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 – 2019

HNDIT1105-Database Management Systems

Instructions for Candidates:
Answer any four questions
All questions carry equal marks

No. of questions : 05
No. of pages : 04
Time : 2 hours

Question 1 **[Total 25 marks]**

i. Write four (04) reasons to select Database Management System (DBMS) to manage database in an organization. (04 marks)

ii. List two (02) main characters of the database approach and briefly explain one of them. (04 marks)

iii. What are the responsibilities of Database Administrator and Database Designers? (04 marks)

iv. Explain the components of database system environment. (05 marks)

v. Explain the following terms.
   a. Data & Information
   b. Database
   c. Database Management System
   d. Concurrency control (08 marks)

[Total 25 marks]

Question 2

i. Briefly explain Database Architecture. (04 marks)

ii. What is **data model**? Give two examples for data implementation models. (04 marks)

iii. What is the benefit of using input mask in Ms Access? (04 marks)

iv. Define logical data independence & physical data independence. What is the need of **mapping** between schemas? (05 marks)

v. Describe the three-schema architecture with a suitable diagram. (08 marks)

Question 3 **[Total 25 marks]**

i. Following relation contains the students' information. Identify a suitable data type for each column in MS Access. (03 marks)

STUDENT

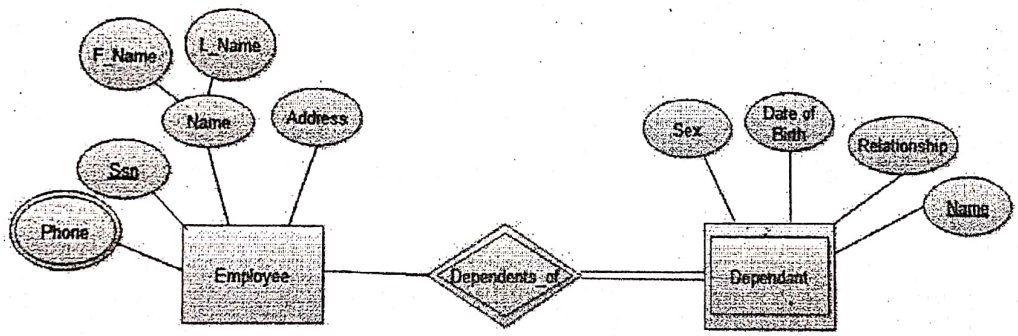
Stu_No	Name	Date_of_birth	Year	GPA	Web
S100	Kamal	03/10/1990	1	3.4	www.rjt.ac.lk
S101	Sarath	10/12/1987	2	3.2	www.rjt.ac.lk

ii. Define the following attribute types with the relevant Entity Relationship (ER) diagram fragment.

a. Composite attribute
b. Derived attribute
c. Descriptive attribute

(06 marks)

iii. Convert the following Entity Relationship Diagram (ERD) fragment to corresponding relations. (06 marks)



iv. The university research symposium committee has decided to use a database to handle the research papers of the annual research symposium.

The data requirements are summarized as follows.

- The authors of the papers are uniquely identified by an email ID. First name, last name, research field and institute are also recorded.
- A paper may have multiple authors. Each paper is assigned a paper ID by the system and is described by a title, keywords of the paper, and the year of the research.
- Each reviewer is uniquely identified by a reviewer's ID. Each reviewer's first name, last name, phone number, affiliation and topics of interest are also recorded.
- Each paper is reviewed by two reviewers. A reviewer mark each paper assigned to him. These marks are stored as a review status along with the paper ID and the reviewer's ID. Finally, each reviewer provides an overall recommendation regarding each paper.

a. Identify all the **entities, attributes** and then draw the ER (Entity Relationship) diagram for the proposed system. (10 marks)

Question 4

[Total 25 marks]

i. Consider the following schema,

Employee (F_name, L_name, SSN, BirthDay, Address, Sex)

Write SQL statements to perform the following tasks.

a. Create the structure of Employee relation. (03 marks)

b. Insert the following information to the Employee relation. (02 marks)

F_name	L_ name	SSN	BirthDay	Address	Sex
John	Smith	1234	1960.10.12	No 206,Huston	M
Ramesh	Nayagran	9878	1980.10.12	No 420,Texsas	M

c. Add a new column for salary (Salary: float) to Employee relation. (02 marks)

d. Update the Salary field of Smith with 35000.00. (02 marks)

e. Change the SSN of Smith into 1256. (02 marks)

f. Count the number of Male Employees in the above relation. (02 marks)

ii. The following schema represents the Customer and BookSales relations from database of ABC bookshop management system.

Customer(Cus_No, Cus_Name, Cus_add)

BookSales(Cus_no,ISBN,SalesDate,Qty)

a. Create the structure of the BookSales relation. (03 marks)

b. List the ISBN and salesDate of all sales. (03 marks)

c. List the cus_no and total quantity of sales of each customer. (03 marks)

d. List names of the customers who bought books on 2019/01/01. (03 marks)

Question 5

[Total 25 marks]

i. List two (02) advantages of database normalization process. (04 marks)

ii. Explain the **functional dependency** and **transitive dependency**. (04 marks)

iii. Consider the following Department relation and convert it into first normal form.

Department

DepNo	DName	DLocation
01	Admin	Colombo, Kandy
02	Sales	Kandy
03	Marketing	Colombo, Kandy

(04 marks)

iv. Name three (03) major anomalies available in relational database management system. Illustrate any two (02) anomalies with relevant examples. (05 marks)

v. The following EMPLOYEE_PROJECT relation is already in first normal form. It contains employee number (Ssn), Project number (Pnumber), working hours (Hours),Employee name (Ename), Project name (Pname) and project location(Plocation). . Consider the functional dependencies and normalize it into second normal form.

EMPLOYEE_PROJECT (Ssn, Pnumbe, Hours, Ename, Pname, Plocation)

(08 marks)