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**Question Paper Code: U4C01**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Fourth Semester

Computer Science and Business Systems

21UCB401– DATABASE MANAGEMENT SYSTEM

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State the functions of Database Administrator (DBA). CO1-U
2. Mention the three levels of views used in DBMS. CO1-U
3. Define the terms i) DDL ii) DML CO1-U
4. Write the Armstrong's axioms. CO1-U
5. Define Normalization. CO1-U
6. "BCNF is found to be stricter than third normal form". Justify the statement. CO1-U
7. Define Deadlock. CO1-U
8. What is meant by log based recovery? CO1-U
9. Explain B+ tree index structure? CO1-U
10. What is indexing and what are the different kinds of indexing? CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Explain in detail about the database architecture with suitable diagram. CO1-U (16)  
Or  
(b) (i) Discuss about different types of Data models? CO1-U (16)  
(ii) Explain the disadvantages of using file processing systems.
12. (a) With relevant examples discuss the various fundamental operations in Relational Algebra. CO1-U (16)  
Or  
(b) Explain about DDL, DML commands in SQL with examples. CO1-U (16)

13. (a) Consider a relation  $R(A,B)$ .  $R$  is in first normal form. Justify  $R$  is in second normal form, third normal form and BCNF. CO2-App (16)
- Or
- (b) Solve the statement by using Relation  $R = (A, B, C, D)$  with Functional dependency  $F = \{C \rightarrow D, C \rightarrow A, B \rightarrow C\}$ . CO2-App (16)
- i. Identify all candidate keys for  $R$ .
  - ii. Identify the best normal form that  $R$  satisfies.
  - iii. Decompose  $R$  into a set of BCNF relations.
  - iv. Decompose  $R$  into a set of 3NF relations.
14. (a) Describe the concept of serializability with suitable examples. CO1-U (16)
- Or
- (b) What are different types of schedules are acceptable for recoverability. CO1-U (16)
15. (a) Consider any table from the database. Imagine if the records are arranged in sequential order in memory. Analyze the performance of the following two indexing mechanisms. Give a valid conclusion based on your analysis. CO3-Ana (16)
- i. Primary index
  - ii. B tree index
- Or
- (b) Let relations  $r1(A, B,C)$  and  $r2(C, D, E)$  have the following properties:  $r1$  has 20,000 tuples,  $r2$  has 45,000 tuples, 25 tuples of  $r1$  fit on one block, and 30 tuples of  $r2$  fit on one block. Estimate the number of block transfers and seeks required, using each of the following join strategies for  $r1 * r2$ : CO3-Ana (16)
- i. Nested-loop join.
  - ii. Block nested-loop join.
  - iii. Merge join.
  - iv. Hash join.