

employee (*person-name*, *street*, *city*)
works (*person-name*, *company-name*, *salary*)
company (*company-name*, *city*)
manages (*person-name*, *manager-name*)

Solve the following Queries using relational algebra:

i. Modify the database so that "Sachin" now lives in "Agra"
ii. Find the names, street address, and cities of residence of all employees who
work for ICICI and earn more than Rs10,000 per month
iii. Find the company with the smallest payroll

Solve the following Queries using domain Calculus

iv. Find the names of all employees in this database who do not work for ICICI Bank
v. Find the company name which is in Mumbai

3b Explain ACID properties of a transaction also explain various states of transaction. **10**

4a i. Suppose that we decompose the schema $R = (A, B, C, D, E)$ into **5**
(A, B, C)
(A, D, E)
Show that this decomposition is a lossless-join decomposition if the following set F of functional dependencies holds:
$A \rightarrow BC$

$CD \rightarrow E$
$B \rightarrow D$
$E \rightarrow A$

ii. Explain First and Second Normal form with example **5**

4b Explain various RAID levels . **10**

5a Explain two phase locking protocol **10**

5b Consider the following two transactions: **10**

$T31$: read(A);
read(B);
if $A = 0$ **then** $B := B + 1$;
write(B).
$T32$: read(B);
read(A);
if $B = 0$ **then** $A := A + 1$;
write(A).

Add lock and unlock instructions to transactions $T31$ and $T32$, so that they observe the two-phase locking protocol. Can the execution of these transactions result in a deadlock?

6a Explain Differed modification technique for log based recovery **10**

6b Explain what is deadlock and methods for deadlock Prevention **10**

7 **Write short notes for: (Any four)** **20**

i. Mapping Cardinalties
ii. Aggregate functions in SQL
iii. Shadow Paging
iv. Checkpoints
v. Views in SQL