

SCHOOL OF APPLIED SCIENCE & HUMANITIES

DEPARTMENT OF MATHEMATICS

Subject: Foundations of Engineering Mathematics

Subject Code: 25MT101

Sem. : Pre-Semester

Academic Year: 2025-2026

Section: 31

Regulation: R25

**Assignment 1**

**20 Marks**

---

1. Answer the following questions with explanations.
  - a. If a set  $A$  has  $n$  elements, then what is the cardinality of the power set of  $A$ ?
  - b. If the sets  $A$  and  $B$  have 6 and 9 elements respectively, such that  $A$  is proper subset of  $B$ , then what is the total number of elements in  $A \cap B$ ?
  - c. Is the power set of an empty set is an empty set?
  - d. Does all equivalent sets are equal sets?
  
2. Illustrate DeMorgan's laws using Venn diagrams.
  
  
3. Suppose 50 science students are polled to see whether or not they have studied French (F) or German (G) yielding the following data: 25 studied French, 20 studied German, 5 studied both.  
  
Find the number of the students who: (a) studied only French, (b) did not study German, (c) studied French or German, (d) studied neither language.
  
  
4. If  $n(U) = 200$ ,  $n(A) = 120$ ,  $n(B) = 80$ , and  $n(A \cap B) = 50$ , Find: (a)  $n(A \cup B)$  (b)  $n(A' \cap B')$ .