



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

INFORMATION TECHNOLOGY

SUBJECT: Computer Quantitative Methods PAPER NO: 553/18/S06

DURATION: 3 Hours

NOVEMBER/DECEMBER 2025 EXAMINATION

REQUIREMENTS

- 1) Answer booklet.
- 2) Non programmable calculator
- 3) Mathematical tables and formula sheets.
- 4) Graph paper

INSTRUCTIONS TO CANDIDATE

- 1) Answer all questions.
- 2) Show all essential working.
- 3) Where degree of accuracy is not specified in the question, give answer correct to 3 significant figures.

This paper consists of 3 printed pages.

QUESTION 1

- a) Given that $f(x) = x^2 - 2$. Sketch the graph showing important points. (6 marks)
- b) Given the following matrix:

$$A = \begin{pmatrix} 1 & 2 & 2 \\ 1 & 0 & 1 \\ 1 & 1 & 3 \end{pmatrix} \quad (8 \text{ marks})$$

Find adjoint of A

- c) Solve the following linear equations

$$2x + y - 3z = -7$$

$$3x - 2y + z = 11$$

$$-2x - 3y - 2z = 3$$

(6 marks) ✓

QUESTION 2

- a) Integrate the following:

i) $\cos 2x$ (2 marks)

ii) $2e^{1/2x}$ (2 marks)

iii) $2x - 6x^2 + 10$ (2 marks)

- b) Find the derivative of:

$$f(x) = x^3 - 11x^2 \quad (3 \text{ marks})$$

- c) Given that $y = 2x^5 + 7 + \frac{1}{x^3}, x \neq 0$,
Find:

i) $\frac{dy}{dx}$ (3 marks)

ii) $\int y \, dx$ (4 marks)

- d) Differentiate $\sqrt{x^2 - 1}$ with respect to x (4 marks)

QUESTION 3

The length of 30 plant leaves were measured and the information grouped as shown.

Length (cm)	10-14	15-19	20-24	25-29
Frequency	3	8	12	7

Calculate:

- a) Mean (5 marks)
- b) Standard deviation (5 marks)
- c) Mode (5 marks)
- d) Median (5 marks)

QUESTION 4

- a) The table below shows approximate probabilities for scoring 0,1,2,3 or 4 runs in a single inning of a baseball game.

x	0	1	2	3	4
$P(x)$	0.68	0.16	0.09	0.05	0.02

- i) Show that x is a random variable. (2 marks)
 - ii) Calculate $P(x < 2)$. (3 marks)
 - iii) Calculate $P(x \geq 3)$. (3 marks)
 - iv) Find $E(x)$. (4 marks)
- b) The r.v $X \sim N(300; 25)$, Find:
- i) $P(x > 305)$ (4 marks)
 - ii) $P(x < 291)$ (4 marks)

QUESTION 5

- a) 150 bags of flour of a particular brand are weighed and the mean mass is found to be 748g with standard deviation 3.6g. Find the 90% confidence intervals for the mean mass of bags of flour of this brand. (10 marks)
- b) Test at the 1% level whether the single sample value 54 has been drawn from a normal population with mean 65 and variance 30, or whether the mean is less than 65. (10 marks)

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