Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 30125

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fourth Semester

Computer Science and Engineering

CS 3492 – DATABASE MANAGEMENT SYSTEMS

(Common to: Computer and Communication Engineering/Computer Science and Business Systems/Information Technology)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Define foreign key with an example.

2.   What is data definition language?

3.   What is an derived attribute? Give example.

4.   What is functional dependency? Give example.

5.   Define serializability.

6.   Name the four conditions for deadlock.

7.   Outline the need for indexing.

8.   What is a hash function? Give example.

9.   What is a distributed database management system?

10. Define encryption with an example.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the database management system architecture with a neat sketch. (13)

Or

(b) (i) Outline select and project operations in relational algebra with an example. (5)

(ii) What is embedded SQL? Explain with an example. (8)

12. (a) Elaborate on first normal form, second normal form and third normal form with examples. (13)

Or

(b) Explain Boyce Codd normal form, fourth normal form and fifth normal form with examples. (13)

13. (a) (i) What is a transaction? List and explain ACID properties with an example. (6)

(ii) Outline the two phase locking protocol with an example. (7)

Or

(b) What is recovery? Outline the steps in the Algorithm for Recovery and Isolation Exploiting Semantics (ARIES) algorithm with an example. (13)

14. (a) (i) Outline B tree index and B+ tree index with an example. (6)

(ii) Explain static hashing with an example. (7)

Or

(b) What is query processing? Elaborate about the steps in query processing with a diagram. (13)

15. (a) What is a distributed transaction? Explain distributed query processing with an example. (13)

Or

(b) (i) What is NoSQL? Outline the features of NoSQL databases. (8)

(ii) Discuss role based access control with an example. (5)

2   30125

16. (a) Consider the following relations:

EMPLOYEE

ENO	NAME	DOB	GENDER	DCODE
12345	HAMEN	24-MAR-2001	M	201
12346	VINI	12-MAR-2001	F	202
12347	ANI	11-JAN-1999	F	
12348	PETER	14-FEB-2001	M	

DEPARTMENT

DCODE	DNAME
201	COMPUTER SC
202	INFN SC
203	CIVIL
204	MECHANICAL

The primary key of each relation is underlined. Outline Cartesian product, equi join, left outer join, right outer join and full outer join operations in relational algebra. Illustrate the above relational algebra operations with the EMPLOYEE and DEPARTMENT relations.

Or

(b) A Company is organized into departments. Each department has employees working in it. The attributes of department include department number and department name. The attributes of employee include employee number, employee name, date of birth, gender, date of joining, designation and basic pay. Each department has a manager managing it. There are also supervisors in each department who supervise a set of employees. Each department controls a number of projects. The attributes of project include project code and project name. A project is controlled only by one department. An employee can work in any number of distinct projects on a day. The date an employee worked, in time and out time has to be kept track. The company also keeps track of the dependents of each employee. The attributes of dependent include dependent name, date of birth, gender and relationship with the employee.

(i) Model an Entity Relationship diagram for the above scenario. (7)

(ii) Map the Entity Relationship diagram you have modeled to relations. (8)

_____