

Printed By And Vocational College Date: 05.08.2025 07:54 AM

071505T4MTP

#### MECHANICAL PRODUCTION TECHNOLOGY LEVEL 5

 $ENG/OS/ME/CC/04/5 \ \ \text{Technical And Vocational College}$ 

Apply Engineering Mathematics AM

July/August 2025

Printed By Technical And Vocational College Date: 05.08.2025 07:54 AM



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

Printed By Technical And Vocational College

Date: 05.08.2025 07:54 AM WRITTEN ASSESSMENT

**Time: 3 HOURS** 

Printed By Technical And Vocational College Date: 05.08.2025 07:54 AM

#### INSTRUCTIONS TO CANDIDATE

Printed By: Technical And Vocational College

- 1. This paper consists of TWO sections: A and B.
  - Printed By And Vocational College
- 2. Attempt ALL questions in section A and ANY THOR ERE 0(3) TQUESTIONS in section B.
- 3. Marks for each question are indicated in the brackets.
- 4. Candidates are provided in with a ssrw or in ban okletocational cologe
- 5. Do not write on the questions parter. 0754 AM

Printed By: And Vocational College Date: 05.08.2025 07:54 AM

This paper consists of FIVE printed pages

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

(4 Marks)



Printed By: And Vocational College Date: 05.08.2025 07:54 AM

## SECTION A (40 MARKS)

#### Attempt ALL the questions in this section.

 $1. \quad Simplify \ the \ fo^P l^r l^{in} o^{te} w^d i^B n^y g^{: \ \text{Technical And Vocational College Date:}}$ (4 Marks) 05.08.2025 07:54 AM  $log_a x^2 + 3log_a x - 2log_a 4x$ 

2. Evaluate the following using law of indices

$$2^3 \times 2^4$$
  
 $a^{\text{Printed By:}}$  Technical And Vocational College Dat  $2^{\text{C}} \times 2^{\text{S}} \times 2^{\text$ 

b. 
$$\frac{3^2}{3\times 3^9}$$
 Technical And  $\bigvee$  Technical

- 3. Simplify  $\frac{p^{\frac{1}{2}}q^2r^{\frac{2}{3}}}{p^{\frac{1}{4}}q^{\frac{1}{2}}r^{\frac{1}{6}}}$  and evaluate when p= 16, q= 9, r=4 (4 Marks)
- 4. A pedestrian notices that a tower is at a horizontal distance 30 m away from him and the angle of elevation is 35°. Find the height of the tower. (4 Marks)
- 5. Simplify the following equation Printed By: Technical And Vocational C Date: 05.08  $(x - 2y)^2$   $(2x - y)^2$
- 6. Find the volume of a cylinder of length 15 cm and diameter 8 cm. (2 Marks)
- 7. Express in polar co-ordinates the position (-4,3). (3 Marks)
- 8. Calculate the surface area of a cylinder open at Porince end to the surface area of a cylinder open at Porince end at Porince end to the cylinder open at Date: 05.08.2025 07:54 AM height of 50 cm (4 Marks)
- 9. A force of 5 N is inclined at an angle of 450 to a second force of 8 N, both forces acting Printed By: Technical And Vocational College at a point. Calculate the magnitude of the resultant of these two forces with respect to the 8 N force. Printed By: And V(o3: aMb raar kCso) He ge Date: 05.08.2025

10. If,  $(2x + 1)^2 + (x - 1)(x - 3) = ax^2 + b$ , determine the values of a and b (4 Marks)

11. Determine the standard deviation from the mean of the following set of numbers;

Printed By And Vocational College Date: 05.08.2025 07:54 AM



College

Date: 05.08.2025 07:54 AM

#### **SECTION B (60 MARKS)**

#### Attempt any THREE questions in this section

12. Printed By: Technical And Vocational College

Date: 05.08.2025 07:54 AM

- Determine the angle between vectors 2i j + 3k and i + 3j k(5 Marks)
- Use elimination method to solve the simultaneous equation below (7 Marks)

3x + 4y = 5Printed By: Technical And Vocational College

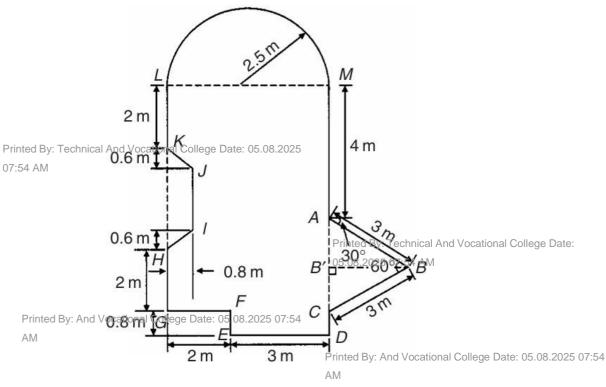
Dat2x05.085xy25=07:542M

c. The figure below shows a plan of a floor of a building which is to be carpeted.

Printed By: And Vocational College

Calculate the area in square meters.

(8 Marks) Date: 05.08.2025 07:54 AM



13.

a. Given matrix 
$$A = \begin{bmatrix} 1 & 2 & 3 \\ 6 & \text{inte} & 5 & \text{d By:} \\ 07:54 & \text{AM} \end{bmatrix}$$
 i call And Vocational College by ate:  $8^{5.08}$ 9<sup>2025</sup> (5 Marks)

The table below shows the marks scored by 50 engineering students in a mathematics

| Printed By: Technical And Vocational College |                    |                 |       |       |       |       |       |       |       |
|--|--------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|
| Date: 05.                                    | 8 <b>Marks</b> :54 | A <b>2</b> 0-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90-99 |
|  |                    |                 |       |       |       |       |       |       |       |
|  | No. Of             | 2               | 3     | 7     | 12    | 15    | 7     | 3     | 1     |
|  | students           |                 |       |       |       |       |       |       |       |
|  |                    |                 |       |       |       |       |       |       |       |



Printed Technical And Vocational College Date: 05.08.2025 07:54

### Draw a frequency distribution table, hence Determine the;

Printed By Technical And Vocational College

- i. Mean. Date: 05.08.2025 07:54 AM
- ii. Median,
- iii. And Vocational College Date: 05.08.2025 07:54 AM
- iv. The standard deviation.

(15 Marks)

Printed By Technical And Vocational College

Date: 05.08.2025 07:54 AM

14.

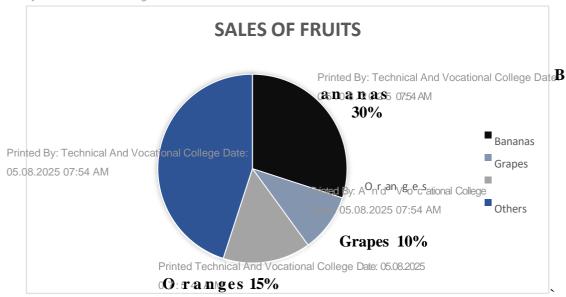
a. Solve the following quadratic expression

(4 Marks)

$$2x^2 + 8x - 10 = 0$$

b. The pie chart below shows the sales of different fruits in a day for a certain shop

Printed By: And Vocational College Date: 05.08.2025 07:54 AM



i. If a total of 1200 kg of fruits were sold in a day, calculate the amount of

Pinted By. B nTasc Is odal A(nn)  $V_{k}c_{0}c_{0}$ ational College

(2 Marks)

Date: 05.08ii.2.025 07: Find the difference between sales of grapes and oranges

(5 Marks)

c. A surveyor measures the angle of elevation of the top of a perpendicular building as 19<sup>0</sup>. He the moves 120 m nearer the building and finds the angle of elevation is now 47<sup>0</sup>. Determine the height of the building. (9 Marks)

©2025 TVET CDACC

Printed By: Technical And Vocational College Date: 05.08.2025 07:54 AM

15.

#### a. Prove that;

Printed By: Technical And Vocational College

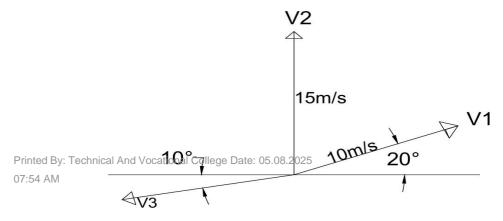
$$\frac{1+\cot\theta}{1+\tan\theta} = \frac{\frac{1+\cot\theta}{\cos\theta} \cdot \frac{\cos\theta}{\cos\theta} \cdot \frac{\cos\theta}{\cos\theta}}{\sin\theta}$$
 (4 Marks)

## brin Calc the three velocities given in the diagram below

Date: 05.08.2025 07:54 AM

(8 Marks)

Printed By: And Vocational College Date: 05.08.2025 07:54 AM



## c. Use matrix method to solve the following simultaneous equation

Printed By: And Vocational College 
$$3x-5y-7=0$$
 Date: 05.08.2025 07:54 AM 
$$4x-3y-19=0$$
 (8 Marks)

Printed By And Vocational College Date: 05.08.2025 07:54 AM

Printed Technical And Vocational College Date: 05.08.2025 07:54 AM