

SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme: MCA

Year: I

Semester: I

Academic Year: 2014-15

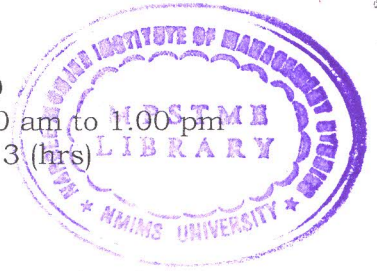
Subject: Database Management System

Date: 06/12/2014

Marks: 100

Time: 10.00 am to 1.00 pm

Durations: 3 (hrs)



Final - Examination

Instruction: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

NB:

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) In all 5 questions to be attempted.
- 4) All questions carry equal marks.
- 5) Answer to each new question to be started on a fresh page.
- 6) Figures in brackets on the right hand side indicate full marks.

1(a) Draw an ER diagram for University database. Assume at least five entities with their attributes. Assume relationships and participation of entities. Also convert the ER diagram into equivalent schema 10

1(b) Discuss advantages of database management system to overcome the problems of file processing system 10

2(a) For the given schema 10

Employee(*fname*, *mint*, *lname*, *ssn*, *bdate*, *address*, *sex*, *salary*, *super_ssn*, *dno*)

Department(*dname*, *dno*, *mgr_ssn*, *mgr_start_date*)

Project(*pname*, *pnumber*, *plocation*, *dnum*).

Give the relational algebra expressions for the following queries

1. Select the employees who work in department no 4 and make over 25000 per year
2. Display the employee first name, bdate and salary of department number 5. Use rename operation for this query
3. Write an expression to count the number of employees in every department
4. Retrieve the name and address of all employees who work for research department
5. For every project located in Mumbai list the project number, the controlling department number, and the department manager's last name, address and birthdate

2(b) Explain the following terms with example: 10

- (i) Instances
- (ii) Data abstraction
- (iii) Referential integrity
- (iv) Entity and entity set

(v) Multivalued attribute

- 3(a) What is normalization? Give the difference between 3NF and BCNF 10
- 3(b) (i) Suppose that we decompose the schema $R = (A, B, C, D, E)$ into $R_1(A, B, C)$, $R_2(A, D, E)$. Show that this decomposition is a lossless-join decomposition if the following set F of functional dependencies holds: 5
- $A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A$
- (ii) Explain dependency preservation for loss less join decomposition 5
- 4(a) Consider the following schemas and write SQL statement of given queries: 10
- employee* (*employee-name*, *street*, *city*)
works (*employee-name*, *company-name*, *salary*)
company (*company-name*, *city*, *company-shares*)
- Delete the records of those employee whose name starts from 'P'
 - Find all employees who earn more than the average salary of those employees who lives in Watson city
 - Retrieve the company record of each city which is having total 5 shares
 - Find the names and cities of residence of all employees who work for First Bank Corporation
 - Modify the company name Wipro to TCS
- 4(b) Explain deferred database modification of log based recovery 10
- 5(a) Explain lock based protocols? 10
- 5(b) Define schedule in transaction and explain conflict serializability with example 10
- 6(a) What is RAID Technology? How is reliability improved using RAID 10
- 6(b) 1. Consider a relation $R(A, B, C, D, E)$ with the following dependencies: 5
- $\{AB \rightarrow C, CD \rightarrow E, DE \rightarrow B\}$
- Is AB a candidate key of this relation?
2. Define Armstrong's axioms in terms of functional dependencies 5
- 7 Write short notes on any four: 20
- a) Acid properties
 - b) Outer Joins in relational algebra
 - c) Deadlock detection
 - d) Data Constraints
 - e) Mapping cardinalities
 - f) Aggregate functions in SQL

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