# DBMS – ASSIGNMENT 1

M.Tech. (CS), First Year, 2019–2020

**Deadline**: February 28, 2020

Total: 10 marks

**SUBMISSION INSTRUCTIONS**

1. Submit all the solutions in a single file.
2. Naming convention for your submission file (assuming CS19xx is your roll number): `CS19xx-assign1` (.rtf, .docx, .doc, .pdf, .tex, etc.).
3. To submit a solution file (say `CS19xx-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) 2019-21 CS19xx Assignment 1`.

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

Q1. Justify mathematically whether a union operation is valid on a pair of relations having the same set of attributes but in arbitrary order.

Q2. Which the following relational algebra expressions are always invalid for any arbitrary pair of relations $R1$ and $R2$. Justify your answers.

(i) $R1 \div (R1 - R2)$

(ii) $R1 \bowtie_\theta R1$

**Note:** Consider the division operator (in subproblem (i)) to be the Codd's original division operator.

Q3. Given a pair of relations $R1$ and $R2$, on which the set difference is applied as $R1 - R2$, prove that the operation is monotonic with respect to $R1$ but not $R2$.

Q4. Verify whether the set of relational algebra operations $\{\sigma, \pi, \cup, \cap, \times\}$ is complete or not.

Q5. How can you show the following things in an E-R diagram?

(i) A composite attribute.

(ii) A unary relationship.