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Question Paper Code: R4H06

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

CSE (CYBER SECURITY)

R21USY406- DATABASE MANAGEMENT SYSTEM AND SECURITY

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Construct an SQL query to retrieve employee details that joined before 2020 and have a salary greater than Rs.50, 000. CO2-App
2. Propose a data fragmentation strategy for a multinational company's distributed database. CO2-App
3. Give the key differences between committed and rolled-back transactions with examples. CO1- U
4. A company stores employee data with repeated department names. Which normalization step should be applied to remove redundancy? CO2-App
5. Define a transaction in the context of database management systems. CO1- U
6. List any two transaction isolation levels and briefly describe them. CO1- U
7. How does user input contribute to SQL Injection vulnerabilities? CO1- U
8. How can web application firewalls (WAF) help mitigate SQL injection attacks? CO1- U
9. A company has different roles: Manager, Developer, and HR. How would you implement RBAC to ensure only HR can access employee records? CO2-App
10. How can an attacker infer sensitive information in a database even if direct access is restricted? CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) Create an ER diagram for a university database, including entities like students, courses, and instructors. Map the ER model to a relational schema. CO2- App (16)

Or

- (b) Create a relational database using a database management system (DBMS) like MySQL or Oracle. Define the database schema, create tables, and insert sample data. CO2- App (16)
12. (a) Create a relational database schema for a hospital management system. Include entities such as patients, doctors, and appointments, and define their relationships. CO2- App (16)

Or

- (b) Normalize a given relational database schema to remove data redundancy and improve integrity. Explain the steps with examples. Given schema: The unnormalized table for employee details in a company database. This table has several issues, such as data redundancy, inconsistent data, and difficulties in updating records. CO2- App (16)

EID	Name	Dept	Manager	Projects	Skills
1	Alice	IT	Bob	Project A, Project B	Python, SQL
2	Cherry	HR	Darwin	Project C	Communication
3	Eve	IT	Bob	Project A, Project D	Java, Python

13. (a) Create a log-based recovery system to handle transaction failures in a distributed database. Explain the role of checkpoints. CO2- App (16)
- Or
- (b) Suggest how Recovery Strategies will be used in Large-Scale Distributed Databases with examples CO2- App (16)
14. (a) Explain the Need for Database Security with suitable examples CO1- U (16)
- Or
- (b) Explain the Impact of SQL Injection Attacks in an Organization in detail. CO1- U (16)
15. (a) Describe SQL-Based Access Control Mechanisms in detail. CO1- U (16)
- Or
- (b) Illustrate real-world data breaches caused by excessive privileges CO1- U (16)