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**Question Paper Code : 20013**

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

Third Semester

Artificial Intelligence and Data Science

AD 3391 – DATABASE DESIGN AND MANAGEMENT

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the disadvantages of file processing systems?
2. List the applications of DBMS.
3. What are the categories of SQL command?
4. What is a candidate key and primary key?
5. List the desirable properties of decomposition.
6. What is meant by normalization of data?
7. What are the ACID properties?
8. What are the different modes of lock?
9. What are the advantages of NoSQL?
10. Write the advantages of object oriented model.

PART B — (5 × 13 = 65 marks)

11. (a) (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, the time and place of the class meetings. For each student-class pair, a grade is recorded. (6)
- (ii) Draw an ER-diagram for the above specified relational database for a university registrar's office. (7)

Or

- (b) (i) Explain the 3 schema architecture of DBMS. Why do we need mappings between different schema level? (6)
- (ii) Explain the architecture of DBMS. (7)
12. (a) List and explain various DDL, DML and DCL commands in detail with examples. (13)
- Or
- (b) Explain in brief about Subqueries and Correlated queries. (13)
13. (a) Explain various normal forms in database management systems which are required for fulfilling normalization requirements of an organization. (13)
- Or
- (b) Explain in detail, the Closure of set of functional dependency and Closure of Attribute sets. (13)
14. (a) Explain in detail two-phase locking and how does it guarantee serializability. (13)
- Or
- (b) Discuss the concurrency control mechanism in detail using suitable example. (13)
15. (a) Explain mapping an EER Schema to an ODB Schema in detail. (13)
- Or
- (b) Explain MongoDB-Data Modelling in detail with a real time example. (13)

PART C — (1 × 15 = 15 marks)

16. (a) 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)
- Write appropriate SQL commands to solve the following queries :
- (i) Find the names of suppliers who supply some red part.
- (ii) Find the sids of suppliers who supply some red or green part.
- (iii) Find the sids of suppliers who supply some red part or are at 221 Packer Street.
- (iv) Find the sids of suppliers who supply some red part and some green part.
- (v) Find the sids of suppliers who supply every part.

Or

- (b) Consider the following Schema :
- Flights (flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time)
- Aircraft (aid: integer, aname: string, cruisingrange: integer)
- Certified (eid: integer, aid: integer)
- Employees (eid: integer, ename: string, salary: integer)
- Write appropriate SQL commands to solve the following queries :
- (i) Find the eids of pilots certified for some Boeing aircraft.
- (ii) Find the names of pilots certified for some Boeing aircraft.
- (iii) Find the aids of all aircraft that can be used on non-stop flights from Bonn to Madras.
- (iv) Identify the flights that can be piloted by every pilot whose salary is more than \$100,000.
- (v) Find the names of pilots who can operate planes with a range greater than 3,000 miles but are not certified on any Boeing aircraft.