

Fourth Semester Internal Examination, February 2026  
Major Course in Mathematics  
Real Analysis I  
MAT4CJ203

Time: 1 Hr

Max Marks: 35

Name:  Class:	Marks Scored	Section A		Total Marks
		Section B		
		Section C		

**Section A**

(Each question carries 3 marks, Max marks for section - 7)

1. Let  $S = \{1 - \frac{(-1)^n}{n} : n \in \mathbb{N}\}$ . Find  $\inf S$  and  $\sup S$ .
2. Determine the set  $A$  of all real numbers  $x$  such that  $2x + 3 \leq 6$
3. A bounded sequence is always convergent. Prove or disprove.

**Section B**

(Each question carries 6 marks, Max marks for section - 18)

4. If  $a, b \in \mathbb{R}$ , then prove that,  $||a| - |b|| \leq |a - b|$ .
5. State and prove Archimedean property of  $\mathbb{R}$ .
6. If  $0 < b < 1$ , then prove that  $\lim(b^n) = 0$ .
7.  $X = (x_n)$  and  $Y = (y_n)$  be sequences of real numbers converge to  $x$  and  $y$  respectively, then prove that  $X.Y$  converge to  $x.y$ .

**Section C**

(Answer any one question, Each question carries 10 marks)

8. State and prove nested interval property.
9. State and prove Monotone convergence theorem.