National University
Science & Technology
الــجامــعــة الوطنيــة
للعلــوم والتكنــولوجيا

كليــة عمـان البحـريـة الـدوليـة
International Maritime College Oman

Final Exam
TCOMP: COMPUTER APPLICATION
Spring 2025

Points of attention:

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

Exam Duration: 2 hours	
Instructor's Name: Amer Alhabsi	**45**
Exam Date: 22/06/2025	
Program: PE	**10**

Student Information		
Name:		ID:
Signature:		

Invigilator	
Initials:	☐ Student ID checked
Time received:	

Question 1 [16 marks]

Download the Excel sheet Problem2.xlsx from Moodle at **moodle.imco.edu.om** [not Blackboard]. Fill in the Student Information on first Tab.

    (a) On the Sheet **"Grocery"**, fill in the cells that are highlighted in. The sheet represents purchases of groceries for a person.
- a. Calculate the VAT allowance for each item.
- b. Apply the percentage from cell G9 only to non-food items. For food items, the VAT allowance should be 0. Your formula must reference cell G9. Do not type the percentage value directly into the formula (i.e., avoid hard coding). (3 marks)
- c. Calculate the total and store them in column H.(2 marks)
- d. Calculate the largest, smallest and mean for Qty, Unit Price and Total. (3 marks)
- e. Apply conditional formatting to column G. Highlight cells with total above 25. Make them with dark blue background and white text. Also highlight cells with total less than 20. Make them with red background and white text. (2 marks)

    (b) The laptops tab shows sales data for a company selling laptops of different models. You are asked to summarize the data into two pivot table. First calculate the value of the total sales given the quantity sold (qty) and the unit price.
- a. Create a pivot table where the rows represent the model, and the columns represents the Memory. Use the total price for the values. (3 marks)
- b. Create another pivot table. In this one, use the model for rows, disk for the columns and **quantity** for the value. (2 marks)
- c. How many Samsung with 2T NVMe were sold. Write the value in cell B1. (1 mark)

Question 2 [14 marks]

    (a) Create a Word document with the specifications below. For each section and subsection, add dummy text using the function `=lorem(20)`. Use style sheet for all titles and headings. The styles are (5 marks).:

Heading 1: Font Arial, Size 30, color: dark brown, left aligned.

Heading 2: Font Helvetica, color: red, size 20, left aligned

Normal: font: Garamond, color: black, size 11, justified.

Title: font: Arial, size: 32, color: dark blue, right aligned.

The document has the following structure:

Title: Power Plant Optimization

Introduction

    Background

    History
Procedure

Conclusion

(b) Add the following equation in the anywhere in the Introduction (3 marks).

$$\int_0^\infty \frac{\sqrt{x^2+2}+1}{\pi}\,dx$$

(c) Add a reference for a book. The title of the book is Machine Learning, author: John Doe, year:2018, publisher: Oxford Press. Include in text citation somewhere in the History sub-section. Also include a bibliography at the end. (3 marks).

(d) Add a header with 3 sections. The right section is right aligned with the text: TCOMP. The middle section is centrally justified with text showing your first name. The right section is right aligned with a page number. Include a line below the three sections. (3 marks).

Question 3   **[10 marks]**
Let A, B and c be related by

$$A = 4Bc^2$$

(a) Write c as a function of A and B. (2 marks).
(b) Write a Python function and test it in Jupyter Notebook to implement the function c above. (5 marks).
(c) Test the function for A=5.3 and B=5000. Test again for A=0.001 and B =2.1x10^4. (3 marks).

Question 4   **[5 marks]**
Let x represents time in seconds and f(x) represents the voltage of a load in (V). Write a Python program to plot

$f(x) = \sin(20x)\exp(-0.4x)$ in the range $0 \le x \le 6\pi$. Display in the plot _all_ necessary labels. Show a grid. Add your name as the title. Ensure the plot looks _smooth_.

MLO and Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
1	**1, 3**	Apply	**16**	
2	**2**	Apply	**14**	
3	**3**	Create	**10**	
4	**3, 4**	Create	**5**	

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
```