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Question Paper Code : 71100

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fifth/Seventh Semester

Aeronautical Engineering

OIT 551 – DATABASE MANAGEMENT SYSTEMS

(Common to: Aerospace Engineering/Agriculture Engineering/Automobile Engineering/Biomedical Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Material Science and Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Production Engineering/Robotics and Automation/Bio Technology/Food Technology/Pharmaceutical Technology)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Physical data independence?

2. Define Super key.

3. What is entity integrity constraints?

4. The relational algebra operators can be composed. Why is the ability to compose operators important?

5. What is dynamic SQL?

6. Define View.

7. What are functional Dependencies?

8. What is multivalued dependency? When does it arise?

9. Define term frequency and inverse document frequency.

10. What are the threats to database?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the components of a Database System architecture. (6)

    (ii) Consider a database used to record the marks that students get in different exams of different course offerings. Construct an E-R diagram that models' exams as entities, and uses a ternary relationship, for the database. (7)

Or

(b) (i) Explain the difference between a weak and a strong entity set. We can convert any weak entity set to a strong entity set by simply adding appropriate attributes. Why, then, do we have weak entity sets? (6)

    (ii) Design an E-R diagram for keeping track of the exploits of your favourite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. Summary statistics should be modelled as derived attributes. (7)

12. (a) What is the basic structure of SQL queries? Explain each with example.

Or

(b) (i) What are the aggregate operators? Explain with example. (6)

    (ii) Consider the following schema:

        Suppliers (sid:integer, sname:string, address:string)

        Parts (pid:integer, pname:string, color:string)

        Catalog(sid:integer : pid:integer,cost:real)

        The CatLog relation lists the prices charged for parts by Suppliers. Write the following queries in SQL: (1+2+2+2)

        (1) Find the pnames of parts for which there is some supplier.

        (2) Find the snames of suppliers who supply every part.

        (3) Find the sids of suppliers who supply only red parts.

        (4) Find the sids of suppliers who supply a red part and a green part

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13. (a) (i) What is functions and procedure? Explain with examples. (6)

    (ii) Write a function using JDBC metadata features that prints a list of all relations in the database, displaying for each relation the names and types of its attributes. (7)

    Or

    (b) (i) Define trigger. State and explain the need of trigger with example. (6)

    (ii) Given a relation S(student. subject, marks), write a query to find the top n students by total marks, by using ranking. (7)

14. (a) (i) What is the problem caused by redundancy? Explain with example. (6)

    (ii) Consider a relation R with five attributes ABCDE. You are given the following dependencies: $A \to B$, $BC \to E$ and $ED \to A$. (3+2+2)

        (1) List all keys for R.

        (2) Is R in 3NF?

        (3) Is R in BCNF?

    Or

    (b) What is the normalization process? Explain the different normal form with example

15. (a) State and explain the discretionary access control based on granting and revoking privileges.

    Or

    (b) What is the important model of IR? State and explain each model.

16. (a) The following relations keep track of airline flight information (3+4+4+4)

Flights(flno: integer, from: string, to: string, distance: integer,

departs: time, arrives: time, price: real)

Aircraft(aid: integer, aname: string, cruisingrange: integer)

Certified(eid: integer, aid: integer)

Employees(eid: integer, ename: string, salary: integer)

(i) Find the names of aircraft such that all pilots certified to operate them have salaries more than $80,000,

(ii) For each pilot who is certified for more than three aircraft, find the eid and the maximum cruisingrange of the aircraft for which she or he is certified.

(iii) Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.

(iv) For all aircraft with cruisingrange over 1000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.

Or

(b) (i) Design a relational database for a university registrar's office. The office maintains data about each class, including the instructor, the number of students enrolled, and the time and place of the class meetings. For each student–class pair, a grade is recorded. (8)

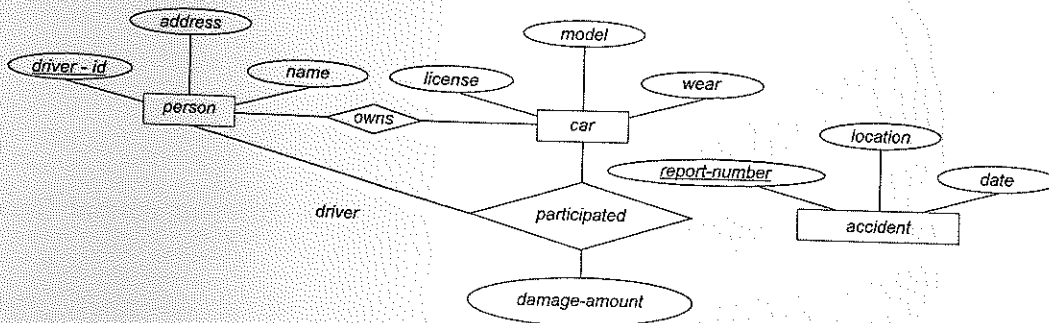(ii) Design a relational database corresponding to the E-R diagram given in figure 1. (7)

Figure 1.

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