BACHELOR OF PRINTING ENGINEERING EXAMINATION, 2017

(3ʳᵈ Year-1ˢᵗ Semester Supplementary)

DATABASE MANAGEMENT SYSTEM

Time: Three hours   Full Marks: 100

Group A

Answer any two questions

1.

(a) Consider the following library database (underlined attributes are the primary keys):

Employee(emp-id, emp-name, address)

Works(emp-id, company-name, designation, salary)

Company(company-name, city, state)

Write DDL statements to create above tables.

Write the following queries in relational algebra:

(i) List the names of employees who are "Manager".

(ii) List the companies residing in "Kolkata".

(b) **Write the above queries in SQL.**

(c) **Write SQL queries to retrieve the following information.**

(i)   Make a list of all companies of "West Bengal".

(ii)   List the names of employees who work for a company situated in "Kolkata".

5+5+4+6=20

2.

(a) What is candidate key.

(b) Differentiate between file processing systems and database management systems.

(c) Explain the difference between an *entity* and an *entity set* (give an example).

(d) Explain the differences between *schema* and *instances*.   2+12+3+3=20

3. A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BE, MCA, MSc, etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, teaching staff and the department they come from. A module is co-ordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Each module provides some compulsory courses. Students enroll for each course. The database contains some information about students including their numbers, names, addresses, degrees they read for, and their past performance (i.e. modules taken and examination results).

   a) Draw an E-R diagram for the above scenario.

   b) Design an appropriate relational database schema for it. 12+8=20

Group B
Answer any three questions

4. (a) Write a program/algorithm to implement a stack.

   (b) Write a program/algorithm to implement quick sort algorithm. 10+10=20

5. (a) Define the following: binary search tree, complete binary tree.

   (b) Write a program/algorithm to implement depth-first search.

   (c) Write down the algorithm for breadth-first search. 6+7+7=20

6. a) Write a program/algorithm for checking balancing of parentheses.

   b) Write a program/algorithm to implement a queue. 10+10=20

7. a) Define the following: Cycle, Path, Graph, Degree.

   b) What is POSET? How is it related to directed graphs?

   c) How can graphs be stored in memory? 10+6+5=20

8. a) Write a program/algorithm to store a *list* of students in a single linked list and implement following operations: addition of a new student to the list and displaying the list.

   b) Compare between array and linked list. 12+8=20