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

End-Semester Theory Examination – November-2022
Title of the Course: <Database Management System >
Class: M.Sc. (Mathematics and Computing)

Course Code: MA-731   **Semester: 3**
Duration: 03:00 Hours   **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 INF, 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->C, AC->D, E->AD, E->H} and G={A->CD, E->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->C, AC->D, E->AD, E->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->B, C->DF, AC->E, D->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*********