ACADEMIC YEAR 2023 - 2024

Program	Year	Semester	Paper
PE	**1**	**2**	**MAIN**

MODULE NAME:	**COMPUTER APPLICATIONS**		
MODULE CODE:	**TCOMP**	EXAM DATE:	
INSTRUCTOR's NAME:	**Amer Alhabsi**	DURATION:	**2.5 hrs.**

Questions to be answered on:	Allowed tools:	Number of pages
✔ Space provided on the question paper. The practical questions to be uploaded to Moodle.	Pen, Pencil & Lab PC (**no personal laptops**)	(Incl. cover page): 5

Points of attention:

- For each question, the maximum earned points are mentioned between brackets at the end of each question.
- Write very clearly! Answers that are not readable are not marked and don't get points!
- Make sure your answers are written to the point.
- All answers should be written **in English.**
- Write all the answers in **blue or black pen only.**
- Use the **pencil** only for **diagrams & 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.

FINAL MARKS

STUDENT NAME:

STUDENT ID:

	40
	10

Number of answer scripts:……...…………..

Student's signature: …………………………

Invigilator:…………….…………….……

Time of receipt:………………………..…

For all questions requiring Python programming, use Jupyter Notebook. **Use ONE notebook for all questions**. Separate the questions with a heading that shows the question number.

Q1:   [10 marks]

The pressure, P, of a gas, and its volume, V, are related by

$$PV^{1.2} = 2000 \log\left(\frac{1003}{101}\right)$$

(a)   (2 marks) Write P as a function of V.   ....

(b)   (5 marks) Write a Python function that accepts one input for representing the volume, V. The function calculates and returns the pressure.

(c)   (3 marks) Test the function by calling it with V=25, 30, 35 and 40. Print the result.

Q2:   [10 marks]

Create a new MS Word document. Apply the following.
(a) (1 mark) Create a title: Acid-Base Titration.
(b) (2 marks) Create a document structure consisting of:
   Introduction (heading 1)
   History (heading 2)
   Background (heading 2)
   Procedure (heading 1)
   Experiments (heading 2)
   Results (heading 1)
   Discussion of Results (heading 1)
   Conclusion (heading 1)
(c) (2 marks) Apply the following styles:
   a.   Title: Font Arial, font size: 36, left aligned, font color: dark blue.
   b.   Heading 1: Font Arial, font size: 18, left aligned, font color: dark green.
   c.   Font Calibri, font size: 14, bold, left aligned, font color: red.
(d) (1 mark) Add dummy text in each section. Use the function =lorem(10) followed by pressing enter. Create 10-20 paragraphs for each section.
(e) (2 marks)Add a table of contents at the top of the page.
(f) (2 marks)Insert the equation below after first paragraph in Introduction.

$$\frac{dy}{dx} = 7x^3 + \sin(2\theta) + \sqrt{x + \pi}$$

Q3: [10 marks]

Let *x* represents time in seconds and *f(x)* represents the volume of a spring displacement in (cm). Write a Python program to plot

$f(x) = \cos(10x) \exp(-0.3x)$ in the range $0 \le x \le 4\pi$. Display in the plot **all necessary labels**. Show a grid. Add your name as the title. *Ensure the plot looks <u>smooth</u>*.

Q4: [10 marks]

Analyze the following program. Trace it and show what the program will output when executed. **Trace with a paper and pen. DO NOT use a computer for this part**.

```python
def test(a, b):
    if a%2 == 0:
        z = 4*a + b
    else:
        z = b**2 + a
    return z

x = 3
y = 2
print("welcome")
f = test(x, y)
print("f = ", f)

y = 1
f = test(x+3, y)
print("f = ", f)
```

No questions beyond this point.

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

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

Common Numpy functions: **Common Matplotlib.pyplot functions**
```
np.sin()               plt.plot()
np.cos()               plt.linspace()
np.tan()               plt.grid()
np.sqrt()              plt.saveplot()
np.log()               plt.title
np.log10()             plt.xlabel()
np.exp()               plt.ylabel()
np.pi
```

Common Math functions:
```
math.sin()
math.cos()
math.tan()
math.sqrt()
math.log()
math.log10()
math.exp()
math.pi
```

MLO & Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
1	**3, 4**	Creating	**10**	
2	**1, 2, 5**	Applying	**10**	
3	**4, 5**	Applying, Analysing	**10**	
4	**4**	Analysing	**10**	