Roll No.:_____

M.Sc. (Informatics) 3rd Semester, 2011

Paper: IT-32- **Database Management System**

Time allowed: **03 Hrs** Maximum Marks: **75**

Answer any five questions in all.

(Write your roll number on the top on receipt of the question paper)

Q1 (a) Define and describe the following terms. Use examples in your explanation 10

(i) Super Key
(ii) Data Model
(iii) View
(iv) Procedural Database Languages
(v) Query Processing

(b) Define attribute closure? Write the algorithm for computing it with example? 5

Q2 (a) Discuss Entity-Relationship model and the Relational Model, and discuss rules for the translation of an E-R design into an equivalent set of relational schema. Demonstrate the application of these rules with example. 12

(b) Discuss the usage of Materialized views for query optimization. 3

Q3 Consider the database which contains the following tables :

faculty (fno, name, dno, salary, birthdate, NoPubl), key : fno
dept(dno, name, budget, dateStarted, budget), key : dno
courses(cno, name, pre-req, dno), key : cno, pre-req
students(sno, name, hno, birthdate, joinYear, dno), key : sno
study(sno, cno, grade, year, semester), key : sno, cno
teach(fno, cno, year, semester), key : fno, cno

dno, hno stands for department number and hostel number respectively. pre-req gives course-no (cno) of the course which is a pre-requisite of a course.

(a) Write the DDL commands to create the above tables and constraints. 3

(b) Write a SQL query to list students (name, etc) of EE dept staying in hostel no 4 and having age more than 23 4

(c) Write a SQL query to list students studying more than 6 courses in this semester (year = 2001 and semester = 1) 4

(d) Write a SQL query to list courses of CSE dept whose pre-requisites are from a non-CSE dept 4

Q4 (a)What is a functional dependency? How does functional dependency relate to referential integrity constraint? 15
(b) What is a multi valued dependency? How does it relate to multi valued attributes?
(c) Define extraneous attribute. Explain with example its application to process of normalization.

(d) Given the three goals of relational-database design, is there any reason to

design a database schema that is in 2NF, but is in no higher-order normal form?

Q5 (a) Write a short note on 9
(i) Data Warehouse
(ii) Object-Oriented versus Object-Relational databases
(iii) Distributed databases

(b) For the following instances S1 and S2 and R1, give the result of 6

(i) Π sname, rating(σ rating>8(S2))
(ii) S1US2
(iii)S1 - S2
(iv)S1 ∩S2
(v) S1X R1
(vi)S1 ÷S2
(vii) outer join of s1 and s2

Instance of S1:

Sid	Sname	Rating	Age
22	dustin	7	45.0
31	lubber	8	55.5
58	Rusty	10	35.5

Instance of S2:

Sid	Sname	Rating	Age
28	yuppy	9	35.0
31	lubber	8	55.5
44	guppy	5	35.0
58	rusty	10	35.0

Instance of R1:

Sid	Bid	day
22	101	10/10/96
58	103	12/12/96

Q6 (a) Define Thomas' write rule and Phantom phenomena. 4

(b) Give the advantages and disadvantages of Timestamp-based protocols in comparison to Lock based protocols for concurrency control. Discuss these approaches in terms of serializability, recoverability and cascade less rollback. 7

(c) What is the purpose of a Transaction? Why transactions are required to have ACID properties? What are the different states of transactions and how do they relate to recovery. 4