DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [INFORMATION TECHNOLOGY]
SUBJECT: (IT 502) DATABASE MANAGEMENT SYSTEM

Examination	**: First Sessional**	**Seat No.**	**:**
Date	**: 01/08/2015**	**Day**	**: Saturday**
Time	**: 11.15 to 12.30**	**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.

(a) Compare file system and database management system in terms of concurrent access anomalies problem. **[2]**

(b) Explain the responsibilities of DBA. **[2]**

(c) Given the basic E-R and relational models, which of the following is INCORRECT? **[2]**
(A) An attribute of an entity can have more than one value.
(B) An attribute of an entity can be composite.
(C) In a row of a relational table, an attribute can have more than one value.
(D) In a row of a relational table, an attribute can have exactly one value or a NULL value.

(d) Explain referential integrity problem with example. **[2]**

(e) Given an instance of the **STUDENTS** relation as shown below: **[2]**

student_ID	student_name	student_email	student_age	student_cpi
1000	Vishnu	vishnu@cs	X	7.7
1289	Indra	indra@math	20	8.8
1359	Vishnu	vishnu@ee	20	9.9
5214	Indra	indra@ee	19	8.5
7862	Shiva	shiva@ee	20	8.9

For (**student_name, student_age**) to be a primary key for this instance, the value of X should NOT be equal to _____.

(f) Consider the relational schema given below, where **eId** of the relation **dependent** is a foreign key referring to **empId** of the relation **employee**. Assume that every employee has at least one associated dependent in the **dependent** relation. **[2]**

employee(empId, empName, empAge)
dependent(depId, eId, depName, depAge)
Consider the following relational query:

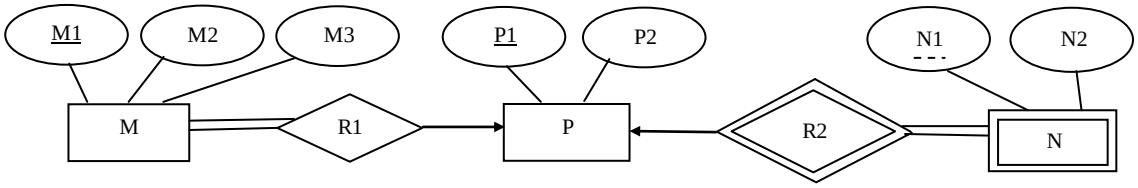
$$\Pi_{empId}(employee) - \Pi_{empId}(employee \bowtie_{(empId=eId) \wedge (empAge \leq depAge)} dependent)$$

The above query evaluates to the set of **empId**s of employees whose age is greater than that of:
(A) some dependent
(B) all dependents
(C) some of his/her dependents
(D) all of his/her dependents

Q.2 Attempt ***Any Two*** from the following questions. **[12]**

(a) Draw an E-R diagram for **Hostel Mess Management System**. (Min. 4 Entity Sets) [6]

(b) (i) Consider the following E-R diagram: [4]



1) Let X denotes the minimum number of tables needed to represent M, N, P, R1, and R2. What is the value of X?
2) List all the X tables along with their attributes, primary key, and foreign key(s).

(ii) SELECT operation in SQL is equivalent to: (Choose one from the following) [2]

(A) the selection operation in relational algebra
(B) the selection operation in relational algebra, except that SELECT in SQL retains duplicates
(C) the projection operation in relation algebra
(D) the projection operation in relation algebra, except that SELECT in SQL retains duplicates

(c) (i) Explain strong and weak entity set with appropriate example. [3]
(ii) What is Key? Explain different types of keys in DBMS with its significance. [3]

Q.3 (a) Consider the following relational schema **Library** with key underlined. **[6]**

Book(book_id,title,publisher_name)
Book_Auther(book_id,Author_name)
Book_copies(book_id,no_of_copies)
Book_loans(book_id,card_no,date_issue,due_date)
Borrower(card_no,name,address,phone)

Write the following queries in SQL:

(i)Add Address column in Book_Author relation. [1]
(ii)Modify the due_date to '01/Aug/2015'for the book with book_id 'B111'. [1]
(iii)Retrieve the books of Author 'IVAN BAYROSS'. [1]
(iv)Delete all the records from Book_copies in a Faster and Effective way. [1]
(v)Retrieve book title for the book borrowed by Borrower whose name is 'Sunil Gandhi' issued on '01/Aug/2015'. [2]

(b) Write the Tuple Relational Calculus queries for the following: **[6]**
(i) Retrieve details of borrower who has borrowed at least one book. [2]
(ii) Retrieve book title for the book borrowed by Borrower whose name is 'Sunil Gandhi' issued on '01/Aug/2015'. [2]
(iii) Retrieve book_id for books having largest number of copies. [2]

OR

Q.3 (a) 1. Explain different types of joins. **[2]**

2. Consider two relations R_1 (A, B) with tuples (1, 5) and (3,7) and R_2(A,C) with tuples (1,7) and (4,9). Assume that R (A, B, C) is the **full natural outer join** of R_1 and R_2. Consider the following tuples of the form (A,B,C): a=(1,5,null), b=(1,null,7), c=(3,null,9), d=(4,7,null), e=(1,5,7), f=(3,7,null), g=(4,null,9). Which one of the following statements is correct? **[4]**

(A) R contains a,b,e,f,g but not c,d
(B) R contains all of a,b,c,d,e,f,g
(C) R contains e,f,g but not a,b
(D) R contains e but not f,g

(b) Write Relational Algebra queries for the following: **[6]**
(i) Retrieve details of borrower who has borrowed at least one book. [2]
(ii) Retrieve book title for the book borrowed by Borrower whose name is 'Sunil Gandhi' issued on '01/Aug/2015' [2]
(iii) Retrieve the no. of books borrowed by borrower whose card_no is 'C111'. [2]