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KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY <u>KIT 2105 INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS</u>

Date: 9TH AUGUST 2024 Time: 2:30PM – 4:30PM

<u>INSTRUCTIONS TO CANDIDATES</u> <u>ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS</u> <u>QUESTION ONE (30 MARKS</u>)

a) Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):

- the NHL has many teams,
- each team has a name, a city, a coach, a captain, and a set of players,
- each player belongs to only one team,
- each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
- a team captain is also a player,

b)

c)

- a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 2024) and a score (such as 4 to 2).

Using the above outlined requirement details, answer the following questions;

i)	Identify at least six relations which can be created in designing and developing the	NHL
	database.	(3 Marks)
ii)	Create a relation schema for each of the relation you have identifies.	(6 Marks)
iii)	Create an ER-Diagram showing the logical database schema for NHL database. In	dicate the
	primary key and foreign keys.	(6 Marks)
iv)	Prepare a database dictionary for the above database.	(6 Marks)
State	e and explain five reasons why it is important to use a relational database.	(5 Marks)
Expl	ain the purpose of the following types of joins as used in data manipulation.	
i)	Inner Join	(2 Marks)
ii)	Outer Join	(2 Marks)

QUESTION TWO (20 MARKS)

a) Consider the Student database schema given below.

```
CREATE TABLE Student (
StudentId int PRIMARY KEY,
Stud_Name varchar NOT NULL);
CREATE TABLE Course (
CourseId char(7) PRIMARY KEY,
Cour Name varchar NOT NULL,
NoOfPts int NOT NULL);
CREATE TABLE Enrolled (
StudentId int NOT NULL REFERENCES Student,
CourseId char(7) NOT NULL REFERENCES Course,
Grade char(2),
PRIMARY KEY (StudentId, CourseId));
CREATE TABLE Stud Sport (
StudentId int NOT NULL REFERENCES Student,
Sport Name varchar NOT NULL,
PRIMARY KEY (StudentId, Sport_Name));
```

Write SQL queries for the database above to do the following:

b)

i)	Retrieve names of students that have enrolled for the courses.	(4 Marks)	
ii)	Use LIKE expression, or SIMILAR TO operator to retrieve students whose name	name start with	
	capital letter S.	(4 Marks)	
iii)	Retrieve student id's, student names and grade of students.	(6 Marks)	
Exp	lain the function of each of the clauses in an SQL statement.		
i)	HAVING		
ii)	GROUP BY		

iii) ORDER BY (6 Marks)

QUESTIONS THREE (20 MARKS)

a) An instance of the Student database schema above is given below

cudencia scua_name	
7007 James Bond 1313 Susan Brown 5050 Susan Smith 8989 Megan Black	
Course Table	
courseid cour_nam	ne noofpts
COMP302 Database Systems COMP203 Computer Organizatio COMP206 Program and Data Str COMP442 Issues in Database a	on 15 ructures 22 and Info Systems 15
Enrolled Table	Stud_Sport Table
studentid courseid grade	studentid sport_name
	1313 Netball

- i) Based on the above instance explain in English what the SQL statement below means.
- ii) What will be the output of the SQL statement when executed.

```
q2db=> SELECT s.StudentId, Stud_Name
FROM Student s
WHERE NOT EXISTS
((SELECT e.StudentId
  FROM Enrolled e
  WHERE s.Studentid = e.StudentId)
EXCEPT
(SELECT p.StudentId
  FROM Stud_Sport p
  WHERE Sport_Name = 'Squash' AND
  s.Studentid = p.StudentId));
```

b) State four characteristics of a relational model

(4 Marks)

(6 Marks)

(4 Marks)

c) Giving an example, explain the properties of candidate key in relational database models relational keys. (6 Marks)

QUESTION FOUR (20 MARKS)

- a) A TV company wishes to develop a database to store data about the TV series that the company produces. The data includes information about actors who play in the series, and directors who direct the episodes of the series. Actors and directors are employed by the company. A TV series are divided into episodes. Each episode may be transmitted at several occasions. An actor is hired to participate in a series, but may participate in many series. Each episode of a series is directed by one of the directors, but different episodes may be directed by different directors.
 - i) As a database designer, you are expected to create a database for this TV company. Identify four database tables you can have in this database. (4 Marks)
 - ii) In each table above, show different attributes you can capture and indicate the primary key field in each. (4 Marks)
 - iii) Write SQL queries to create the above tables. (4 Marks)
 - iv) Write SQL query to populate the above table with at least three records of data in each table. (4 Marks)
 - v) Show the relationship among the relations/tables you have create. Clearly indicate the primary and foreign keys. (4 Marks)

QUESTION FIVE (20 MARKS)

- a) State and explain the three types of relationships in relational databases, using at least two pairs of database tables for each to depict the relationship. (6 Marks)
- b) Explain the distinctions among the terms primary key, candidate key, and Composite key.

(6 Marks)

c) Describe the process of creating a database for a particular enterprise in MS SQL Server Management Studio, with full explanation of an enterprise of your choice. (8 Marks)