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Daffodil International University

Department of Information Technology & Management

Faculty of Science & Information Technology

Final Examination, Fall 2023

Course Code: SE 223; Course Title: Database Systems

Sections & Teachers: All

Time: 2:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. **a)** [Marks-10] CLO-3 Level-3

Department

Department_Id	Department_name	MANAGER_ID	Location_id
10	Administration	200	1700
20	Marketing	201	1800
30	Purchasing	114	1700
40	Human Resources	203	2400
50	Shipping	121	1400

EMPLOYEE

EMPLOYEE_ID	FIRST_NAME	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	MANAGER_ID	DEPARTMENT_ID
100	Steven	5151234567	2003-06-17	AD_PRES	24000.00	0	90
101	Neena	5241234567	2005-09-21	AD_VP	17000.00	100	90
102	Lex	5151258567	2001-01-13	AD_VP	17000.00	90	90
103	Alexander	5151248567	2006-01-03	IT_PROG	9000.00	102	60
104	Bruce	515489567	2005-06-25	IT_PROG	6000.00	103	60
105	David	5784489567	2006-02-05	IT_PROG	4800.00	103	60
106	Valli	6894489567	2007-03-07	IT_PROG	4800.00	103	60

a. **Develop** a SQL query to retrieve the average salary for each department.

b. **Develop** a SQL query to find the names and salaries of employees who work in the "IT_PROG" department.

c. **Develop** a SQL query to find those employees who earn more than the average salary.

d. **Develop** a SQL query to find those employees who report to that manager whose first name is 'Lex'.

e. **Develop** a SQL query to know the details of employees whose manager from "Marketing Department"

f. **Develop** a SQL query to know the employee details whose job_id "AD_VP"

g. **Develop** a sql query to know the employee information whose name starts with "A"

h. **Develop** a SQL query to the phone number of those employees who are hired in between 17th june 2003 to 3rd January 2006.

i. **Develop** a SQL query to know the all department names.

j. **Develop** a SQL query to find employee id who gets highest salary

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3. Consider the following Information

Hospital Management System Data

PatientID: 021222000123456789
PatientName: John Doe
DepartmentName: Cardiology
DepartmentNo: 10
PatientEmail: johndoe@mail.com
PatientPhoneNo: 01589955454

VisitID: V001
VisitDate: 20-11-24
NextVisitDate: 04-12-24

Prescription:

MedicineID: M001
MedicineName: Aspirin
Dosage: 75 mg daily
MedicineManufacturer: Bayer

MedicineID: M002
MedicineName: Atorvastatin
Dosage: 10 mg nightly
MedicineManufacturer: Pfizer

DoctorID	DoctorName	DoctorSpecialization	DoctorPhoneNo
D001	Dr. Jane Smith	Cardiologist	01712233445
D001	Dr. Jane Smith	Cardiologist	01712233445

	a)	Normalize the table from 1NF up to BCNF; examining every step of the process from those tables given in question 3 with proper explanation.	[Marks-8]	CLO-4 Level-4
	b)	List the normalization rules and explain why we need normalization to design databases.	[Marks-4]	CLO-4 Level-4
	c)	Distinguish between full functional dependency and partial dependency and transitive dependency from the above tables.	[Marks-4]	CLO-4 Level-4
	d)	Establish an Entity relationship diagram based on the normalized tables with appropriate attribute type, cardinality, and relationship.	[Marks-4]	CLO-4 Level-4
4.		**Imagine a Banking System where a user is transferring funds from Account A to Account B. The transaction consists of several steps:** 1. **Check Account A for sufficient funds.** 2. **Debit Account A by the transfer amount.** 3. **Credit Account B with the transfer amount.** 4. **Commit the transaction if all steps succeed; otherwise, rollback if any step fails.**		
	a)	Explain the states of the transaction from scenario given in question 4.	[Marks-3]	CLO-5 Level-2
	b)	Define each component of ACID properties, and how they ensure reliability, integrity, and concurrency control in database transactions from scenario given in question 4.	[Marks-2]	CLO-5 Level-2