

Final Exam
TCOMP: COMPUTER APPLICATION
Spring 2026

Points of attention:

- For each question, the maximum earned points are specified in the question.
- Write clearly! Answers that are not readable are not marked and don't earn marks!
- All answers should be written in English using **blue or black pens** only.
- Use the pencil only for diagrams and graphs.
- Show all the calculation steps in the given space.
- When finished, submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Any cheating/copying may result in an instant failing of the examination.

Exam Duration: 2 hours
Instructor's Name: Amer Alhabsi
Exam Date: 17/05/2026
Program: PE

	40
	10

Student Information

Name: ID:
Signature:

Invigilator

Initials: ☐ Student ID checked
Time received:

Question 1**[10 marks]**

Create a document using word processing software. Use **stylesheet for the title and all headings**. For *each section* add dummy text using the function **=lorem(3)**. The document must include:

- (a) The title is Process Control. Font for title is Arial, size 30, color dark green, left aligned.
- (b) Main sections: Introduction, Procedure, Results and Summary. In introduction there are two sub-sections: Background and Review. The style for the sections is (font: Impact, color: green, size 20, left-aligned.) For the subsection (font: Arial, size: 18, color: red)
- (c) Add the following equation in the Introduction

$$\int_{-\infty}^{\infty} \frac{1}{x^2 + 1} dx = k\pi$$

- (d) Add a header on all pages with 3 sections. The left section (left aligned) has the text TCOMP. The middle section has your name (centrally aligned) and the right section has the page number (right aligned). There must be a line below the text similar to the heading on this page.
- (e) Add two in-text citations in the Introduction and a bibliography at the end. Add the following references:
 - a. A book titled Process Engineering, author: Ali Salem, year of publication 2019, publisher: Amazon
 - b. A website title: Laplace Transform, author: Zoe Doe, site nu.edu.om, accessed today.
- (f) Add a table of contents after the title but before Introduction. Update the table.

Question 2**[10 marks]**

Download the exam spreadsheet on Blackboard/Moodle under the heading Final Exam. The sheet has multiple tabs. Complete *all* the work provided in the instructions on each tab. Save the file and upload it to Blackboard.

- (a) Put your information on the tab: Student information.
- (b) On tab 2: basic functions, find the required data using Excel functions, and draw two plots as indicated on the sheet.
- (c) On the tab: pivot table, insert two pivot tables as per the instructions on the sheet.

Question 3**[10 marks]**

For an ideal gas, the pressure (P), temperature (T) and volume (V) are related by

$$V = \frac{nRT}{P}$$

where n is the number of moles, and R is constant equal to 0.08026.

- (a) Write a **function** in Python that calculates V given the other parameters.
- (b) Test your function by calling it with the values: $n=2.8$, $P=1.75$ and $T=300$.
- (c) Write another program that calls the function above. The program calculates V for $n=2.0$, $P=1.1$ and for values of $T=300, 305, 310, \dots, 340$. For each value of T , display the temperature and the corresponding V .

Question 4**[10 marks]**

Let $f(x) = \frac{14}{1+e^{-2x}}$ be a crude approximation of the pH change in a titration process. Using Python, plot the function for $-6 \leq x \leq 6$. Include a grid and a title. *The plot must be smooth*. Show suitable labels on both axes. Add `plt.figure(figsize=(12, 8))` at the top of your program just after the import.

MLO and Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
1	1, 2	Apply	10	
2	1, 2, 3	Apply	10	
3	3, 4	Create	10	
4	4	Create, Analyze	10	

No questions beyond this point.

The following are commonly used statements you may or may not find useful in your exam.

```
import math
import numpy as np
import matplotlib.pyplot as plt
```

Common Numpy functions:

```
np.sin()
np.cos()
np.tan()
np.sqrt()
np.log()
np.log10()
np.exp()
np.pi
np.linspace()
```

Common Matplotlib.pyplot functions

```
plt.plot()
plt.grid()
plt.savefig()
plt.title
plt.xlabel()
plt.ylabel()
```

Common Math functions:

```
math.sin()
math.cos()
math.tan()
math.sqrt()
math.log()
math.log10()
math.exp()
math.pi
```