الجامعة الوطنية
National University
Science & Technology للعلوم والتكنولوجيا
كلية عمان البحرية الدولية
International Maritime College Oman

ACADEMIC YEAR 2023 - 2024

Program	Year	Semester	Paper
LTM	2	1	MAIN

MODULE NAME:	**STATISTICS-I**		
MODULE CODE:	**PCALC-II.I**	**EXAM DATE:**	**31/12/2023**
INSTRUCTOR's NAME:	**Muhammad Javed**	**DURATION:**	**120 MINS.**

Questions to be answered on:	**Allowed tools:**	**Number of pages**
✓ Space provided on the question paper	Pen, Pencil & Calculator	(Incl. cover page): **11**

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.

STUDENT NAME:

STUDENT ID:

FINAL MARKS	
	40
	10

Number of answer scripts:……..…….

Invigilator:……..……..…..

Student's signature: ……

Time of receipt:……..…..

Question 1 **[10 Marks]**

A survey was conducted among 50 logistics professionals to understand their frequency of delivering goods per week. Participants were asked to report how many days per week they typically engage in deliveries.

1	3	4	0	4	5	2	2	3	1
2	2	2	2	2	2	2	2	2	3
2	2	5	2	4	2	4	5	2	1
4	1	3	2	2	2	0	7	2	3
2	2	2	5	2	3	3	4	1	3

a. Construct a grouped frequency distribution using 8 classes to represent the data. Add the following columns to the distribution.
   1. No. of days or class **(2 Marks)**
   2. Frequency for all the number of days. **(2 Marks)**
   3. Class boundaries. **(1 Marks)**
   4. Cumulative frequency **(1 Mark)**

b. Construct a histogram according to part-a distribution. Provide titles for x and y lines. Describe the shape of the histogram. (4 Marks)

1. **[10 Marks]**

Assume that a logistic manager for a shipping company has collected data on the number of shipments handled by 100 delivery trucks in a month. The following is the frequency distribution table for the of shipments of the trucks.

a. Compare the mean and median for the number of shipments. **(5 Marks)**

b. Locate the median and modal classes for the data to optimize the allocation of resources. **(2 Marks)**

c. Plot the data on a frequency polygon chart for the number of shipments and their frequencies. What is the frequency for 200 shipments. **(3 Marks)**

No. of shipments	Frequency
150–158	5
159–167	16
168–176	20
177–185	21
186–194	20
195–203	15
204–212	3

2. **[10 Marks]**

The data shown here represent the number of hours that 12 part-time employees at a store worked during a month.

a. Find the value that corresponds to 85th percentile. **(1 Mark)**

b. Determine the values of five number summary. **(3 Marks)**

c. Show the spread of the part time hours on a box-plot chart. **(3 Marks)**

d. Locate the mean number of part-time hours of an employee on the same chart. **(2 Marks)**

e. Comment on the spread of the hours by using the same chart and identify the shape of the distribution of the data in term of skewness. **(1 Mark)**

38	16	18	24	12	30	35	32	31	30	24	35

3. **[5 Marks]**

The Following data includes per capita debt and per capita tax amounts. An economics student wish to see if there is a relationship between the amount of state debt per capita and the amount of tax per capita at the state level. Both amounts are in dollars and represent five randomly selected states

a. Draw scatter plot for the amounts **(2 Marks)**
b. Calculate the correlation coefficient for the data and conclude the strength of the linear relationship. **(3 Marks)**

Per capita debt x	1924	907	1445	1608	661
Per capita tax y	1685	1838	1734	1842	1317

4. **[5 Marks]**

The average gasoline price per gallon (in cities) and the cost of a barrel of oil are shown below for a random selection of weeks in a specific year.

a. Derive an equation of regression for the data. **(3 Marks)**

b. Find the cost of gasoline when oil is $60 a barrel. **(2 Marks)**

Oil ($)	51.91	60.65	59.56	52.86	45.12	44.21
Gasoline ($)	1.97	1.96	2.06	2.04	2.00	1.99

Formula sheet

1. $$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n(\Sigma x^2) - (\Sigma x)^2][n(\Sigma y^2) - (\Sigma y)^2]}}$$ correlation coefficient

2. $$a = \frac{(\Sigma y)(\Sigma x^2) - (\Sigma x)(\Sigma xy)}{n(\Sigma x^2) - (\Sigma x)^2} \qquad b = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$$, for the equation of regression.

3. The Median (for grouped data)

4. $$\left[\frac{\frac{n}{2} - cf}{f}\right](w) + l_m$$

5. $$Percentile = \frac{(Number\ of\ terms\ before\ x) + 0.5}{n}$$

6. $$c = n.\frac{p}{100}$$