ACADEMIC YEAR 2022 - 2023

Program	Year	Semester	Paper
PE	**2023**	**2**	**MAIN**

MODULE NAME:	

MODULE CODE:	**TCOMP**	**EXAM DATE:**	
INSTRUCTOR's NAME:	**Alhabsi and Vasudevan**	**DURATION:**	**2.5 hrs.**

Questions to be answered on:	Allowed tools:	Number of pages
✓ Space provided on the question paper	Pen, Pencil & Calculator	(Incl. cover page): **7**

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:	**40**
STUDENT ID:	**10**

Number of answer scripts:…….…….……. **Invigilator:**…………….……………..….

Student's signature: …….………….……… **Time of receipt:**……………………..….

Q1:
  (a) Write a **function** in Python that takes one input, **n**, and it prints the number, its cube and sin(n). If, for example, the number is 3, then the function prints

```
3    27    0.141120
```

  (b) Write a program that calls the function with inputs 2, 3, 4, 5, …, 66

Q2: Let x represents time in seconds and $f(x)$ represents the volume of a liquid in (L). Write a Python program to plot $f(x) = \cos(x)\sin(10x)$ in the range $-3 \le x \le 4$. Display in the plot all necessary labels.

Q3: Analyze the following program. Trace it and show what the program will output when executed.

```python
def test(a, b):
    if a%3 == 0:
        z = a**2 + b
    else:
        z = b**3 + a
    return z

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

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

Q4: For an ideal gas, the pressure (P), the temperature (T), the volume (V) and the number of moles (n) are related by
$$PV = nRT$$

Where R is a constant equal to 0.08206. Write a program that asks the user for P, T, V and then it calculates and displays the number of moles, n.

No questions here.

The following commonly used statements may or may not be useful.

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

MLO & Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
XX		Application		
XX		Understanding/ Analysing		
XX		Evaluating		
XX		Analysing		
XX		Remembering		
XX				
XX				
XX				
XX				