SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology

First Year, First Semester Examination – 2016

HNDIT 1105 - Database Management System / Introduction to Relational Database Management System

Instructions for Candidates:
Answer any 4 questions.

No. of questions : Five
No of Pages : 5
Time : Two hours

Q1.

a) Define the following [12 Marks]

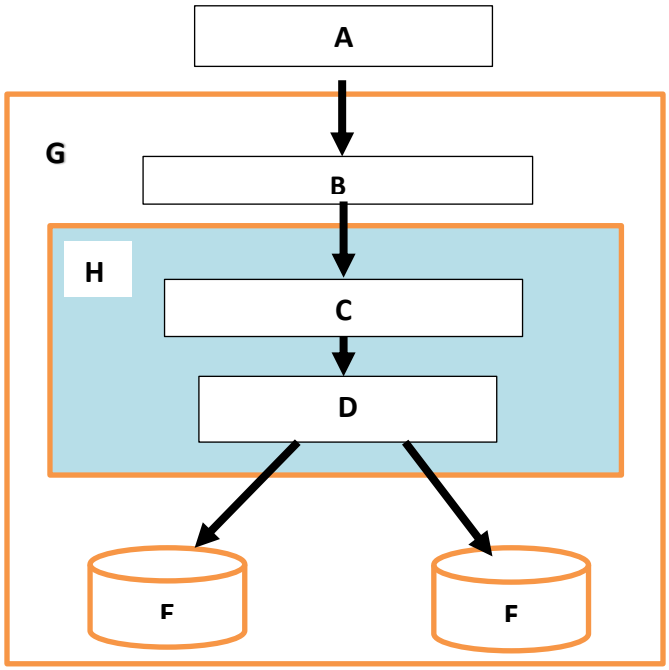
i. Data vs Information
ii. Meta data
iii. Database
iv. DBMS

b) Explain the components of a Data Base System Environment. [05 Marks]

c) Following diagram depicts a "Simplified database system architecture". Select suitable components given in the following list to match with the labels in the diagram. [08 Marks]

Software to Access stored data ***Users/Programs*** ***Meta Data*** ***Stored Database***
Application Programs /Queries ***Database system*** ***DBMS software***
Software to process Queries/Programs

(Total 25 marks)



Q2.

a) Describe three schema architecture with a diagram. (5 marks)

b) What is the difference between logical data independence and physical data independence? (4marks)

c) Briefly explain the following DBMS Languages

   i. Data Manipulation language (DML)

   ii. Data Definition Language (DDL)

   iii. Data Control Language (DCL) (6 marks)

d) What is the benefit of using **Input Masks** in MS Access Database**?** (4 marks)

e) Details of sponsors are stored in the sponsor table. The structure of the Sponsor table is as follows. **Give suitable MS Access data type for each field** (6 marks)

Field name	**Description**	**Data Type**
Sponsor_Ref	Unique number of Sponsor	
Title	Title of sponsor-on of Dr,Mr,Miss,Mrs	
First_Name	First name of the sponsor	
DOB	Date of birth of sponsor	
Address	Address of sponsor	
Amount donated	Amount of money sponsor has donated	

(Total 25 marks)

Q3.

a) What is mean by "Degree of a relationship" and explain three types of it using suitable diagrams. (04 Marks)

b) Consider the following ERD fragment and write the name of following attribute if exist.

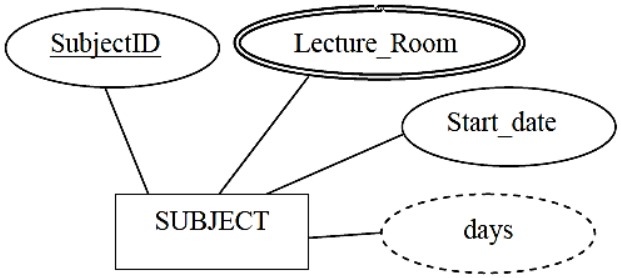
   i. Name key attribute

   ii. Multivalue attribute

   iii. Composite Attribute

   iv. Derived Attribute

   v. Stored Atribute

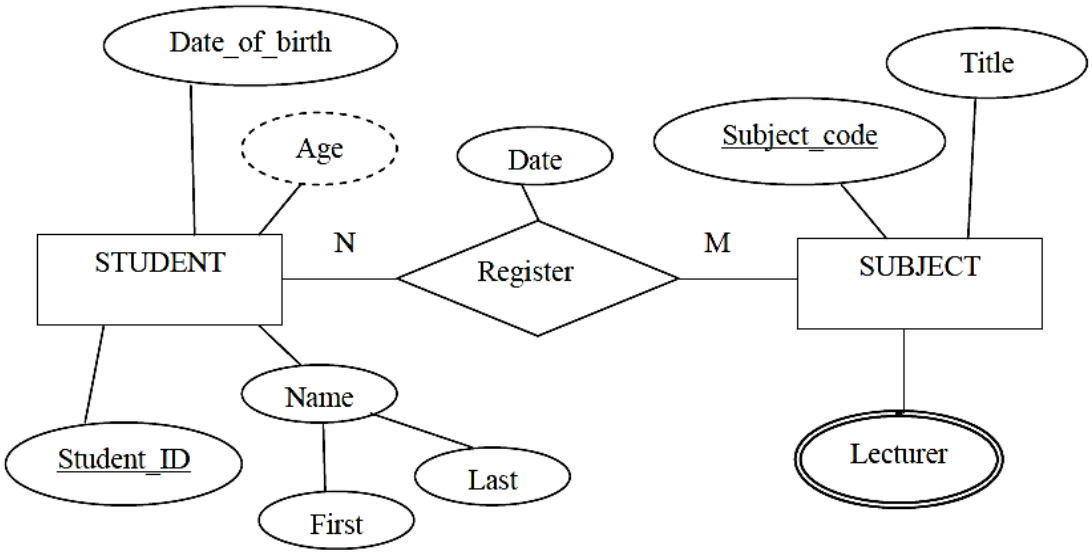


(04 Marks)

c) Draw an entity-relationship diagram for the following system. The system is required to store information about movies for a movie hire business. The users wish to keep track of the following data: (09 Marks)

- Members have a username, password and address – no two members are allowed to have the same username.
- Every movie has a title, year released and category. Movie is identified by MovieID.
- A movie only has one director but a director may have directed more than one movie.
- The director's first and last names as well as address is stored. The Director was identified by DirectorID
- Members can hire more movies and one movie can be hired by many members The date the movie is hired is recorded, as well as the date the movie is due to be returned.

d) Convert the following ERD fragment to corresponding relations. (08 Marks)



(Total 25 marks)

Q4.

a) Consider the following schema:

Student_Info (StudentNo:Integer; Name:varchar(50), Major:char(4); GPA:float)

Write SQL statements to perform the following (3*6 = 18 Marks)

i. Create the above table

ii. Insert the following information:

StudentNo	Name	Major	GPA
100	Sampath	EE	3.5
101	Nishani	CSE	3.4

iii. Update Sampath's GPA to 3.7.

iv. Write the SQL statement to delete student_Info table from the Database

v. Add a column address (i.e. address: varchar(50)) to the *Student* table.

vi. Change the data type of address column into varchar(100).

b) Consider the following schemas: Write SQL statements to perform the following

Emp_Information (**EId**, name, salary, dept, address)

Department (**DeptNo**, dname, building, mgr)

i. Print all employee names. (2 Marks)

ii. Print names of employees working for 'Administration' (i.e. dname) department. (2 Marks)

iii. Print names of employees working for 'Administration' (i.e. dname) department and getting a salary > Rs. 50,000. (3 Marks)

Q5.

a) What is the purpose of the normalization process in database management system? (05 marks)

b) Identify determinant and dependencies of following functional dependencies? (05 marks)

- VIN--→Make, Model, Color
- ISBN--→Title, Author name, Price

c) Briefly explain the following normal forms? (05 marks)

i. 1st Normal form (1NF)

ii. 2nd Normal form (2NF)

iii. 3rd Normal form (3NF)

d) Consider the following un normalized product table. Convert it into 1NF? (05 marks)

TABLE_PRODUCT

Product ID	Color	Price
1	red, green	15.99
2	yellow	23.99
3	green	17.50
4	yellow, blue	9.99
5	red	29.99

e) The following purchase details table is in 1st normal form (1NF) and contains only a single key as the primary key. Normalize the table to 2NF? (05 marks)

TABLE_PURCHASE_DETAIL

Customer ID	Store ID	Purchase Location
1	1	Los Angeles
1	3	San Francisco
2	1	Los Angeles
3	2	New York
4	3	San Francisco

(Total 25 marks)