

DBMS – ASSIGNMENT 1

M.Tech. (CS), First Year, 2025–2026

Deadline: January 15, 2026

Total: 5 marks

SUBMISSION INSTRUCTIONS

1. Submit all the solutions in a single file.
2. Naming convention for your submission file (assuming CS25xx is your roll number): CS25xx-assign1 (.rtf, .docx, .doc, .pdf, .tex, etc.).
3. To submit a solution file (say CS25xx-assign1.pdf), ensure that it is not password protected and mail to <assignisik@gmail.com> with the subject line as follows: DBMS M.Tech. (CS) 2025-27 CS25xx Assignment 1.

NOTE: All the solutions must be self-sufficient and to the point.

Q1. For connecting and moving data across databases, PyMySQL can be used in python. The PyMySQL is a Python implementation of the MySQL client protocol. It is used as a drop-in replacement for MySQLdb. Install it and show its usage on any arbitrary scenario of running a MySQL query.

Installation command: `pip install pymysql`

Q2. Suppose there exists a pair of relations $R_1(X, Y, Z)$ and $R_2(X, Y, Z)$ having $t_1 > 0$ and $t_2 > 0$ tuples, respectively. Consider that X , Y and Z take integer values only. Without making any further assumptions, find out the minimum and maximum possible number of tuples that may appear in the resulting relations provided by the following operations.

- (i) $(R_1 \cup R_2) - ((R_1 - R_2) \cup (R_2 - R_1))$
- (ii) $R_1 - (\pi_{X,Y}(R_2) \times (R_1 \div \pi_{X,Y}(R_2)))$
- (iii) $R_1 \bowtie (R_1 - R_2)$
- (iv) $(R_1 \ltimes R_2) - (R_1 \rhd R_2)$