

071304T4EIN

ELECTRICAL INSTALLATION LEVEL 4

ENG/OS/EI/CC/01/4/A

Apply Engineering Mathematics

March/April 2025



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

WRITTEN ASSESSMENT

INSTRUCTIONS TO CANDIDATE

1. This paper consists of **TWO** sections **A** and **B**.
2. Attempt **ALL** the questions in each section.
3. Marks for each question are indicated in the brackets.
4. You are provided with a separate answer booklet to answer the questions.
5. **DO NOT** write on the question paper.
6. Use Mathematical table and non-programmable scientific calculator

This paper consists of FOUR (4) 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 (10 MARKS)

Attempt all questions in this section. Each question carries one mark

1. Determine the value of $(64^{\frac{1}{3}})^2$
 - A. 16
 - B. 12
 - C. 8
 - D. $2\frac{4}{3}$
2. Subtract -104 from 364
 - A. 304
 - B. 264
 - C. 464
 - D. -264
3. Solve for x and y in the expression
$$\begin{aligned} 3x + 2y &= 8 \\ 2x + 6y &= 12 \end{aligned}$$
 - A. $(2, -2)$
 - B. $(0, 2)$
 - C. $(4, 2)$
 - D. $(-4, 2)$
4. Given that the value of position vectors $z_1 = 2i + 4j$ and $z_2 = 5i + 2j$, find $z_1 + z_2$.
 - A. $4i + 6j$
 - B. $3i + 2j$
 - C. $7i + 6j$
 - D. $7i - 6j$
5. The Cartesian coordinates of a given values of current at any given time was plotted as $(-4, 3)$. Express these values into their corresponding polar coordinates.
 - A. $(5, 80^\circ)$
 - B. $(5, 143.13^\circ)$
 - C. $(4, 36.87^\circ)$
 - D. $(4, 143.87^\circ)$

6. The length, breadth and height of a cuboid shaped meter box is 14cm, 3cm and 6cm respectively. Find the total surface area of the meter box.
- A. 224cm^2
B. 430cm^2
C. 132cm^2
D. 268cm^2
7. For a singular matrix $\begin{pmatrix} 8 & x \\ 2 & 3 \end{pmatrix}$, find the value of x .
- A. 3
B. 11.5
C. 24
D. 12
8. Given $\log_2 x = 5$, find the value of x :
- A. 4
B. 32
C. 25
D. 8
9. Evaluate $2abc + 3bc - abc$ when $a = 3$, $b = 2$ and $c = 5$
- A. 60
B. 16
C. 14
D. 36
10. Solve the equation $3^{(2x-1)} = \frac{1}{27^x}$
- A. $\frac{1}{5}$
B. 2
C. $\frac{1}{3}$
D. 9

SECTION B (40 MARKS)

Attempt ALL questions in this section.

11. Simplify the indicial expression $\frac{(x^2\sqrt{y})(\sqrt[3]{y^2})}{(x^5y^3)^{\frac{1}{2}}}$ (4 Marks)
12. Evaluate without using a calculator $\frac{\log 3125 - \frac{1}{3}\log 125}{\log 625 + \frac{1}{2}\log 25}$ (3 Marks)
13. Given the matrices $A = \begin{bmatrix} 3 & 6 \\ 2 & 1 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$ find $(A + B)^{-1}$ (4 Marks)
14. If vectors $p = 2i + j - k$ and $q = i - 3j + 2k$ determine $|p + q|$ (3 Marks)
15. The base of a square pyramid is 24cm and the perpendicular height is 12cm. Find the volume of the pyramid. (3 Marks)
16. Solve the simultaneous equation by elimination method (3 Marks)
 $3x + 4y = 12$
 $6x + 12y = 24$
17. Simplify the following fractions $\frac{1}{3}$ of $(5\frac{1}{2} - 3\frac{3}{4}) + 3\frac{1}{5} \div \frac{4}{5} - \frac{1}{2}$ (5 Marks)
18. The roots of a quadratic equation are 1 and $-\frac{2}{3}$, determine the equation. (4 Marks)
19. Change the Cartesian coordinates (-3, -4) in to polar coordinates (5 Marks)
20. Determine the angle between the vector $a = i + 2j - 3k$ and vector $b = 2i - j + 4k$ (3 Marks)
21. Solve the equation $\frac{3}{x-2} = \frac{4}{3x-4}$ (3 Marks)