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National Institute of Technology, Hamirpur (H.P.)

End-Semester Theory Examination – November-2022

Title of the Course: <Data Base Management Systems >

Class: BTech (Mathematics and Computing)

Course Code: MA-313

Duration: 03:00 Hours

Semester: 5

Max. Marks: 50

**Instructions:**

- All Questions are compulsory.
- Marks are given against each question.

1. Briefly explain the following terms: Database and DBMS (02 Marks)
2. Draw an ER Diagram for University Database by considering at least 5 entities. Also specify the relationships among entities. (04 Marks)
3. Write SQL syntax for the following with example: (06 Marks)  
(i) SELECT (ii) ALTER (iii) UPDATE
4. Define the following terms: super key, candidate key, primary key, and foreign key. (04 Marks)
5. Explain 1NF, 2NF, and 3NF with suitable Examples. (06 Marks)
6. Given below are two sets of FD's for a relation R(A,B,C,D,E). Are they equivalent?  
 $F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$  and  $G = \{A \rightarrow CD, E \rightarrow AH\}$ . (04 Marks)
7. Write the algorithm to find the minimal cover for a sets of FD's and consider  $R = \{A, B, C, D, E, F\}$ , FD's are  $\{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$ . Find the irreducible cover for this set of FD's (minimal cover). (04 Marks)
8. Consider the relation schema R(A,B,C,D,E,F) and the functional dependencies are  $A \rightarrow B, C \rightarrow DF, AC \rightarrow E, D \rightarrow F$ . What is the primary key of this relation R? What is its highest normal form? Preserving the dependency, decompose R into third normal form. (05 Marks)
9. What is transaction? Explain ACID Properties and two phase locking protocol. (07 Marks)
10. Discuss how multi-level indexes are constructed using B trees and B+ trees? Explain. (08 Marks)

\*\*\*\*\*ALL THE BEST\*\*\*\*\*