TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

LEVEL 6 YEAR 1 EXAMINATION

FINAL INTEGRATED SUMMATIVE EXAMINATION

SITTING: APRIL / MAY 2026

SUBJECT: FOUNDATION PHYSICS THEORY

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. Write your Examination Number and National Registration Card (NRC) Number on the answer booklet provided.
2. Write the ANSWER SCRIPT SERIAL NUMBER on the examination register and on the entry slip.
3. This paper has seven (7) questions. Question one (1) is compulsory. Answer four (4) Questions from the remaining six (6) questions.
4. Diagrams may be used where necessary to clarify your answer.
5. Cellphones and programmable calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

QUESTION ONE (COMPULSORY)

a) Explain the term Vector quantity. **[2 marks]**

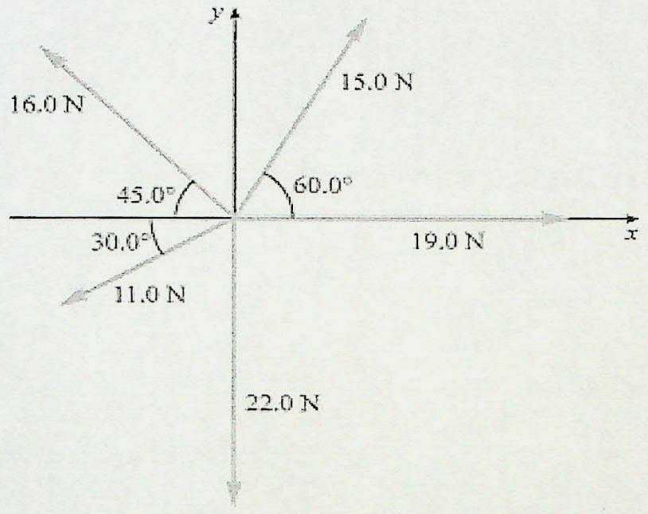
b) Express the following quantities in base units.

i. Joule **[3 marks]**

ii. Resistance **[3 marks]**

iii. Voltage **[3 marks]**

c) The diagram below shows **five (5)** forces acting at one point. Determine the magnitude and direction of the resultant force of the system of vectors below.



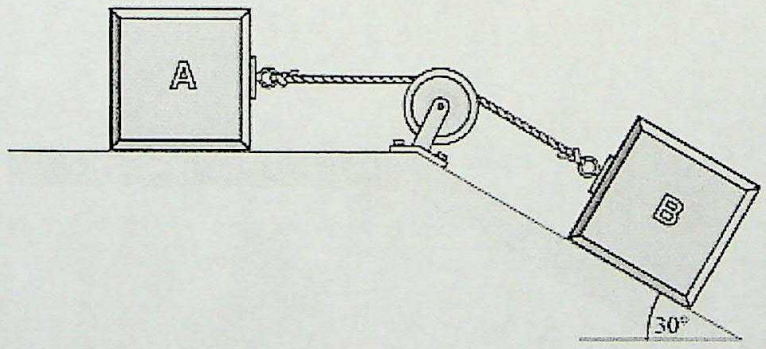
[9 marks]

[Total: 20 marks]

QUESTION TWO

a) State Newtons **three (3)** Laws of motion. **[6 marks]**

b) The diagram below shows **two (2)** identical masses of mass 40 kg. Both experiencing a sliding force of $\mu_k = 0.4$.



c) Determine the following:

(i) Acceleration of the system **[7 marks]**

(ii) Tension in the cord **[7 marks]**

[Total: 20 marks]

QUESTION THREE

a) Define the following:
   (i) Relative percentage error **[2 marks]**
   (ii) Random error **[2 marks]**
   (iii) Systematic error **[2 marks]**
   (iv) Precision **[2 marks]**
   (v) Accuracy **[2 marks]**

b) The length of a brass cylindrical object was measured and stated as 26.47±0.01cm. If the relative percentage error is estimated at 0.2 %, write down the correct reading in keeping with the 0.2% error in the measurement. **[2 marks]**

c) A science laboratory technology student recorded the following results in her Experimental determination of the resistivity of a conducting wire:

Resistance of wire (R) = 2.06± 0.01Ω,
Diameter of wire (d) = 0.057± 0.001cm
Length of wire(l) = 105.6±0.1cm
Resistivity(ρ) $= \frac{R\pi d^2}{4l}$

Determine the following:
   (i) maximum percentage relative uncertainty. **[6 marks]**
   (ii) Determine the variable in the formula for resistivity must be measured with greater accuracy to increase the accuracy of the final result? **[2 mark]**

[Total: 20 marks]

QUESTION FOUR

a) Write down **four (4)** equations of uniformly accelerated linear motion identifying symbols used. **[4 marks]**

b) A small ball of mass (m) is attached to an inextensible string of length 100m and moves in a horizontal circle of radius (r) with constant angular speed 9ω). The angle between the string and the vertical is π/6 radians. Determine the periodic time T of the motion of the ball. [Take g = 9.8ms^{-2}] **[10 marks]**

c) A car accelerates steadily from rest at a rate of 2.5ms^{-2} to a speed of 16ms^{-1}. Calculate how far the car moves during the period of acceleration. **[6 marks]**

[Total: 20 marks]

QUESTION FIVE

a) Explain the conditions for a body to be in static equilibrium under the action of a coplanar and concurrent forces **[4 marks]**

b) A uniform pole PR has length 4m and weight W Newtons. The pole is held in horizontal position by two vertical ropes attached to the pole at points P and Q where PR=4m and PQ = 2.4m. Given that the tension in the rope attached to the pole at point Q is seven times
The tension in the rope attached to the pole at P.
(i) Draw the force body diagram **[4 marks]**
(ii) Calculate the value of W **[7 marks]**

c) A spring with spring constant 50N/m is hanging from a stand. A second spring with spring constant 100N/m is hanging from the first spring. Determine the extension of both springs if a 0.50kg mass is hung from the bottom spring. [Take g=9.8N/kg] **[5 marks]**

[Total: 20 marks]

QUESTION SIX

a) Define the following terms;
(i) Ampere **[2 marks]**
(ii) Volt **[2 marks]**

b) State **three (3)** effects of electricity passing in a wire. **[3 marks]**

c) A Student wants to make a heating coil that will have a power output of 48 W when there is a potential difference of 12 V across it. The student has a reel of nichrome wire of diameter 0.24 mm. The resistivity of nichrome is $1.3 \times 10^{-8} \Omega$ **m**. Calculate the length of the wire the student requires. **[5 marks]**

d) **Figure 6.0** shows a network of capacitors connected to a 24-volt supply **PQ**

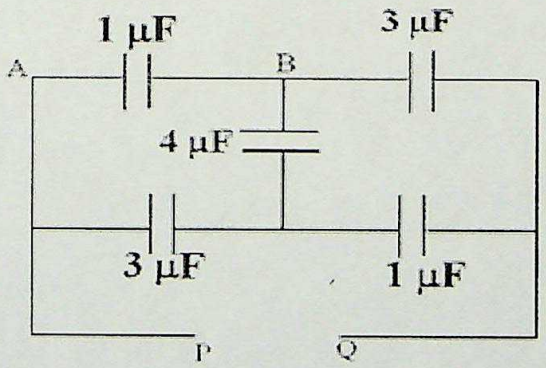


Fig.6.0

Determine the following:
(i) Equivalent capacitance of the network of capacitors in figure 6.0. **[4 marks]**
(ii) The total energy stored by the network of capacitors in figure 6.0. **[4 marks]**

[Total: 20 marks]

QUESTION SEVEN

(a) Define the following:

(i) Radioactivity **[2 marks]**

(ii) Isotopes **[2 marks]**

(iii) Mass number **[2 marks]**

b) Cobalt 60 is often used in medicine. It has a half- life of 5.25 years. Determine the time taken for the activity to reduce to:

(i) One-eighth its original value **[5 marks]**

(ii) One-third its original value **[5 marks]**

(iii) State **two (2)** applications of radiations **[4 marks]**

[Total: 20 marks]