COMSATS University Islamabad
Sahiwal Campus
Department of Computer Science

Course Title:	Database Systems I			**Course Code:**	CSC371	**Credit Hours:**	4
Course Instructor:	Tariq Rafiq			**Programme Name:**	BSSE		
Semester:	3rd	**Batch:**	B24 **Section:**	A, B, C	**Date:**	01-07-2022	
Time Allowed:	2 hours 40 minutes			**Maxim[redacted]**		35	
Student's Name:	[redacted]			**Reg. No.** [redacted]		/SW1.	

Important Instruction
Read the question paper carefully and answer the questions according to their statements.
Return the question paper with the answer sheet. Mobile phones and any other digital storage medium are not allowed.

Terminal Examinations Spring-2022

Differentiate between the following: [14]

i) Cardinality of relationship & Degree of relationship
ii) Multivalued attribute & Composite attribute
iii) Insertion anomaly & Deletion anomaly
iv) Primary key & Foreign key
v) Generalization & Specialization
vi) Select & Project
vii) Views & Indexes

Q # 3.

Draw an ERD for the following scenario. If you believe that you need to make additional assumptions, clearly state them. [05]

Scenario

Anjum & Co. Services is a consultancy company providing consultancy services to small scale manufacturing companies. Each company to which Anjum & Co. Services is providing consultancy is called a Project. It has a number of employees working in different shifts. The attributes of Employee include Employee_Id (identifier), Name, Address and Birthdate. Attributes of Project include Project_Id (identifier), Project_Name and Start_Date. Each employee may be assigned to one or more projects, or may not be assigned to a project. A project must have at least one employee assigned, and may have any number of employees assigned. An employee's billing rate may vary by project and the company wishes to record the applicable billing rate (Billing_Rate) for each employee when assigned to a particular project.

Q # 4. Describe how the following components of an E-R diagram are transformed into relations: [05]

a. relationship (1:M)
b. relationship (M:N)
c. weak entity
d. multivalued attribute
e. relationship (supertype/subtype)

Q # 5. The following figure shows a class list for Millennium College. Convert this user view to a set of 3NF relations. Assume the following: [06]

- An instructor has a unique location.
- A student has a unique major.
- A course has a unique title

MILLENNIUM COLLEGE
CLASS LIST
FALL SEMESTER 201X

COURSE NO.: IS 460
COURSE TITLE: DATABASE
INSTRUCTOR NAME: NORMA L. FORM
INSTRUCTOR LOCATION: B 104

STUDENT NO.	STUDENT NAME	MAJOR	GRADE
38214	Bright	IS	A
40875	Cortez	CS	B
51893	Edwards	IS	A

Q # 6.

Consider the following database schema of the Customer order system, where the primary keys are underlined. [05]

Customer (customeId, cname, address,,balancedue)

Product (productId, description,qtyavailable, price)

Order (orderId, orderdate, customerid)

OrderDetail (orderId, productId, quantity)

Write SQL commands to do each of the following (any five):

i) For all customers, list their names and address.

ii) For a given order with orderId=7001, list all the ordered products in terms of productId, product's description and the price (per unit).

iii) For all products that contain the word shoe in its description and are priced over Rs. 3000, list the product details in terms of description, productId and the price. Sort the output first according to the price in decreasing order, then according to the description alphabetically.

iv) Count the total number of orders from the order table

v) Count the customer wise number of orders

vi) Change the address of Singh Associates to 'E2,24-C' and Balance to 80,000

vii) List employees whose name have 'i' as 3rd character followed by any number of characters.

The End

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Course Instructor:	Tariq Rafiq			**Programme Name:**	BSCS		
Semester:	3rd	**Batch:**	B24	**Section:**	A, B, C	**Date:**	13-01-2022
Time Allowed:	2 hours 30 minutes			**Maximum Marks:**		40	
Student's Name:				**Reg. No.**	CUI/		/SWL

Important Instructions / Guidelines:

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Terminal Examinations Fall-2021
Subjective Part

Q # 2.

a) What is prototype model and where is prototype model used? [3]

b) What are the main reasons for introducing the concepts of superclasses and subclasses into an ER model? [2]

Q # 3.

A nonprofit organization XYZ depends on a number of different types of persons for its successful operation. The organization is interested in the following attributes for all of these persons: SSN, Name, Address, City/State/Zip, and Telephone. Three types of persons are of greatest interest: employees, volunteers, and donors. Employees have only a Date Hired attribute, and volunteers have only a Skill attribute. Donors have only a relationship (named Donates) with an Item entity type. A donor must have donated one or more items, and an item may have no donors, or one or more donors. There are persons other than employees, volunteers, and donors who are of interest to the organization, so that a person need not belong to any of these three groups. On the other hand, at a given time a person may belong to two or more of these groups (e.g., employee and donor).

Draw an EER diagram for the above description. [5]

Q # 4.

Explain the following terms with examples: [12]

i) Multivalued attribute
ii) Derived attribute
iii) Database Relation
iv) Deletion Anomaly
v) Views
vi) Transaction

Q # 5.

Examine the Invoice data for the Pine Valley Furniture Company case study shown in the following figure.

a) In what normal form is this Invoice table. [1]

ii) List the functional dependencies [2]

c) Convert invoice table up to 3NF relations. [5]

Order ID	Order Date	Customer ID	Customer Name	Customer Address	Product ID	Product Description	Product Finish	Unit Price	Ordered Quantity
1006	10/5/2016	2	Value Furniture	Plano, TX	7	Dining Table	Natural Ash	800.00	2
					5	Writer's Desk	Cherry	325.00	2
					4	Entertainment Center	Natural Maple	650.00	1
1007	10/30/2016	6	Furniture Gallery	Boston, MA	11	4-Dr Dresser	Oak	500.00	4
					4	Entertainment Center	Natural Maple	650.00	3

Q # 5.

The following tables form part of a database held in an RDBMS:

Employee (empNo, fName, lName, address, DOB, sex, position, salary, deptNo)

Department (deptNo, deptName, mgrEmpNo)

Project (projNo, projName, deptNo)

WorksOn (empNo, projNo, dateWorked, hoursWorked)

where

- Employee contains employee details and empNo is the key.
- Department contains department details and deptNo is the key. mgrEmpNo identifies the employee who is the manager of the department. There is only one manager foreach department.
- Project contains details of the projects in each department and the key is projNo (notwo departments can run the same project).
- WorksOn contains details of the hours worked by employees on each project, and empNo/ projNo/dateWorked form the key.

Formulate the following queries both in Relational Algebra and SQL. [10]

i) List all the details of employees who are female and born after 1990.

ii) List employee numbers and names of all employees who are not managers and are paid more than $1500.

iii) Produce a list of the names and addresses of all employees who work for the IT department.

iv) Produce a list of the names of all employees who work on the Biometric project.

v) Produce a report of all projects under the IT department.

The End

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Course Instructor:	Tariq Rafiq		Programme Name:	BSCS, BSSE	
Semester:	4th Batch: SP21 Section:	A, B	Date:	14-11-2022	
Time Allowed:	1.5 hours		Maximum Marks:	25	
Student's Name:	Raiha Mehdi		Reg. No.	CUI/ SP21-BSE-028	/SWL

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Midterm Examinations Fall-2022

Q # 1. [CLO1-C1/SO1] [10]

Define each of the following terms:

a. database application

b. database management system

c. data integrity

d. logical data independence –

e. data abstraction

Q # 2. [CLO2-C3/SO2] [10]

The following tables form part of a database held in an RDBMS:

Employee (empNo, fName, lName, address, DOB, sex, position, deptNo)
Department (deptNo, deptName, mgrEmpNo)
Project (projNo, projName, deptNo)
WorksOn (empNo, projNo, dateWorked, hoursWorked)

where Employee contains employee details and empNo is the key.

Department contains department details and deptNo is the key. mgrEmpNo identifies the employee who is the manager of the department. There is only one manager for each department.

Project contains details of the projects in each department and the key is projNo (no two departments can run the same project).

and WorksOn contains details of the hours workedby employees on each project, an empNo/projNo/dateWorked form the key.

Produce the following queries in relational algebra and domain relational calculus.

a) List all employees.

b) List all the details of employees who are female and born after 1990.

c) List all employees who are not managers.

d) List of the names and addresses of all employees who work for the IT department.

e) List of the names of all employees who work on the SCCS project.