

091405T4SLT

SCIENCE LABORATORY TECHNOLOGY LEVEL 5

SLT/OS/SL/CR/02/5

Apply Physics Techniques

March/April 2026



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

WRITTEN ASSESSMENT

Time: 2 HOURS

INSTRUCTIONS TO CANDIDATE

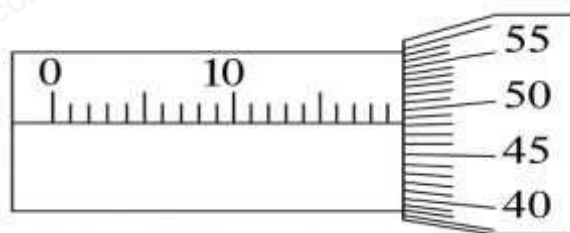
1. This paper consists of **TWO** sections: **A** and **B**.
2. Attempt **ALL** questions in section A and **ANY THREE** (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet.
5. Do not write on the question paper.

This paper consists of SIX (6) printed pages

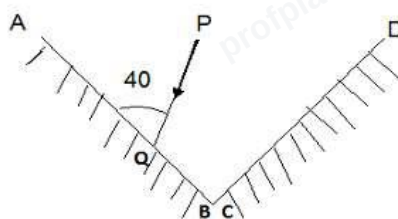
**Candidates should check the question paper to ascertain that all
pages are printed as indicated and that no questions are missing.**

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

1. Physical quantities are classified as either basic quantities or derived quantities. State any FOUR basic quantities (4 Marks)
2. The scale below shows the reading of a micrometer screw gauge used to measure the thickness of a piece of wire. Determine the thickness of the wire. (4Marks)

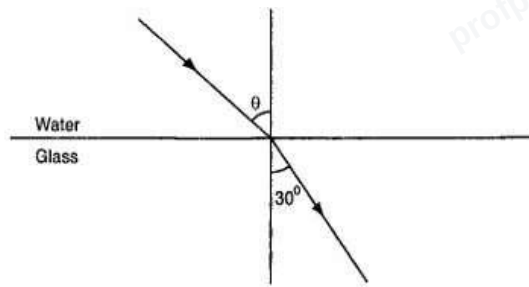


3.
 - a. Define the term heat capacity. (1 Mark)
 - b. Calculate the quantity of heat required to raise the temperature of a metal block with a heat capacity of 460JK^{-1} from 15°C to 45°C . (3 Marks)
4. Identify the function of each of the following optical instruments;
 - a. Microscope (1 Mark)
 - b. Periscope (1 Mark)
 - c. Projector (1 Mark)
 - d. Telescope (1 Mark)
5. The mirror AB and CD are at right angle to each other.

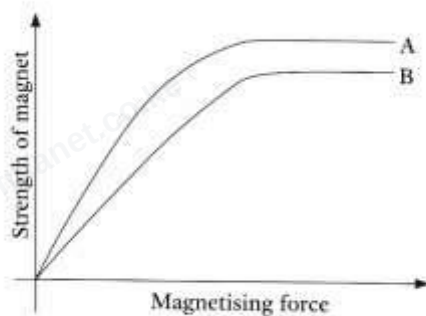


Complete the diagram to show the path taken by the ray PQ after reflection at both mirrors. (4 Marks)

6. An object is placed 10cm in front of a concave mirror of focal length 20cm. Determine the image distance using the mirror formula. (4 Marks)
7. Given that the velocity of light in water is $2.26 \times 10^8 \text{ ms}^{-1}$ and in glass $2.0 \times 10^8 \text{ ms}^{-1}$, calculate the angle θ below. (4 Marks)



8. The graph below shows two magnetic materials A and B



Name:

- i. Which material is easier to magnetize (1 Mark)
- ii. Which material forms a stronger magnet (1 Mark)
- iii. State ONE application of the named material in (i) and (ii) (2 Marks)

9. Capacitors have extensive uses. State FOUR applications of capacitors. (4 Marks)

10.

- a. State Ohm's Law (1 Mark)
- b. Calculate the current in amperes flowing through a device of resistance $5k\Omega$ when a 10V source is connected to it. (3 Marks)

SECTION B (60 MARKS)***Attempt ANY THREE (3) questions in this section.***

11.

- a. Conduction is the transfer of heat within an object without the movement of the object as a whole. Explain FOUR applications of good and poor conductors of heat.

(8 Marks)

- b. A trainee wanted to take a bath with warm water at 25°C. If she had hot water of mass 2 kg at 100°C, what mass of cold water should she have added to obtain her choice of bath? (*Take specific heat capacity of water = 4200 J/kg/K*)

(4 Marks)

- c. A rim of foolscaps contains 500 papers and has a mass of 2kg. The size is 300mm by 200mm by 50mm. Find:

i. the mass of one sheet of paper (2 Marks)

ii. the density of one sheet of paper in S.I units. (6 Marks)

12.

- a. Sketch a graph of potential difference against time for a discharging capacitor.

(2 Marks)

- b. A trainee was provided with two metal spheres and a negatively charged rod.

Using diagrams, explain how the trainee charged the two spheres by use of separation method. (label the two spheres as A and B)

(8 Marks)

- c. Two plates of a parallel -plate capacitor are 0.6mm apart and each has an area of 4cm². Given that the potential difference between the plates is 100V, calculate the charge stored in the capacitor. (Take $\epsilon_0 = 8.85 \times 10^{-12} \text{ Fm}^{-1}$)

(5 Marks)

- d. Describe how you would verify the basic law of magnetism given two bar magnets and a piece of thread.

(5 Marks)

13.

- a. Sketch a diagram to illustrate how a concave lens is used as a magnifying glass.

(4 Marks)

- b. The Table below shows values of image distance V and magnification M for a convex lens

Image distance V (cm)	13.3	15.0	16.7	20.0	30.0
Magnification M	0.3	0.5	0.7	1.0	2.0

- i. Plot a graph of M against V (6 Marks)
 - ii. From the graph determine the focal length f of the convex lens. (3 Marks)
 - iii. Show that $M = \frac{v}{f} - 1$ where M = magnification and f = focal length. (3 Marks)
- c. Magnets have a wide range of applications in different industries. Explain TWO uses of magnets. (4 Marks)

14.

- a. In an experiment to determine the E.M.F of internal resistance of two cells, the following results were obtained;

Pd (V)	2.6	2.4	2.2	2.0	1.8	1.6
I (A)	0.15	0.25	0.35	0.45	0.55	0.65

- i. Plot a graph of Pd (V) (y -axis) against Current (I) (6 Marks)
Find the slope (S) of your graph (3 Marks)
 - ii. Given that the relationship between Pd (V) and Current (I), supplied from two cells is given by the equation $E = V + Ir$, use your graph to determine E and r (3 Marks)
- b. Draw an electric symbol used in circuits for the following electrical components.
- i. Rheostat (1 Mark)
 - ii. Capacitor (1 Mark)
 - iii. Fuse (1 Mark)

iv. Voltmeter

(1 Mark)

c. Calculate the current through each resistor in the figure below. (4 Marks)

