



# MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF ENGINEERING, APPLIED SCIENCES AND  
TECHNOLOGY

DEPARTMENT OF MINING AND MINERAL PROCESSING

ENGINEERING MATHEMATICS II

CODE: ENGT 124

SESSIONAL EXAMINATIONS

APRIL 2024

DURATION: 3 HOURS

EXAMINER: MR I.ZVAWANDA

---

## **INSTRUCTIONS**

1. Answer **ALL** questions from Section A
2. Answer any **three** questions from Section B
3. Total: 100 Marks

## **REQUIREMENTS**

*Statistical tables; Graph paper  
Non-programmable scientific calculator*

---

**SECTION A [40 MARKS]**  
**Answer ALL Questions in this Section**

**A1.** Define the following terms as used in Statistics

- i) Primary data;
- ii) Secondary data;
- iii) Skewness;
- iv) Quantitative data.

**[2, 2, 2, 2]**

**A2**

a) State and explain any four importance of statistics.

b) Distinguish between time series and deseasonalising data.

**[8, 4]**

**A3**

A typist makes 2 mistakes per page on average when typing. Find the probability that

- i. She makes 3 mistakes on a given page
- ii. She makes 5 mistakes on 2 pages
- iii. At least 1 mistake per page

**[3, 3, 4]**

**A4**

a) Determine if each of the following variable is qualitative or quantitative

- i) number of people employed by the government
- ii) hair colour
- iii) net weight in grams of a packaged dry cereals
- iv) life times in hours of 100 watt light bulbs
- v) number of on time arrivals at a large airport

b) Explain any 5 properties of a Normal curve

**[5, 5]**

**SECTION B [60 MARKS]**

ANSWER ANY **THREE (3)** QUESTIONS IN THIS SECTION

**B5**

The annual profits made by a random sample of 40 companies in the textiles industry are shown in the table 1 below

Profit	Number of companies
10-20	3
20-30	7
30-40	12
40-50	10
50-60	5
60-70	3

Calculate:

- i) the three measures of central location;
- ii) variance;
- iii) upper quartile;
- iv) lower quartile;
- v) pearson's coefficient of skewness. [2, 3, 3, 3, 3, 3, 3]

**B6**

a) Discuss the following sampling techniques:

- i) simple random sampling;
- ii) cluster sampling;
- iii) Stratified sampling;
- iv) systematic sampling.

[12]

b)The average hourly rate paid to domestic worker is \$285.The house wives league wishes to test the claim. The league conducted a survey with a sample of 250 domestic workers. The results revealed a mean hourly rate of \$303 and a standard deviation of \$100.Test at the 5% level of significance whether the mean

hourly rate is \$285.

[8]

**B7**

a) In order to find out if males preferred a certain political party compared to women, the following data given on table 2 below were obtained from a sample of 1718 voters.

	Party A	Party B	Party C
Male	313	124	391
Female	344	158	388

Test at 5% significance level whether there are differences in the way that males and females vote.

[9]

b) State and explain the four components of time series. [8]

c) State any two rules of probability. [3]

**B8**

a) The average number of loaves of bread sold daily by a baker is normally distributed with a standard deviation of 300. The baker claimed that 3000 loaves are sold daily. An employer wants to test the accuracy of this statement . A random sample of 36 days showed that the average daily sales were 3150 loaves .Test at the 1 % level of significance if the bakery 's statement can be accepted. [12]

b) A micro computer software company reports the following quarterly demand for a certain software from 2002 to 2004. Calculate the three point moving average for the data on table 3 below.

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2002	37	24	62	80
2003	77	95	94	133
2004	148	155	128	161

[8]

**END OF PAPER**