

073106T4QSV

QUANTITY SURVEY LEVEL 6

ENG/OS/QS/CC/02/6

Apply Engineering Mathematics

March/April 2026



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

Time: 2 HOURS

INSTRUCTIONS TO CANDIDATE

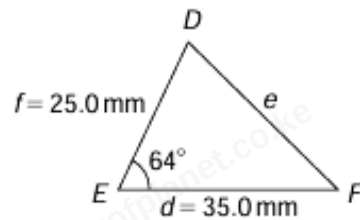
1. This paper consists of **TWO** sections: **A** and **B**.
2. Answer **ALL** questions in section A and **ANY THREE** (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet
5. Do not write on the question paper.

This paper consists of THREE (3) printed pages

**Candidates should check the question paper to ascertain that all
pages are printed as indicated and that no questions are missing.**

SECTION A (40 MARKS)*Answer ALL questions in this section*

- Given that $5\log_3 y - 2\log_3(x + 3) = 2\log_3 y + \log_3 x$. Express y in terms of x . (3 Marks)
- Solve the equation $3^{2x} = 81^{x-1}$ (3 Marks)
- Factorize $x^3 + 4x^2 + x - 6$ Hence solve the equation. (4 Marks)
- Evaluate $\secant 302^\circ 29'$ correct to 4 decimal places. (3 Marks)
- Solve the triangle DEF and find its area given that $EF=35.00\text{mm}$, $DE=25.00\text{mm}$ and $\angle E=64^\circ$ (3 Marks)



- Show that $\cosh^2 x - \sinh^2 x = 1$ (4 Marks)
- Find the Laplace transform of $6 \sin 3t - 4 \cos 5t$ (3 Marks)
- If in the Fourier series $f(x) = \frac{4}{\pi}(\sin x + \frac{1}{3}\sin 3x + \frac{1}{5}\sin 5x + \dots)$ $k=1$ deduce a series for $\frac{\pi}{4}$ at the point $x = \frac{\pi}{2}$ (4 Marks)
- Given $z_1 = 2 + j_4$ and $z_2 = 3 - j$ determine $z_1 + z_2$ (3 Marks)
- Determine the value of $[2 \angle 35^\circ]^5$ (3 Marks)
- Determine the standard deviation from the mean of the set of numbers $[5, 6, 8, 4, 10, 3]$ to correct 4 significant figures. (3 Marks)
- Find the rate of change of y with respect to x given $y = 3\sqrt{x \ln 2x}$ (4 Marks)

SECTION B (60 MARKS)*Answer THREE questions in this section*

13. A student saves money every week. In the first three weeks, she saved Ksh. 500, Ksh.550 and 600. After 12 weeks she decided to invest her savings, she invested Ksh. 2000 and each month the invested grew by 5%.

a. Determine:

- The type of progression the savings formed. (2 Marks)
- Show that the savings formed the progression (i) above. (2 Marks)
- Find how much she saved in the 10th week. (3 Marks)
- Find the total amount saved in 12 weeks. (4 Marks)
- After 12 weeks she decided to invest her saving, she invested Ksh. 2000 and each month the invested grew by 5%. Determine the total amount after 6months. (4 Marks)

- b. If her weekly savings were increased by Ksh. 50 for another 8 weeks, calculate her total savings. (5 Marks)

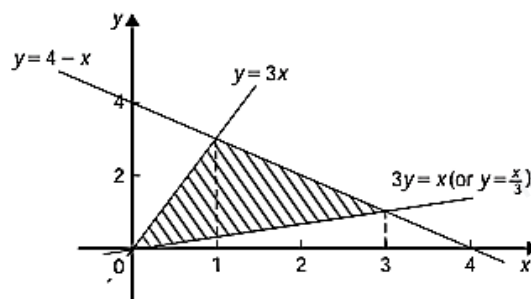
14. Solve the differential equation $2 \frac{d^2y}{dx^2} - 11 \frac{dy}{dx} + 12y = 3x - 2$ (20 Marks)

15. Given the surface defined by the function $f(x, y) = x^3 - 6xy + y^3$

- Find the stationary points of the surface. (10 Marks)
- Determine the nature of the stationary points. (10 Marks)

16. Given the three straight lines $y = 4 - x$, $y = 3x$ and $3y = x$

- a. Determine by integration the area bounded by these lines. (7 Marks)



- b. The curve $y = 2x^2 + 3$ is rotated about the x-axis between the limits $x = 1$ and $x = 2$ through a complete revolution. Determine the volume of the solid generated. (13 Marks)