Mathematics 3A03 — Real Analysis I

TERM TEST — 27 February 2025

Duration: 90 minutes

- Print your name and student number clearly in the space below, with one character in each box.

First name (please write as legibly as possible within the boxes)

Last name

Student ID number

- Write your signature here: _____.

Notes:

- No calculators, notes, scrap paper, or aids of any kind are permitted.
- This test consists of **10 pages** (*i.e.,* **5 double-sided pages**). There are **6 questions** in total. Bring any discrepancy to the attention of your instructor or invigilator.
- All questions are to be answered on this test paper. There is a blank page after questions 2, 4 and 5, and an additional blank page at the end.
- Always write clearly. An answer that cannot be deciphered cannot be marked.
- The marking scheme is indicated in the margin. The maximum total mark is 50.

GOOD LUCK and ENJOY!

MARKS

[6] **QUESTION 1.** (*Circle the correct answer.*) Determine whether each of the following statements is **TRUE** or **FALSE**. *Do not justify your answers.*

(a)

TRUE **FALSE**

(b)

TRUE **FALSE**

(c)

TRUE **FALSE**

(d)

TRUE **FALSE**

(e)

TRUE **FALSE**

(f)

TRUE **FALSE**

[9] **QUESTION 2.** For each of the sets E in the table below, answer **YES** or **NO** in each column to indicate whether or not E is open, . *Do not justify your answers.*

Set E	**Open?**		

[6] **QUESTION 3.** For each of the sets E in the table below, fill in the associated point or set in each column, *i.e.,* for each set E state the closure ($\overline{E}$), .
Do not justify your answers.

E	$\overline{E}$		

[9] **QUESTION 4.**

[2] (a) State

[2] (b) State

[5] (c) Suppose $a < b$ and Prove that

This page has been left blank to provide additional space if needed for your solution of question 4.

. . . Continued. . .

[10] **QUESTION 5.**

Suppose

Prove that

Show, moreover, that

This page has been left blank to provide additional space if needed for your solution of question 5.

. . . Continued. . .

[10] **QUESTION 6.**

[2] (a) State the First

[2] (b) State the Second

[6] (c) Suppose . Prove that

(∗)

This page has been left blank intentionally to provide extra space if needed.

This page has been left blank intentionally to provide extra space if needed.

THE END