KENYA CERTIFICATE OF BASIC EDUCATION (K.C.B.E)

GRADE 10 PHYSICS (Theory) ENDTERM 1

PATHWAY: S.T.E.M

Time: 2 Hours

COMPETENCY BASED EDUCATION

LEARNER'S DETAILS

Name: _____.

School: _____.

Assessment Number: _____. **Date:** _____.

School Code: _____. **Signature**: _____.

INSTRUCTIONS TO LEARNERS

1. Write your name, School, assessment number, signature and date on all the answer sheets provided.
2. Answer all the questions in the spaces provided.
3. **Read each question carefully** before writing your answer.
4. Ensure your answers are **clear, neat, and well-organized**.
5. **Check your work** before submitting the exam.
6. Manage your time well to complete all questions.

Performance Levels Grid

Q.No.	1a	1b	1c	1d	1e	2	3	4	5a	5b	6a	6b	6c	6d	6e	6f	7	8	9a	9b	9c	9d	9e	9f	10a	10b	10c	10d	10e	10f	11	12	13a	13b	Total
Marks	2	4	3	3	3	3	3	3	1	3	4	2	3	3	2	2	2	1	2	3	3	3	2	3	4	2	4	3	2	2	3	3	3	3	100
Learner's Score																																			
Performance Level																																			

Level	Level	% Range	Points	Learner's score
Exceeding (EE)	EE1	90–100%	8	
	EE2	75–89%	7	
Meeting (ME)	ME1	58–74%	6	
	ME2	41–57%	5	
Approaching (AE)	AE1	31–40%	4	
	AE2	21–30%	3	
Below (BE)	BE1	11–20%	2	
	BE2	1–10%	1	

-PHYSICS-
-003-
-Senior Sch

SECTION A: (100 Marks)

Answer all questions in this section.

1. a) Define **Physics** as a body of knowledge in science. (2 marks)

_____

_____

b) Identify **FOUR branches of Physics**. (4 marks)

i._____. ii._____.

iii._____. iv._____.

c) Explain **THREE ways Physics is important in day-to-day life**. (3 marks)

i._____.

ii._____ _____.

iii._____ _____.

d) Describe **ways Physics is related to other fields of study**. (3 marks)

i. Physics and Biology

._____.

._____ _____.

ii. Physics and Chemistry

._____.

._____ _____.

iii. Physics and Geography

._____.

._____ _____.

e) State **three career opportunity** associated with Physics. (3 marks)

i._____.

ii._____ _____.

iii._____ _____.

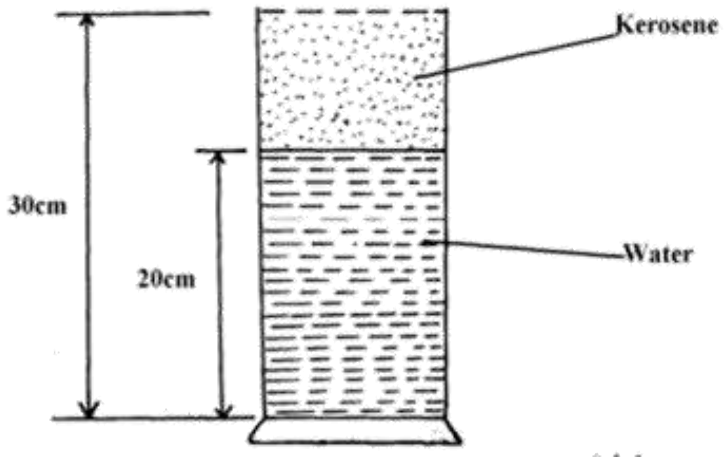
2. State **THREE factors that affect pressure in liquids**. (3 marks)

i._____.

ii._____ _____.

iii._____ _____.

3. The figure below shows a measuring cylinder of height 30cm filled to a height of 20cm with water and the rest occupied by kerosene

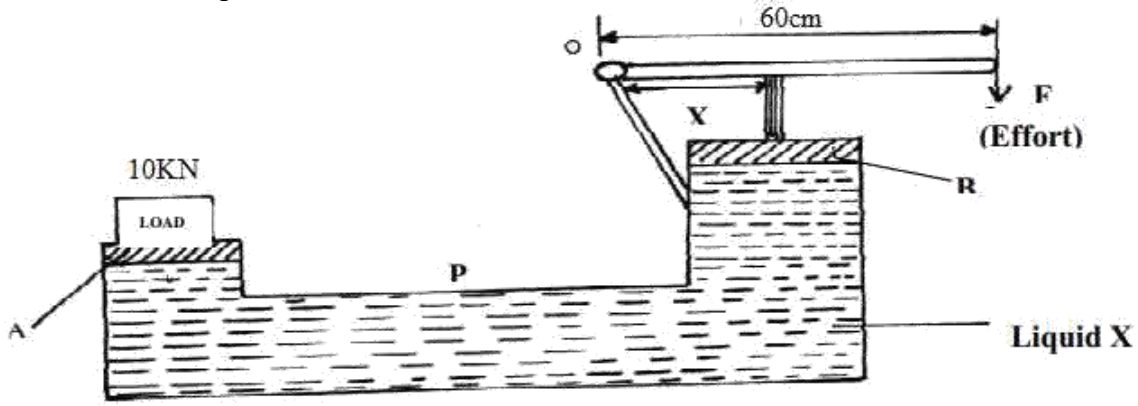


Given that density of water = $1000Kgm^{-3}$, density of kerosene = 800Kgm-3 and atmospheric pressure = $1.03x10^5$ pascals, determine the pressure acting on the base of the container. (3 marks)

4. State Pascal's principle of transmission of pressure(3 marks)

_____

5. The figure below shows a hydraulic press P which is used to raise a load of 10KN. A force F of 25N is applied at the end of a lever pivoted at O to raise the load



a. State one property of liquid X (1 mark)

i._____.

b. Determine the distance x indicated on the press if force on piston B is 100N. (3 marks)

6. *A copper wire being stretched by a Grade 10 learner.*

a) Define the following properties of materials: (4 marks)
i) Ductility

_____

_____

ii) Elasticity

b) State **TWO materials** that show **malleability** in everyday life. (2 marks)

i._____.

ii._____ _____.

c) A wire of original length **2.0 m** extends by **0.004 m** when a force is applied. (3 marks)
Calculate the **strain**. (3 marks)

d) A force of **400 N** is applied on a wire with cross-sectional area **0.0002 m²**.
Calculate the **stress**. (3 marks)

e) State **TWO industrial applications** of mechanical properties of materials. (2 marks)

i._____.

ii._____ _____.

f) Explain why **steel** is preferred over **glass** in construction. (2 marks)

i._____.

ii._____ _____.

7. State the reason why the speed of water at the narrow tube/section of a river is higher than at the wider section. (2mks)

_____.

_____ _____.

_____ _____.

8. State Hooke's law of elasticity (1mark)

_____.

_____ _____.

_____ _____.

9. a) Define **temperature**. (2 marks)

_____

_____

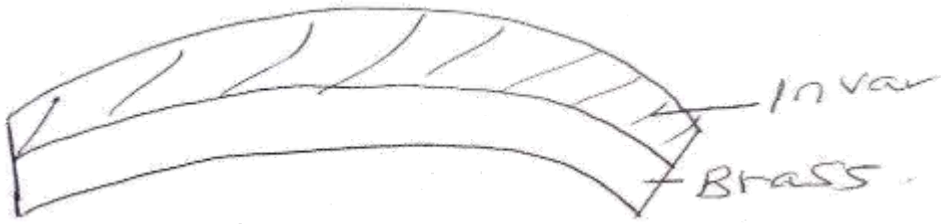
b) Name **THREE units of temperature**. (3 marks)

i._____.

ii._____ _____.

iii._____ _____.

c) The figure below shows the shape of a bi-metallic strip after it has cooled below room temperature.



Explain why the strip curved as shown. (3marks)

._____.

._____ _____.

._____ _____.

d) Identify **THREE temperature-measuring devices**. (3 marks)

i._____.

ii._____ _____.

iii._____ _____.

e) Describe the **unusual expansion of water** between 0°C and 4°C. (2 marks)

._____.

._____ _____.

._____.

f) State **THREE applications of thermal expansion** in daily life. (3 marks)

i._____.

ii._____.

iii._____.

10. a) Define: (4 marks)
i) Moment of a force

._____.

._____.

ii) Torque

_____.

._____.

b) State the **principle of moments**. (2 marks)

._____.

._____.

._____.

c) Explain **TWO states of equilibrium**. (4 marks)

i._____.

ii._____.

e) Describe how the **centre of gravity** affects the stability of an object. (3 marks)

i._____.

ii._____.

iii._____.

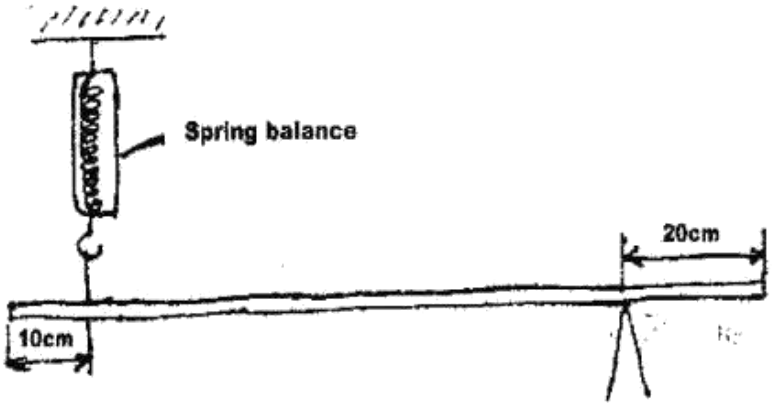
f) State **TWO applications of moments** in daily life. (2 marks)

i._____.

ii._____.

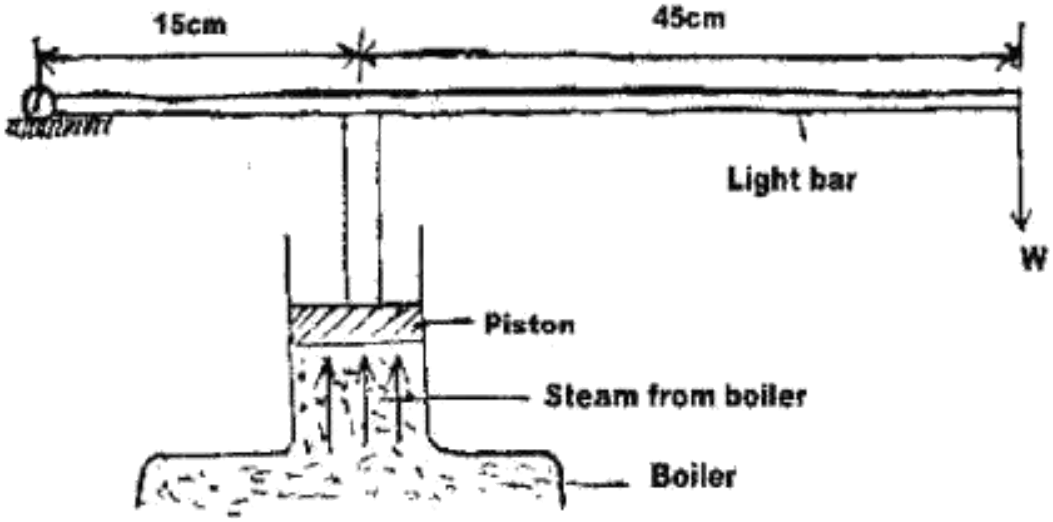
11. The figure below shows a uniform beam of length 1 m pivoted at the centre and ...

spring balance as shown.



Given that the reading of the spring balance is 0.6N. Determine the weight of the bar. (3 marks)

12. The figure shows a device for closing a steam outlet.



The area of the piston is 4.0×10^{-4} m^2 and the pressure of the steam in the boiler is 2.0×10^5 Nm^{-2}. Determine the weight W that just holds the bar in the horizontal position shown. (3 marks)

13.

a. State the principle of moments.
b. Two men P and Q carried a uniform ladder 3.6 m long weighing 1200N. P held the ladder from one end while Q supported the ladder at a point 0.4m from the other end.
    i. Sketch a diagram showing the forces acting on the ladder. (3 marks)

    ii. Calculate the load supported by each man(3 marks)

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NOVEMBER/DECEMBER HOLIDAY REVISION

TRIAL 2 REVISION QUESTIONS

For Marking Schemes, Contact:

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THE 47 COUNTIES C1 SCHOOLS' JOINT NATIONAL SBA ASSESSEMENT

KENYA CERTIFICATE OF BASIC EDUCATION

SENIOR SCHOOL ASSESSMENT

TERM 2: MIDTERM ASSESSMENT 2026

GRADE 10 – PHYSICS

Time: 2 Hours

LEARNER'S DETAILS

Name: _____. **School:** _____.

Assessment Number: _____. **Date:** _____.

School Code: _____. **Signature:** _____.

INSTRUCTIONS TO CANDIDATES

1. Write the details as required in the spaces above.
2. This paper consists of two sections: A and B.
3. Answer all questions in section A and section B.
4. Answer the questions in English.
5. All answers MUST be written in the spaces provided in the paper.
6. Do NOT remove any page from this question paper
7. Silent non programmable calculators may be used.
8. Assume:

    i. Acceleration due to gravity, **g = 10 m/s²**
    ii. Density of water = **1000 kg/m³**

FOR OFFICIAL USE ONLY (EXAMINER'S USE)

SECTION	SECTION A	SECTION B	% SCORE	EE1	EE2	ME1	ME2	AE1	AE2	BE1	BE2
SCORE RANGE	30 MARKS	60 MARKS		90-100	75-89	58-74	41-57	31-40	21-30	11-20	1-10
POINTS				8 POINTS	7 POINTS	6 POINTS	5 POINTS	4 POINTS	3 POINTS	2 POINTS	1 POINT
LEARNER'S TOTAL SCORE											

SECTION A (30 MARKS)

Answer ALL questions in this section.

1. Moraa, a Form 10 learner at Watamu Senior School, attends a career guidance session. During the session, Engineer Omondi explains how various physics branches are applied to solve real-life problems in the community.

(a) Define the following term he explained: (1 mark)

Physics

_____

_____

(b) Match each activity carried out by Engineer Omondi with the correct branch of Physics: (3 marks)

Task Performed	Branch of Physics
(i) Designing a refrigeration system for a dairy plant in Narok	(a) Geometrical Optics
(ii) Determining the force required to pull a tractor stuck in mud	(b) Thermodynamics
(iii) Repairing a lighthouse lens along the Coast	(c) Mechanics

(c) The engineer mentions that a radiologist applies Physics in hospitals.
State the specific branch of Physics involved. (1 mark)

_____.

(d) Explain one connection between Physics and Geography . (1 mark)

_____

_____

2. Chief Lemayian is vaccinating cattle using a syringe. He observes that when he pulls the plunger, the liquid enters the syringe.

(a) Using the concept of atmospheric pressure, explain why the liquid flows into the syringe. (1 mark)

_____

_____

(b) The Chief's son drinks fermented milk using a straw.
If pressure at the bottom of the glass is 101,500 Pa and atmospheric pressure is 101,000 Pa, determine the pressure due to the liquid only. (2 marks)

(c) Explain why heavy tractors are fitted with wide tyres instead of narrow ones. (1 mark)

_____

_____

3. Achieng uses a slingshot made of a rubber band. She notices that excessive stretching causes it to snap permanently.

(a) Name the point beyond which the material does not return to its original shape. (1 mark)

_____.

(b) A spring stretches by 2 cm when a force of 5 N is applied.
Calculate the spring constant (k). (2 marks)

(c) Differentiate between: (2 marks)

i. Ductility
ii. Brittleness

Ductility	Brittleness

4. An electric iron uses a bimetallic strip to control temperature in a modern house in Nanyuki Town.

(a) Name the two metals typically used in the strip. (2 marks)

i. _____.
ii. _____.

(b) Explain how bending of the strip prevents overheating. (2 marks)

_____

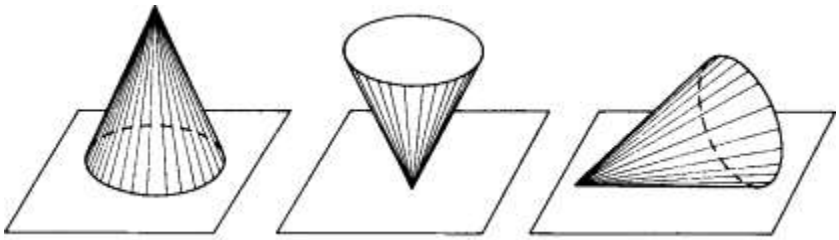
_____

(c) Give one reason why overhead power lines are left slack between poles. (1 mark)

_____

_____

5. Wekesa, a paper artist, is constructing a birthday cap for his children and wants to ensure it is stable.



(a) From the diagram provided, identify the most stable cap and explain why. (2 marks)

_____

_____

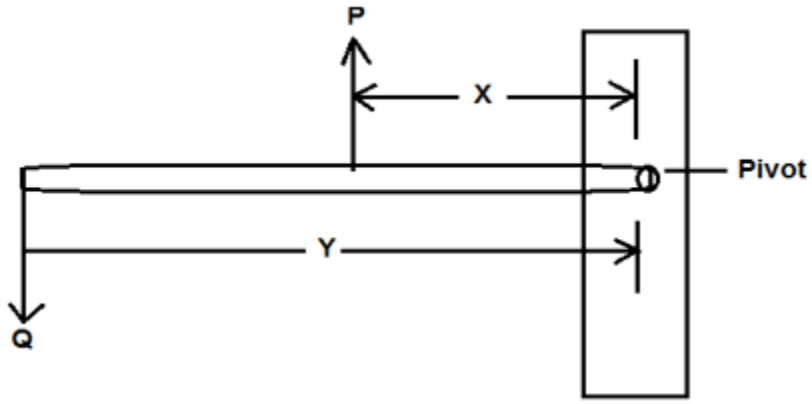
_____

(b) Define moment of a force. (2 marks)

_____

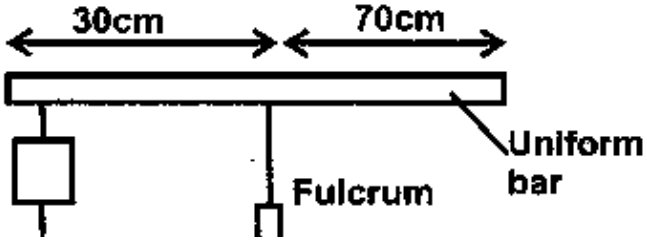
_____

(c) The figure below shows a beam of negligible weight balanced by constant forces P and R.



Derive the relationship between X and Y (2mks)

(d) The system the figure below is in equilibrium (2 marks)



(e) State the two conditions necessary for a body to be in equilibrium: (2 marks)

(i) _____.
(ii) _____.

SECTION B (60 MARKS)

6. Mutua is lifting a crate weighing 800 N to a height of 5 m using a pulley system in 20 seconds. Velocity Ratio = 2

(a) Calculate the work done. (2 marks)

(b) Determine the power produced. (2 marks)

(c) If the applied effort is 500 N, calculate the mechanical advantage. (2 marks)

(d) Find the efficiency of the system. (2 marks)

(e) Explain where energy losses occur in the machine. (2 marks)

(i) _____.
(ii) _____.

7. At a music festival, Otieno plays a guitar while Akinyi plays a flute, producing sound waves.



(a) State the type of wave produced by a vibrating guitar string. (1 mark)

_____.

(b) Differentiate between: (2 marks)

i. Reflection of sound
ii. Refraction of sound

_____
_____.

(c) Explain resonance and its role in amplifying sound. (2 marks)

_____
_____.

(d) Calculate the wavelength of a sound wave with frequency 170 Hz and speed 340 m/s. (2 marks)

8. At Mary Hill Girls Senior School, Grade 10 learners are carrying out a Physics experiment in the laboratory to study wave behavior. Under the guidance of their teacher, they explore interference and diffraction patterns using light and simple apparatus.

a. Distinguish between stationary and progressive waves. (2 marks)

_____
_____
_____
_____

b

_____

_____

_____

_____

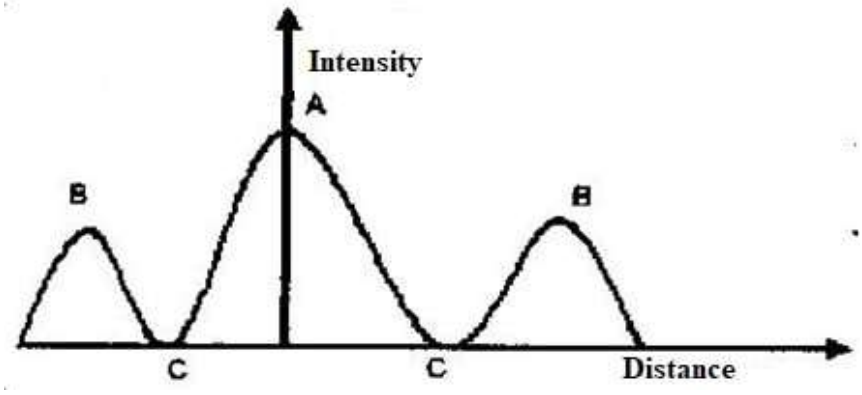
ii. State the condition for a minimum to occur in an interference pattern. (2 marks)

_____

_____

_____

c. The sketch graph below shows the results of an experiment to study diffraction patterns using double silt.



i. Sketch an experimental set up that may be used to obtain such a pattern. (2 marks)

ii. Name an instrument for measuring intensity (1 mark)

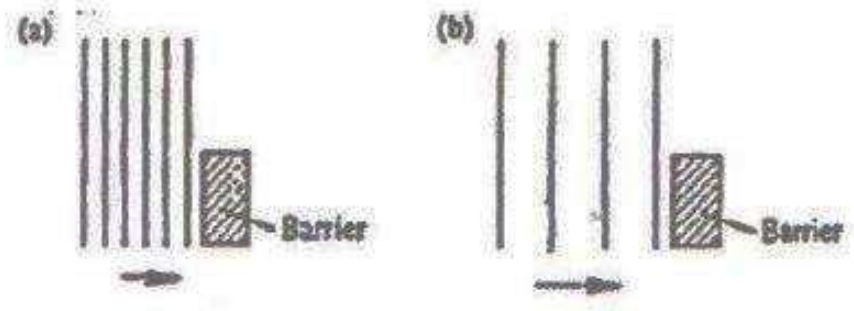
_____.

iii. Explain how the peaks labelled A and B and troughs labeled C are formed. (2 marks)

_____

_____

9. Figures (a) and (b) below show wave fronts incident on barriers blocking part of the path.



On the same figures sketch the wave fronts to show the behaviour of the waves as they pass each barrier and after passing the barrier. (1mk)

10. Scientists use radioactive tracers to study underground water movement.

a. What is meant by the following terms: (2 marks)

i. Radioactive decay

_____

_____

ii. isotope.

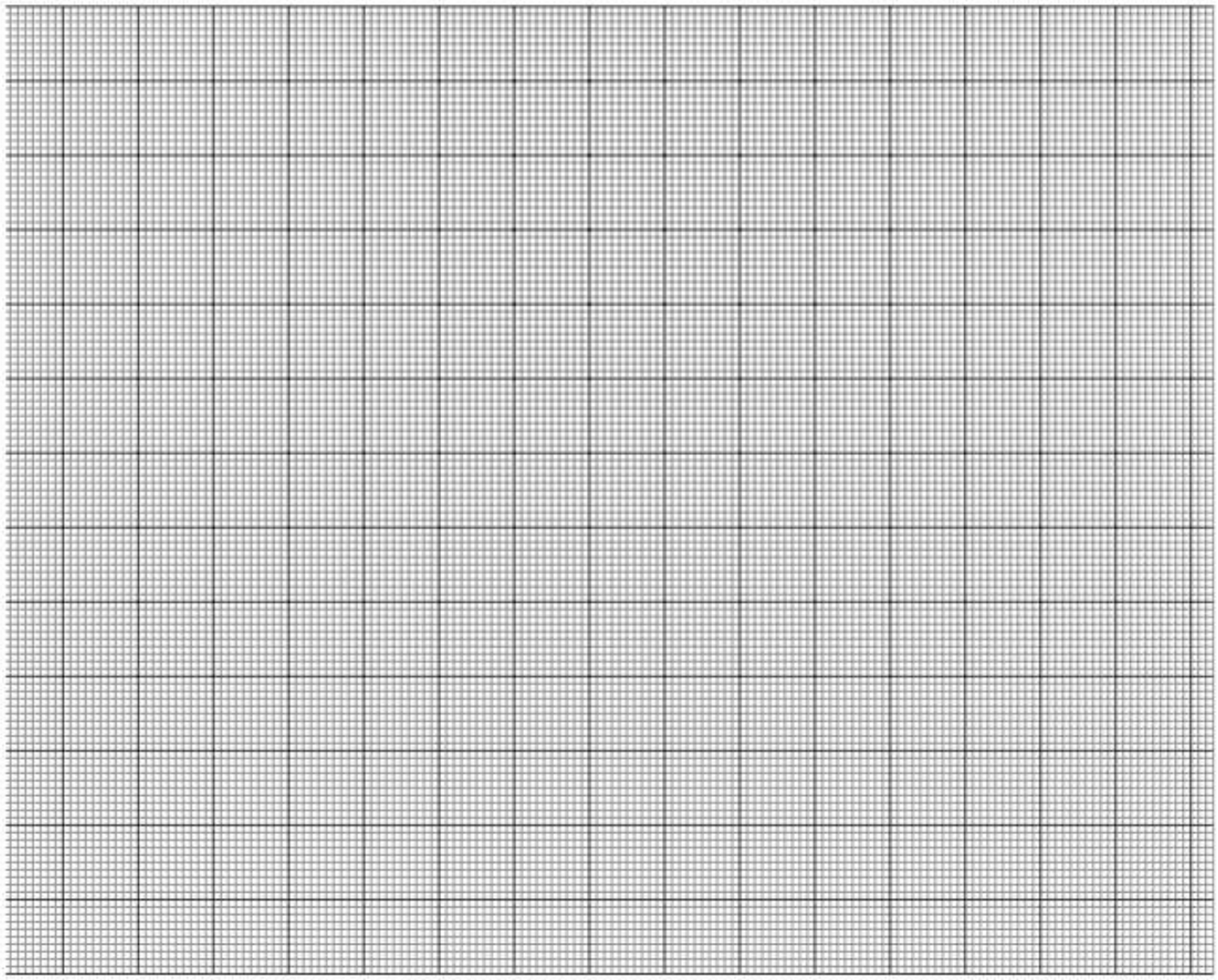
_____

_____

b. The table shows how the activity (disintegrations per minute) of a sample of carbon-14 varies with time (in years).

Time (grs)	0	2500	5000	7500	10000	12500	17250	20000
Disintegration/min	15	11	8	5	4.0	3.2	1.6	1.2

i. Plot a graph of activity against time (x-axis). (2 marks)



ii. Estimate the half-life of carbon-14 from the graph. (2 marks)

ii. Explain how it detects radioactive particles/rays. (1 mark)

d. State one use of radioactivity in each of the following;

i. Medicine(1 mark)

_____

_____

ii. Agriculture. (1 mark)

_____

_____

iii. Radon gas $^{222}_{86}Rn$ decays by emission of α particles. Show by use of an equation the transformation of the gas. (2 marks)

iv. Give two uses of cobalt - 60 as a Radioactive source. (2 marks)

_____

_____

11. (a) A radioactive carbon -14 decays to Nitrogen by beta emissions as shown.

$$^{14}_{6}C \rightarrow {}^{x}_{7}N + {}^{0}_{y}\beta$$

Determine the values of x and y in the equation. (2 marks)

b. State two safety precautions when disposing radioactive waste. (2 marks)

_____

_____

b. You are provided with the following apparatus:

A filter funnel, a thermometer, a stop watch, ice at 0°C, an immersion heater rated P watts, a beaker, a stand, boss and clamp and a weighing machine. Describe an experiment to determine the specific latent heat of fusion of ice. Clearly state the measurements to be made. (3mks)

c. 200 g of ice at 0°C is added to 400 g water in a well lagged calorimeter of mass 40 g.The initial temperature of the water was 40°C. If the final temperature of the mixture is X°C,

(*Specific latent of fusion of ice L = 3.36 x 105 Jkg^{-1}, specific heat capacity of water, c = 4200 $Jkg^{-1}K^{-1}$, specific heat capacity of copper = 400 $Jkg^{-1}K^{-1}$)*

i. Derive an expression for the amount of heat gained by ice to melt it and raise its temperature to X°C (2mks)

ii. Derive an expression for the amount of heat lost by the calorimeter and its content when their temperature falls to X°C. (2mks)

iii. Determine the value of X. (2mks)

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GRADE 10 INTER C1 SENIOR SCHOOLS END OF YEAR EXAMINATIONS

KENYA CERTIFICATE OF BASIC EDUCATION

SENIOR SCHOOL ASSESSMENT

TERM 3: ENDTERM ASSESSMENT 2026

GRADE 10 – PHYSICS

Time: 2 Hours

LEARNER'S DETAILS

Name: _____. **School:** _____.

Assessment Number: _____. **Date:** _____.

School Code: _____. **Signature:** _____.

INSTRUCTIONS TO LEARNERS

1. This paper consists of **TWO sections: A and B**.
2. Answer **ALL questions** in both sections.
3. Show **all working** in numerical questions.
4. Give answers to numerical questions to an appropriate number of significant figures where necessary.
5. Use the following values unless otherwise stated:

- $g = 10\ N/kg$
- Density of water $= 1000\ kg/m^3$
- Speed of light in vacuum $= 3.0 \times 10^8\ m/s$

6. Non-programmable calculators may be used where necessary.

FOR OFFICIAL USE ONLY (EXAMINER'S USE)

SECTION	SECTION A	SECTION B	% SCORE	EE1	EE2	ME1	ME2	AE1	AE2	BE1	BE2
SCORE RANGE	30 MARKS	60 MARKS		90-100	75-89	58-74	41-57	31-40	21-30	11-20	1-10
POINTS				8 POINTS	7 POINTS	6 POINTS	5 POINTS	4 POINTS	3 POINTS	2 POINTS	1 POINT
LEARNER'S TOTAL SCORE											

SECTION A (30 MARKS)

Answer ALL questions in this section.

a) Define **Physics** as a science. (1 mark)

_____

i. _____

ii. _____

2.

a) Explain why atmospheric pressure exists even though air cannot be seen. (1 mark)

_____

_____

b) A diver is swimming at a depth of **8 m** below the surface of fresh water. Calculate the pressure exerted by the water on the diver. (2 marks)

3. A hydraulic lift has a small piston of area 0.02 m^2 and a large piston of area 0.8 m^2.

a) State the principle on which a hydraulic machine operates. (1 mark)

_____

_____

b) A force of 150 N is applied to the small piston. Determine the force exerted by the large piston. (2 marks)

4. A spring has an original length of 20 cm**. When a force of** 15 N **is applied, its length becomes** 26 cm**.**

a) Determine the extension of the spring in metres. (1 mark)

5.

a) Distinguish between **temperature** and **heat**. (2 marks)

_____

_____

_____

_____

b) Explain why small gaps are left between sections of railway tracks. (1 mark)

_____

_____

6.

A uniform metre rule is balanced at the **50 cm mark**. A load of **20 N** is suspended at the **20 cm mark**.

a) State the principle of moments. (1 mark)

_____

_____

b) Calculate the force that must be suspended at the **80 cm mark** to balance the metre rule. (2 marks)

7.

A learner of mass **60 kg** climbs a staircase through a vertical height of **5 m** in **10 seconds**.

a) Calculate the work done against gravity. (1 mark)

8.

A water wave has a frequency of **5 Hz** and a wavelength of **0.8 m**.

a) Calculate the speed of the wave. (2 marks)

b) State one application of the Doppler effect. (1 mark)

_____

_____

9.

a) What is meant by the **half-life** of a radioactive substance? (1 mark)

_____

_____

b) A radioactive sample has an initial mass of **160 g**. Its half-life is **4 hours**. Determine the mass remaining after **12 hours**. (2 marks)

10.

A resistor of resistance **6 Ω** is connected across a **12 V** supply.

a) Calculate the current flowing through the resistor. (1 mark)

b) Calculate the electrical power dissipated by the resistor. (2 marks)

SECTION B: 50 MARKS

Answer ALL questions in this section.

11.

A school science laboratory uses a hydraulic system to raise heavy equipment. The system consists of two pistons connected by an incompressible liquid.

The small piston has an area of $0.025\ m^2$, while the large piston has an area of 0.50 m.

a) Explain why pressure applied to the liquid is transmitted throughout the liquid. (2 marks)

_____

_____

b) A force of **180 N** is applied to the small piston. Calculate the pressure produced in the liquid. (2 marks)

c) Determine the force exerted by the large piston. (2 marks)

d) The large piston is required to raise a load of **3,000 N**. Determine the minimum force that must be applied to the small piston. (2 marks)

ii. _____

12.

A learner investigates the extension of a metal wire by applying different loads. The wire has an original length of **2.0 m** and a cross-sectional area of $1.5\times10^{-6}\ m^2$.

When a force of **150 N** is applied, the wire extends by **2.0 mm**.

a) Define: (2 marks)

i. Stress

_____

_____

ii. Strain

_____

_____

b) Calculate the stress in the wire. (2 marks)

c) Calculate the strain produced in the wire. (2 marks)

d) Determine the Young's modulus of the material. (2 marks)

13.

A uniform beam of length **4.0 m** and weight **200 N** is supported at two points, A and B. Point A is **0.5 m** from the left end while B is **0.5 m** from the right end.

A load of **600 N** is placed **1.0 m** from the left end of the beam.

a) State the two conditions necessary for a body to be in equilibrium. (2 marks)

i. _____
ii. _____

b) Calculate the clockwise moment produced by the **600 N** load about point A. (2 marks)

c) Determine the reaction force at B by taking moments about A. (3 marks)

d) Hence determine the reaction force at A. (1 mark)

e) Give **two practical applications** of the principle of moments. (2 marks)

_____
_____

14.

A construction worker uses a pulley system to raise a **500 kg** load through a vertical distance of **6 m**. The effort

b) Calculate the work input to the machine. (2 marks)

c) Determine the efficiency of the machine. (2 marks)

d) Calculate the mechanical advantage of the machine. (2 marks)

e) Calculate the velocity ratio of the machine. (1 mark)

f) Explain why the efficiency of a real machine cannot normally be 100%. (1 mark)

_____

_____

15.

(a) A sound wave has a frequency of 680 Hz **and travels through air at** 340 m/s**.**

(b) A radioactive isotope has a half-life of 6 years**. A sample initially contains** 800 mg **of the isotope.**

Calculate the amount remaining after **18 years**. (2 marks)

(c) A battery has an electromotive force of 12 V **and an internal resistance of** 1 Ω**. It is connected to an external resistor of** 5 Ω**.**

i) Calculate the total resistance of the circuit. (1 mark)

ii) Determine the current supplied by the battery. (1 mark)

iii) Calculate the terminal potential difference of the battery. (1 mark)

(d) A community experiences increasingly frequent droughts and unusually high temperatures.

i) Explain the relationship between the greenhouse effect and climate change. (1 mark)

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ii) State **one human activity** that increases the concentration of greenhouse gases. (1 mark)

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iii) Suggest **one practical measure** the community can adopt to reduce its contribution to climate change. (1 mark)

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