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# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular/Supplementary) - July, 2021

Regulation: R18

## DATABASE MANAGEMENT SYSTEMS

Time: 3 Hours

(CSE|IT)

Max Marks: 70

Answer FIVE Questions choosing ONE question from each module  
(NOTE: Provision is given to answer TWO questions from any ONE module)

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

### MODULE – I

1. (a) Explain the component modules of DBMS architecture and their interactions with the neat diagram. [7M]  
(b) Draw the ER diagram for banking systems which include details of home loan applications. [7M]
2. (a) Explain different types of database users and write the functions of DBA. [7M]  
(b) Construct ER-diagram for a hospital with a set of patients and a set of medical doctors. Associated with each patient a log of the various tests and examinations conducted. [7M]

### MODULE – II

3. (a) Explain the various types of relational operations under selection, projection and cartesian operations with suitable examples. [7M]  
(b) Consider the following schema :  
Supplier(sid, sname,address)  
Parts(pid, pname, color)  
Catalouge(sid,pid,cost)  
Write the relational algebraic queries for the following :
  - i) Find the sids of supplier who supply some red or some green parts
  - ii) Find the sids of supplier who supply every red or some green parts
  - iii) Find the pids of parts supplied by at least two different suppliers [7M]
4. (a) Discuss about procedural language in SQL with suitable examples. [7M]  
(b) Illustrate the relations employee (name, salary,deptno) department (deptno, deptname, address)  
Solve which query cannot be expressed using the basic relational algebra operations. [7M]

### MODULE – III

5. (a) Write the DDL, DML, DCL for the students database, which contains
- i) Student details: name, id, DOB, branch, DOJ.
  - ii) Course details : Course name, Course id, Stud.id, Faculty name, id, marks. [7M]
- (b) Assume the following data.
- Degree (degcode, name, subject)
- Candidate (seat no, degcode, name, semester, month, year, result)
- Marks (seat no, degcode, semester, month, year, papcode, marks)
- deg code degree code, name name of the degree (Eg. MSc.), subject-subject of the course (Eg. Physics), papcode paper code (Eg. A1) Solve the following queries using SQL.
- Write a SELECT statement to display:
- i) All the degree codes which are there in the candidate table but not present in degree table in the order of degcode.
  - ii) The name of all the candidates who have got less than 40 marks in exactly 2 subjects.
  - iii) The name, subject and number of candidates for all degrees in which there are less than 5 candidates.
  - iv) The names of all the candidate who have got highest total marks in MSc Maths. [7M]
6. (a) What is Normalization? What are the different types of normalizations? Discuss the 1NF, 2NF and 3NF with example. [7M]
- (b) Using the bank example, write relational-algebra queries to find the accounts held by more than two customers in the following ways: i) Using an aggregate function. ii) Without using any aggregate functions. [7M]

### MODULE – IV

7. (a) Explain the serializable and non serializable schedule. [7M]
- (b) Analyze which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock.
8. (a) Describe validation-based locking protocols in detail. [7M]
- (b) Outline deadlock handling mechanisms. How transactions can be written to avoid deadlock? Give an example of a scenario where two phase locking leads to deadlock. [7M]

### MODULE – V

9. (a) Describe different types of file organization. Explain using a sketch of each of the, with their advantages and disadvantages. [7M]
- (b) Construct B+ tree for following data. 30,31,23,32,22,28,24,29 where number of pointers that fit in one node are 5. [7M]
10. (a) What is query optimization? Outline the steps in query optimization. [7M]
- (b) The following key values are organized in an extendible hashing technique. 1 3 5 8 9 12 17 28. Show the extendible hash structure for this file if the hash function is  $h(x) = x \bmod 8$  and buckets can hold three records. Show how extendable hash structure changes as the result of each of the following steps : Insert 2 Insert 24 Delete 5 Delete 12 [7M]

