

29/5/24

DOON UNIVERSITY, DEHRADUN  
END Semester Examination, 2024 Semester, 2024  
Academic Year 2023-24 (Even Semester)

School of Technology Department Name: Computer Science  
Programme Name: B.Sc(Computer Science) SEM IV  
Course Code with Title: CSC251, Database System

Time Allowed 2:00 Hours Maximum Marks: 30

SECTION: A

Note: (Each question carry 2 marks).

1. What is the difference between nested query and correlated query? Explain with an example.
2. Explain ACID property in detail.
3. What is 4<sup>th</sup> normal explain with example.
4. Given a relation R( X, Y, Z, W, P) and functional dependency set  $FD = \{ X \rightarrow Y, Y \rightarrow Z, Z \rightarrow W, W \rightarrow P, X \rightarrow Z, X \rightarrow W, X \rightarrow P \}$ , determine whether the given R is in 3NF? If not convert it into 3NF.

SECTION: B

Note: (Each question carry 4 marks).

1. What is Concurrent execution? Which type of problem occur in concurrent execution? 2. Explain 2 phase locking protocol and strict 2 phase locking protocol in detail? 3. Suppose there is an ordered file of 30,000 records stored on a disk with blocks are of size 1024 bytes and records are fixed length and unspanned of length 100 bytes, of which key field is 9 bytes, and both block and record pointers are of size 6 bytes. Suppose if we construct a primary index on the key field of the file then find the average number of blocks to access to access the record\_\_\_\_\_.
4. Given the following input (42, 16, 51, 33, 18, 37, 46, 62) and the hash function  $H(K) = K \text{ mod } 10$ , another hash function is  $H'(K) = (H(K) + I^2) \text{ Mod } 10$ . Insert keys using quadratic probing?

SECTION: C

Note: (Each question carry 5 marks).

1. What is 5<sup>th</sup> normal form? Explain in detail.
2. What is B Tree and B+Tree? Explain in detail. Create a B Tree with nodes {10, 20, 30, 40, 50, 60, 70, 80, 90, 100}