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| **National University of Computer and Emerging Sciences, Chiniot-Faisalabad Campus** | | | | | | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | | **Course Name:** | | **Database System** | | | | **Course Code:** | **CS2005** |
| **Degree Program:** | | **BS(CS) | BS(SE) | BS(AI)** | | | | **Semester:** | **Spring-2024** |
| **Exam Duration:** | | **60 Minutes** | | | | **Total Marks:** | **46** |
| **Paper Date** | | **Saturday, February 24 , 2024** | | | | **No of Page(s):** | **06** |
| **Sections:** | | **ALL** | | | |  |  |
| **Exam Term & Type:** | | **1st Sessional I Closed Book** | | | | **Required Answer Book: No** | |
| **Course Instructor** | | **Nasreen Akhtar, Dr. Shanza Abbas, Faryal Saud, Saba Ghani, Ch. Usman Ghous** | | | | | | **Invigilator’s Signature** | |
| **StudentName:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Roll No.\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Section:\_\_\_\_\_\_\_** | | | | | | | |
| **CLO’S** | **01** | | **02** | | **02** | **02** |  | | |
| **Q.Part#** | **Q.1** | | **Q.2** | | **Q.3** | **Q.4** | **Examiner Signature and Date** | | |
| **Marks** | **8** | | **10** | | **10** | **18** |  | | |
| **Obtained** |  | |  | |  |  |  | | |
| **Instruction/Notes:** | | Attempt all questions. Programmable calculators are not allowed. | | | | | | | |
| **Vetted By** | |  | | | | **Vetter Signature:** | | | |
| **Declaration by course instructor** | | The question paper has an 100% dissimilarity as compared to the question papers of the same subject from the last two years. | | | | | | | |

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| **Course Learning Outcomes** | | **Domain/TaxonomyLevel** | **PLO** |
| 1 | Describe the storage and retrieval mechanism indifferent databases. | 2 | 1 |

Q#01 Write short answers Marks:8

1. What is DBMS. Also define why database is called self-describing nature. Pt:2.5

A software that helps to create and maintain database. Or A general purpose software that helps to facilitate the process of defining, constructing, manipulating and share of data among user. Because or meta data the database is called self describing nature

1. What are the basic reasons of creating database system. Pt: 2.5  
     
   the basic reason of creating database is to reduce data redundancy. Redundancy creates many other issue like data inconsistency, data integrity issue, storage and time complexity plus program data dependency issue.
2. What is physical and logical data independency

Physical data independency. Change in physical schema without effecting logical schema.

Logical data independency. Change in logical schema without affecting external view.

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| **Course Learning Outcomes** | | **Domain/TaxonomyLevel** | **PLO** |
| 2 | 2. Design a conceptual model using (E)ER diagrams | 6 | 3 |

Q2: Consider the following scenario or relational schema Marks:10

1:M

PART

PROJECT

SUPPLIES

SUPPLIER

1:M

1:M

|  |  |  |  |
| --- | --- | --- | --- |
| Table | Foreign key(s) | Parent Table(s) | Status of table (Parent/Child table) |
| SUPPLIER |  |  | Parent |
| PART |  |  | Parent |
| PROJECT |  |  | Parent |
| SUPPLIES | Suppli\_id, partid, pid | SUPPLY, PART, PROJECT | Child |

1. Fille the given table by considering the above-mentioned schema pt:4

\*\* Parent Table: Table that contain primary key for a relationship,

Child table: Table containing foreign key in a relationship

1. In the above relational schema, there is an associative entity i-e SUPPLIES. What will be the Primary key for that Associative entity. Pt:1.5

Suplliesid, partid,pid makes a composite primary key

1. Give the reasons due to which an associative entity SUPPLIES form in above relational schema? Pt: 4.5

Reason1 after supplies item for project the new attributes amount date and quantity introduces.

Reason 2: there is ternary relationship .

Reason 3. All three entities are connected with many to many relationship

**Q3: Consider the scenario and map the *relationship cardinality* accordingly. Also create logical relationships among entities.   
 Marks:10**

* Customer can place at least one order, a given order is placed by exactly one customer  
    
   1:1 1:m

CUSTOMER

ORDER

PLACED

* A student enrolled in many courses, but a course may not need any student enrolled in it. The teacher teaches course to a student. A given course is taught be many teachers to many students.  
    
    
   1:1 1:m 1:M 0:m

STUDENT

COURSE

ENROLLED

TEACHER

* 1:m

1:1

1. Employee Manages many other employees. An employee is managed by exactly one Employee.  
     
   An Employee is managed by exactly one Employee (one-to-one relationship from Employee to Employee).

EMPLOYEE

MANAGES

1:m  
 1:1

1. Book managers manage Stores. A store may be managed by one or more book managers.

BOOK MANAGER

STORES

MANAGE

1:M 1:M

Q4: For an Online Retail Store Database, there are following Entities and attributes:

**Customer** (CustomerID, Name, Email, Address, Phone)

**Product** (ProductID, Name, Description, Price, StockQuantity)

**Order** (OrderID, CustomerID, OrderDate, TotalAmount, ShippingAddress, Status)

**OrderItem** (OrderID, ProductID, Quantity, UnitPrice)

**Payment** (PaymentID, OrderID, Amount, PaymentDate, PaymentMethod)

**Supplier** (SupplierID, Name, Email, Phone, Address)

**Part A:** \*Fill only those, which are applicable. (10 marks)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 3 pts | 2 pts | 1 pts | 3 pts | 1 pts |
|  | Primary key | Candidate key/s | Surrogate Key | Super key | Composite key |
| Customer | CustomerId | CustomerId, Email, Phone number | Nill | Customerid, any combination of none key with customer id |  |
| Product | ProductId | ProductId | Nill | Productid, any combination of none key with Product id |  |
| Order | OrderID | OrderID | Nill | OrderID, any combination of none key with Order id |  |
| OrderItem | OrderID, ProductId | OrderID, ProductId |  | OrderId+Productid, any combination of none key with ordered+productid | OrderID, ProductId |
| Payment | Payment id | Payment id | Nill | Paymentid, any combination of none key with payment id |  |
| Supplier | SupplierID | SupplierID, Email, Phone number | Nill | Supplierid, any combination of none key with supplierid |  |

**Part B: Answer the following questions based on above given schema information: (8 Marks)**

1): Is it necessary for every order to have a customer associated with it? How would you enforce this?

(2 marks)

To ensure this , we make use of referential integrity, meaning that every value in the CustomerID column of the Order table must match an existing value in the CustomerID column of the Customer table

2): What would happen if a customer is deleted from the database? What kind of integrity constraint handles this situation? ( 2 Marks)

Referential integrity handles such situation with your foreign key constraint by preventing the deletion of a customer if there are related records in other tables that reference the customer.

3: How can you maintain entity integrity of Customer table? (2 Marks)

CustomerID is used to uniquely identify all the records in Customer table. To maintain entity integrity of this table we have to make sure that It can't be null and there must be a proper value in the primary key field.

4): Which integrity constraint will be useful to make sure that order\_Date in order table stores a specific format of date? ( 2 Marks)

**Domain constraint** specifies the valid range of values for a particular attribute or column in a database table. In this case, enforcing a specific format for the OrderDate column in the Order table falls under the domain constraint category.

~~~~~~~~~~~~~~Best of Luck~~~~~~~~~~~~~~~~~~~~~~~~~~