POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year : 2017
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 database management system (DBMS). Mention the advantages of DBMS. Explain data independence with its importance. 7
   b) What do you mean by data model? What are the basic data modelling components? Briefly explain different types of data models. 8
2. a) Define relation schema and views. Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course: 8

   STUDENT(SSN, Name, Major, Bdate)
   COURSE(Course#, Cname, Dept)
   ENROLL(SSN, Course#, Quarter, Grade)
   BOOK_ADOPTION(Course#, Quarter, Book_ISBN)
   TEXT(Book_ISBN, Book_Title, Publisher, Author)

   Draw a relational schema diagram specifying the foreign keys for this schema.
   b) Explain several parts of Structured Query Language (SQL). What are the basic domain types? Describe them. 7
3. a) Describe the basic structure of SQL queries. Considering at least two relations, write SQL for illustrating different types of set operations. 7
   b) Design relational database for the Dept. of Computer Engineering (DoCE) at Pokhara University. Your database should have at least three (3) relations. Describe referential integrity constraint based on the above database of DoCE. 8
4. a) Define normalization in database. Mention its significances. With example, explain requirements to satisfy 1NF, 2NF, and 3NF. 8
   b) Briefly explain encryption techniques to secure application data. 7
5. a) With diagram, briefly explain the basic steps of query processing. 7
   b) Define indexing in database. With example, describe the structure of a B^+-tree. 8
6. a) Explain the architecture of remote backup system. Discuss several issues that must be addressed while designing it. 8
   b) Define transaction and explain its ACID properties. Describe the two-phase locking protocol for concurrency control. 7
7. Write short notes on: **(Any two)** 2×5
   a) Data Dictionary
   b) QBE
   c) Functional Dependencies