POKHARA UNIVERSITY

Level: Bachelor   Semester: Fall   Year   : 2021
Programme: BE   Full Marks: 100
Course: Database Management System   Pass Marks: 45
                                                Time   : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Define Data Independency. Differentiate between Schema and Instance with the help of an example.   7

   b) Differentiate between Data model and E-R model. Draw an E-R diagram for a Library Management System including primary key, weak entity, composite attribute, derived attribute and multivalued attributes in your ER diagram.   8

2. a) Consider following relations, where the primary keys are underlined. Give an expression in the relational algebra to express each of the following queries: 8

   Doctor(SSN, FirstName, LastName, Specialty, YearsOfExperience, PhoneNum) Patient(SSN, FirstName, LastName, Address, DOB, PrimaryDoctor_SSN) Medicine(TradeName, UnitPrice, GenericFlag)
   Prescription(Id, Date, Doctor_SSN, Patient_SSN)
   Prescription_Medicine(Prescription Id, TradeName, NumOfUnits).

   i. List the trade name of generic medicine with unit price less than $50.

   ii. List the first and last name of patients whose primary doctor named 'John Smith'

   iii. List the first and last name of doctors who are not primary doctors to any patient.

   iv. List the SNN of distinct patients who have 'Aspirin' prescribed to them by doctor named 'John Smith'.

   b) Write SQL statements for following: 7

   i. Create a table named Chef with chef_license as primary key and following attributes:
   chef_license, c_fname, c_lname, c_dob, c_gender, c_experience_hours, c_photograph

   ii. Enter a full detailed information of a chef.

   iii. Change chef's experience hours by any value.

   iv. Remove all chef records whose name contains character 'r' in second position in his first name.

   v. Display the total experience hours of all chef.

   vi. Create a view from above table.

   vii. Display details of chef ordering on descending manner in last name and by first name when last name matches.

3. a) Explain Data Constraints and its types with examples.   8

   b) What is the role of Triggers? Write an SQL trigger to carry out the following action: On **delete** of an account, for each owner of the account, check if the owner has any remaining amount, and if she does not, delete her from the *depositor* relation.   7

4. a) Explain about database normalization and its importance. Explain 1NF, 2NF and 3NF with examples.   8

   b) What is security violation and integrity violations? Explain the need of access control, Authorization and Authentication.   7

5. a) Define query optimization. What are the basic steps of query processing with the help of a diagram   8

   b) How do you evaluate the performance of a magnetic disk? What are the optimization techniques to reduce the disk block access?   7

6. a) What is a transaction? Write about the 'ACID' property of any transaction.   7

   b) What is Crash Recovery? Explain log based recovery and what happens for a log-based recovery.   8

   <T0 Start >
   <T0, A, 1000,950 >
   <T0, B, 2000, 2050 >
   <T0 commit >
   <T1 Start >
   <T1, C, 700, 600 >

7. Write short notes on: (**Any two**)   2×5

   a) RAID

   b) Stored procedure

   c) Distributed Database