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MAIN EXAMINATION

JANUARY – APRIL 2022

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

REGULAR PROGRAMME

CMT 109/LIS 203: DATABASE SYSTMES/DATABASE DESIGN MANAGEMENT (COMPUTER SCIENCE)

Date: APRIL 2022	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and any other TWO Questions. Calculators MAY be used for this Examination.	

Q1. a) Distinguish between a role and privilege as applied in the context of database security **[2 marks]**

b) Discuss any TWO characteristics associated with database approach **[4 marks]**

c) Why is it necessary for database designers to adopt and adhere to ANSI-SPARC architecture? **[2 marks]**

d) You have been provided with the following relations.

Student **Course**

Regno	Name	Gender
S001	Jane	Female
S002	Joe	Male
S003	Phil	Male

CID	Regno	Course Name
C001	S001	Arts
C002	S001	IT
C003	S003	Commerce

Additional information:

- Regno is the primary key for student table while CID is the primary key for course table
- Regno is a foreign key course table

Explain what shall happen to both relations if:

i). We insert a tuple in course table bearing the regno "S004" considering the dependent insertion rule **[2 marks]**

ii). We delete a tuple bearing student registration number "S002" from the student table considering restrict delete rule **[2 marks]**

iii). Inserts a tuple bearing student registration number "S004" in the course table considering referential integrity constraint **[4 marks]**

e) The following narrative represents real world activities for a company that deals with project management. Use it to answer the question that follows.

The company would like to capture data about branches, staff and projects employees work on. A staff belongs to only one branch while a branch can have one or more staff. A staff works can work on zero or a maximum of 2 projects at a given time while a given project can be assigned to 4-10 staffs at a given time

REQUIRED:

Use the **CHEN NOTATION**, represent the above relationships **[5 marks]**

f) The following relations schema represent business activities for an apartment named xyz. Use to answer the questions that follow

Tenants(**tenantID**,name,gender,DOB)

House(**houseID**,type,Location,RentPrice)

Transaction(**TransID**,tenantID,housed,amount,Tdate)

REQUIRED

Write appropriate SQL statements to:

i). Create the a database named 'xyz' **[1 mark]**

ii). Create the above relations **[3 marks]**

iii). Insert a tuple for tenants table **[2 marks]**

iv). Return all tuples from house where the rent price is between 5000.00 and 7000.00 and the apartments are found in CBD **[3 marks]**

Q2. a) Discuss any THREE limitations that were associated with early file based approach as a method of storing data **[6 marks]**

b) ISO standard defines 6 integrity enhancement features that can be defined in SQL language. Discuss 3 of these features and using examples of your own, demonstrate how they can be implemented in MYSQL **[6 marks]**

c) Explain why you would advise an organization against using database approach **[4 marks]**

d) Provided with the relation below, write an SQL statement to update all employees with level 2 and above with a salary increment of 30%. **[4 marks]**

employeeID	Name	Salary	Level
E001	Jones	150,000	4
E002	Phil	15,000	1
E003	Jane	20,000	1
E004	Alicia	50,000	2
E005	Francis	100,000	3

Q3. a) Draw a labeled diagram showing the ANSI-SPARC architecture. Discuss what kind of information each level of the level captures **[8 marks]**

b) Relational data model defines three major integrity constraints that can be implemented in RDBMS. Discuss TWO of these constraints **[4 marks]**

c) Differentiate between DELETE and TRUNCATE clauses as used in SQL **[2 marks]**

d) Discuss THREE types of security threat that can occur in a typical

database environment

[6 marks]

Q4. a) Explain TWO 4GL tools provided in a database environment by DBMS **[4 marks]**

b) Why is database independence such an important concept in database system? Discuss two ways through which the same can be implemented? **[5 marks]**

c) The following case study relates to telcos, an upcoming company that deals with telecommunications services. Read it carefully and use it to answer the questions that follows

Telcos wishes to capture information about subscribers, channels, packages and subscriber subscriptions.

The information to be captured regarding subscribers includes subscriber ID, subscriber name (stored as surname, middle name and other names), email address (more than one) and address stored as (city, street and postal code). The subscriber ID uniquely identifies each subscriber.

Information to be captured about channels includes channel ID, channel name, channel rating and description. The channel ID uniquely identifies all instances of a channel.

Information shall be kept about packages which include package name, short description and subscription amount. The package name uniquely identifies each package. A channel can belong to or more packages while a

given package has 10 or more channels

A subscriber can subscribe to one or more packages at a given time while a given package can have one or more subscribers. Information to be kept about subscription included subscription start date, subscription end date and unique subscription ID

Required:

Draw an ERD using crow feet notation standard. Cardinality and multiplicity constraints should be clearly shown **[11 marks]**

Q5. a) Explain two reasons that would compel you advise an organization to use a database approaches. **[2 marks]**

b) Discuss THREE factors that can be used to classify the DBMS that exists currently in the market **[6 marks]**

c) Discuss THREE basic search conditions that can be implemented in conjunction with WHERE clause. Using your own examples, demonstrate how the same can be implemented by MYSQL DBMS **[6marks]**

d) Differentiate between authentication and authorization as used in database security **[2 marks]**

e) Differentiate between the following types of attributes as used during data modelling phase. Use an example for each

i). Derived and stored attribute **[2 marks]**

ii). Atomic and composite attribute **[2 marks]**

END