NAME _____ INDEX NO. _____

CANDIDATE'S SIGNATURE _____

DATE _____

232/1
PHYSICS
PAPER 1
(THEORY)
JULY/AUGUST 2011
2 HOURS

FORM 4 MID – YEAR ASSESSMENT TEST 2011
Kenya Certificate of Secondary Education
PHYSICS
PAPER 1
THEORY
2 HOURS

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index numbers in the spaces provided above.
(b) This paper consists of TWO sections, A and B.
(c) Answer all the questions in section A and B in the spaces provided.
(d) All working MUST be clearly shown.
(e) Candidates should check the question paper to ascertain that all the papers are printed.
(f) Non-programmable silent electronic calculators and KNEC mathematical table may be used.

For examiner's use only

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-13	25	
B	14 15 16 17 18	08 11 15 08 13	
TOTAL		80	

This paper consists of 15 printed pages

Turn Over

SECTION A (25 MARKS)
ANSWER ALL QUESTIONS IN THIS SECTION

1. Figure 1 below is an arrangement of two set squares and a ruler used to determine the external diameter of a cylinder

4 5 6 7 Fig. 1

Record the diameter of the cylinder (1mk)

2. Figure 2 below shows the forces acting on a rain drop which is falling to the ground

A B Rain drop Fig 2

(i) Name force A which causes the drop to fall (1mk)

(ii) Force B is the force opposing the motion of the drop. State one of the possible causes of this force (1mk)

3. Figure 3 below shows a U-tube connected to a gas supply. Determine the pressure of the gas. (Atmospheric pressure = 76cmHg) (2mks)

Fig 3

4. Passengers are not allowed to stand on a moving bus. State and explain the reason (2mks)

5. The figure below shows some thumb pins fixed on a piece of wood. A piece of paper is then stuck on the thumb pins

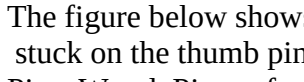


Fig 4

When the set-up is passed over a Bunsen burner flame, the paper gets charred except on areas above the thumb pins. Explain this observation (2mks)

6. The diagram below shows an arrangement used to determine the upper fixed point of ungraduated thermometer

Thermometer T Liquid A Heat Fig 5

(i) Name liquid A (1mk)

(ii) Give a reason why the bulb of the thermometer is not dipped in liquid A (2mks)

7. In the diagram shown below, air is blown through a drinking straw to pass over the open end of a capillary tube

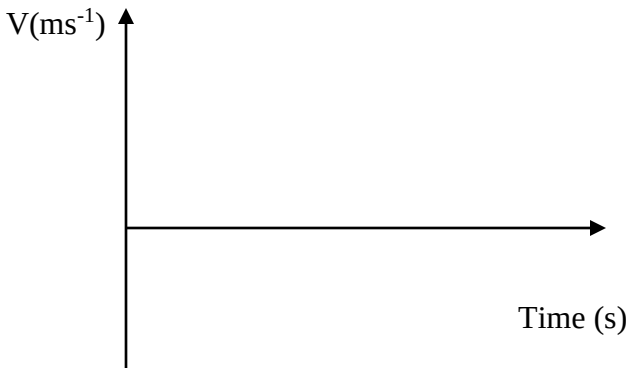
Air blown in Straw Capillary tube Water

State and explain the observation (2mks)

8. The springs A, B, C and D are identical and each extends by 2cm when a force of 10N is suspended from it
50N Fig 6

Determine the extension of the system (3mks)

9. On the axis provided below, sketch a velocity-time graph of a motion of a stone thrown vertically upwards from the edge of a platform and eventually the stone lands without bouncing on the ground below the platform
(1mk)



10. The figure below shows the path of a mass M attached to a string being whirled in a horizontal circle

String M

Sketch on the diagram the path the mass follows if the string breaks at the position shown (1mk)

11. A fisherman on a boat offloads fish from the boat by throwing them to the land. State two observable changes as he ressumes fishing (2mks)

12. Am oil drop of volume $0.004cm^3$ spread into a film of diameter 28cm. Estimate the diameter of one molecule of the oil. (Leave your answer in standard form) (3mks)

13. Using the idea of particles explain why the pressure inside the tyre is increased when it is pumped up (1mk)

SECTION B (55 MARKS)

Answer ALL the questions

14. A student carried out an experiment to investigate the relationship between temperature and length of air column in a school laboratory. He obtained the results and plotted the graph below.

(a) From the graph, determine

(i) The length of the air column at 50^0C (1mk)

(ii) The slope of the graph (3mks)

(iii) The equation relating the length Ycm of the air column with temperature x^0C (1mk)

(b) State the law that relates temperature of a fixed mass of a gas with its volume (1mk)

(c) Explain why this law is not entirely obeyed by the air column as suggested by the graph (2mks)

15. (a) Define moment of a force (1mk)

(b) The figure below shows a uniform bar in equilibrium

A B

When water is added into the beaker A and B until the weights are submerged, it is observed that the bar tips towards B. Explain this observation (2mks)

(c) A uniform metre rule of uniform width 2.5cm and thickness 0.5cm is suspended at the 80cm mark and kept balanced by hanging a mass of 150g at 100cm mark

80cm 100cm 150g

Determine

(i) The mass of the metre rule (3mks)

(ii) The density of the material of the metre rule (3mks)

(iii) The tension T in the string (2mks)

16. Two similar cans are partly filled with equal quantities of paraffin. Each can is covered by a lid holding a thermometer as shown below. The cans are placed on a wooden bench at the same distance from a radiant heat

Paraffin dull surface Heater Bright surface Paraffin Thermometers

One has a dull black surface and the other bright silver surface. The following temperatures were recorded

Time (minutes	0	1	2	3	4	5
Temperatures (^{0}C) dull surface	19	21	23	25	27	29
Temperature (^{0}C) bright surface	19	20	21	22	23	24

(a) Study the table above and explain why there is a difference between the rates of heating of the two cans (1mk)

(b) Explain why the heat from the heater could reach the can by only radiation but not through either conduction or convection (2mk)

(c) Give a reason why paraffin is a better liquid to be used in this experiment than water (1mk)

(d) A student put some small pieces of ice in a beaker and sprinkled salt on the ice. He stirred until the ice melted and took the temperature of the content in the beaker as shown below.

Thermometer Salt Ice

(i) State the observation made (1mk)

(ii) Explain the observation made (1mk)

(e) The figure below shows a block of ice with two heavy weights hanging such that the copper wire connecting them passes over the block of ice

Ice block Wooden support Weights

(i) It is observed that the wire gradually cuts its way through the ice block, but leaves it as one piece. Explain (4mks)

(ii) What change would be observed if the copper wire is replaced by a cotton thread (1mk)

(f) A jet of dry steam at 100^0C is sprayed on the surface of 100g of dried ice at 0^0C contained in a well-lagged calorimeter of negligible heat capacity until all the ice has melted and the temperature begin to rise. The mass in the calorimeter when the temperature reaches 40^0C is found to be 120g. Assuming that the specific latent heat of fusion of ice is $336000 Jkg^{-1}k^{-1}$ specific heat capacity of water is $4200 Jkg^{-1}k^{-1}$. Determine the specific latent heat of vaporization of water. (4mks)

17. The figure below shows a hydraulic press used to lift a load L. The effort applied is 160N at the end of the lever 36cm long and pivoted at the other end. The plunger is 6cm from the pivot. The area of the plunger piston A is $4 \times 10^{-2}m^2$ and that of the load piston B is $4 \times 10^{-4}m^2$

6cm Pivot 160N B $4 \times 10^{-4}m^2$ A $4 \times 10^{-2}m^2$

Determine

(a) Pressure exerted at piston A (3mks)

(b) Weight of the load L being lifted (3mks)

(c) If the small piston moves down a distance of 5cm, determine how far upwards the larger piston moves (2mks)

18. (a) State Newton's second law of motion (1mk)

(b) A bus of mass 3000kg traveling at a velocity of 20m/s collides with a stationary car of mass 600kg. The two then move together at a constant velocity for 30 seconds.
Find

(i) The common velocity after impact (3mks)

(ii) The distance moved after impact (2mks)

(iii) The impulse (2mks)

(iv) Kinetic energy before collision (2mks)

(v) Kinetic energy after collision (2mks)

(vi) State a reason why kinetic energy before collision is not the same as kinetic energy after collision (1mk)

232/1
PHYSICS
PAPER 1
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PAPER 1
THEORY
MARKING SCHEME

1. 6.3 cm – 4.85 cm = 1.45 cm√

2. (i) Weight (force due to gravity)√
   (ii) Upthrust or viscous force (drag)√

3. Pressure at A = pressure at B √
   10 + Atmospheric pressure = Gas pressure + 10
   Atmospheric pressure = Gas pressure
   Gas pressure = 76cmHg√

4. The bus is likely to overturn√
   - Standing passengers raise the C.G√

5. Thumb pins are good conductors of heat. Heat is conducted away at points where the pins are and therefore the paper is not charred.√

6. (i) Water√
   (ii) Boiling point of water is affected by impurities√ and therefore steam√ is used.

7. Velocity of air above the straw increases lowering the pressure.√
   Greater atmospheric pressure outside the straw pushes the water up.√

8. $F = Ke$√
   $K = \frac{F}{e}$ $\frac{10}{2}$ = 5N/cm

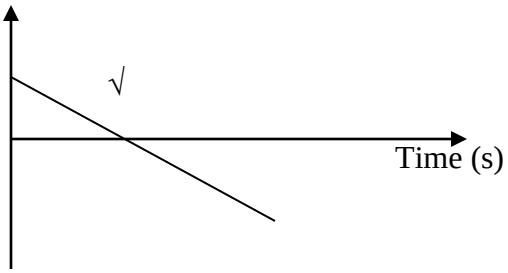
   $e = \frac{50}{5}$ = 10cm

   Parallel arrangement $e = \frac{10}{2}$ = 5cm
   Series arrangement e = 10 x 2 = 20cm √
   Extension of the system
   e = 20 + 5
   = 25cm√

This paper consists of 4 printed pages

Turn Over

9. V m/s



10. Path if string cuts

11. - The boat floated shallowly √
    - The level of the water in the boat dropped.√

12. Volume of the drop = Volume √of the patch
    $0.004 = \pi(14)^2 d$√
    $d = 0.0000065$
    $= 6.5 \times 10^{-6}$cm√

13. More air is pumped into the tyre. The number of particles colliding with the walls increases the increase in the rate of change of momentum, hence the force per unit area increases.√

SECTION B

14. (a) (i) 7.7√
    (ii) Slope = $\frac{\text{Change in y}}{\text{Change in x}}$
    $= \frac{6.7 - 6.0}{30 - 15}$√
    $= 0.04667$ cm/^{0}C√
    (iii) $y = 0.04667x + 5.4$√
    (b) Charles law – the volume of a fixed mass of a gas is directly proportional to its temperature at a constant pressure√
    or
    $V \alpha T$ (p constant)
    (c) The law applies to ideal gases√ only and air is a mixture √of gases.

15. (a) Product of force and perpendicular distance from the point of application of the force to the fulcrum.√
    (b) The larger object A displaces√ more water so has higher upthrust.√
    (c) (i) $F_1 d_1 = F_2 d_2$√
    Sum of clockwise = sum of anticlockwise
    Moments moments
    150 x 20 = 30 x m √
    M = 100g/or 0.1kg√

(ii) $\rho = \frac{m}{v}\surd$

$= \frac{100}{2.5 \times 0.5\surd \times 100}$

$= 0.8 g/cm^3\surd$

(iii) $W + 1.5 = 1 + 1.5$

$T = 2.5N\surd$

16. (a) Dull surfaces are better absorbers and emitters of heat than bright silver surfaces.√

(b) Air is a poor conductor of heat convectional currents of air move upwards√ due to density difference.

(c) Paraffin has a lower√ heat capacity than water, hence higher√ temperature change per unit mass within the same time

(d) (i) Melts at a temperature lower than 0^0C.√

(ii) Impurities (salt) lower the melting point of water.√

(e) (i) Due to weights the wire exerts pressure on the ice beneath it √and therefore makes it melt at a temperature lower than its melting point,√ once the ice has melted the water formed flows over the wire and immediately solidifies since√ it is no longer under pressure. As it solidifies, the latent heat of fusion is given out, conducted by copper wire and melts the ice below it.√

(ii) Cotton thread would not cut through the ice since it is a poor conductor.√

(f) Heat lost = Heat gained √

$(0.02 Lv) + (0.02 \times 4200 \surd \times 60$

$= (0.1 \times 33600) + (0.1 \times 4200\surd \times 40)$

$Lv = 2268000 J/kg\surd$

17. (a) $36 \times 160 = 6 \times F_1\surd$

$F_1 = 960N$

$PA = \frac{F_1}{A_1}$

$= \frac{960}{0.0004}\surd$

$= 2400000 N/M^2\surd$

(b) $P_B = P_A = 2400000$

$P_B = \frac{F_2\surd}{A_2}$

$2400000 = \frac{F_2}{4 \times 10^{-2}}\surd$

$F_2 = 96000N$ √(weight of the load)

(c) $5 \times 4 \times 10^{-4} = 4 \times 10^{-2} \times x\surd$

$x = \frac{5 \times 4 \times 10^{-4}\surd}{4 \times 10^{-2}}$

$x = 5 \times 10^{-2} m\surd$

18. (a) The rate of change of momentum of a body is directly proportional to the applied force and takes place in the direction in which the force acts.

(b) (i) $M_1V_1 + M_2V_2 = V(M_1 + M_2)$

$3000 \times 20 + 600 \times 0 = V(3000 + 600)$

$60000 + 0 = 3600V$

$V = \frac{60000}{3600}$

$= 16.67 m/s$

(ii) $S = \frac{D}{T}$

$D = S \times T$

$= 16.67 \times 30$

$= 166.7 \times 3$

$= 500.1$

$= 500m$ (15.7)

(b) (iii) $I = MV - MU$

$= 3000 \times 16.67 - 3000 \times 20$ √

$= 30 \times 1667 - 60000$

$= 50\,010 - 60000$

$= -9990$

$\therefore$ Impulse $= 9990 kgms^{-1}$√

(iv) $K = \frac{1}{2} mv^2$

$= \frac{1}{2} \times 3000 \times 20 \times 20$√

$= 600000J$

(v) $\frac{1}{2} \times 3000 \times 16.67$√$\times 16.67$

$= 15 \times 1667 \times 16.67$

$= 416833.4J$√

(vi) Kinetic energy is not conserved√

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232/2
PHYSICS
PAPER 2
(THEORY)
JULY/AUGUST 2011
2 HOURS

FORM 4 MID – YEAR ASSESSMENT TEST 2011
Kenya Certificate of Secondary Education
PHYSICS
PAPER 2
THEORY
2 HOURS

INSTRUCTIONS TO CANDIDATES

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SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-10	25	
B	11 12 13 14 15	10 12 13 10 10	
	TOTAL	80	

This paper consists of 9 printed pages

SECTION A (25 MARKS)

(Answer all the questions in this section in the spaces provided)

1. The figure 1 below shows how two magnets are stored in pairs with keepers at the ends

Fig 1 S N N S

Explain how the keepers keep the magnets from demagnetization (2mks)

2. State two advantages of an alkaline battery over a lead acid battery (2mks)

3. The figure 2 shows a negatively charged rod brought slowly near the cap of a positively charged leaf electroscope

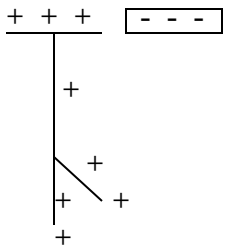


Fig 2

State what is observed and explain your observation (3mks)

4. Give a reason why the core of the electromagnet of an electric bell is made of soft iron and not steel (1mk)

5. The figure 3 shows two parallel rays incident on a concave mirror. F is the focal point of the Mirror

F

On the same diagram sketch the path of the rays after striking the mirror (2mks)

6. (a) Which of the quantities: wavelength, amplitude and velocity change when

(i) A wave is reflected (1mk)

(ii) A wave is refracted (2mks)

7. A capacitor of capacitance 2000μ F is charged to a potential of 6V. Calculate the charge stored in the capacitor (3mks)

8. A current of 13A flows through a heating element of resistance 8.5Ω for 1.5 minutes. Calculate the quantity of heat supplied (3mks)

9. With the time base switched on the following traces wave obtained on the C.R.O as shown below

Draw a circuit diagram that can be used to produce the wave (3mks)

10. The half life of a radioactive substance is 1 minute. If the reading of 200 microamperes is obtained on a rate meter at a given time, what is the reading three minutes later (3mks)

SECTION II (55 MARKS)

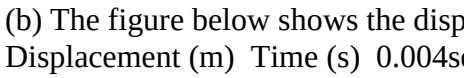
11. (a) Give one example of

(i) Transverse wave (1mk)

(ii) Longitudinal wave (1mk)

(iii) What is the main difference between these two types of waves (2mks)

(b) The figure below shows the displacement time graph for a wave



(i) How many complete cycles are shown (1mk)

(ii) What is the frequency of the wave form shown (2mks)

(c) A radiowave has a frequency of 3MHz and travels with a velocity of 3×10^8m/s. What is its wavelength (3mks)

12. (a) State Lenz's law of electromagnetic induction (1mk)

(b) The figure shows a simple microphone which sound waves from the person talking cause the cardboard diaphragm to vibrate

(i) Explain how a varying current is induced in the cell when the diaphragm vibrates (3mks)

(ii) State two ways in which the induced current in (i) above can be increased (2mks)

(c) An ideal transformer has 2000 turns in the primary circuit and 200 turns in the secondary circuit. When the primary circuit is connected to a 400V ac source the power delivered to a resistor in the secondary is found to be 800W. Determine current in

(i) The secondary circuit (3mks)

(ii) The primary circuit (3mks)

13. (a) A defective eye focuses a distant object as shown below

(i) State the eye defect (1mk)

(ii) Suggest a suitable lens to correct the defect (1mk)

(iii) Draw on the same diagram a suitable correction of the defect (2mks)

(b) An object is placed 15cm from a diverging lens of focal length 12cm
Find

(i) Position of image (3mks)

(ii) Nature of image (2mks)

(iii) Magnification of the lens (2mks)

(iv) Power of the lens (2mks)

14. The graph below shows the variation of potential difference against current for a certain set up
X^{-1} V I(A) 1 2 3 4 5 5 10 15 20 20 $X10^{-1}$v

(a) Draw a possible set up that can be used to carry out this experiment (2mks)

(b) Describe how the experiment was carried out (3mks)

(c) From the graph, determine

(i) Electromotive force, E (2mks)

(ii) Internal resistance of cells used (3mks)

15. (a) Distinguish between intrinsic and extrinsic semi-conductor (2mks)

(b) (i) A junction diode is used as a rectifier. Draw a simple circuit diagram to show how two junction diodes and a centre-tapped transformer can be used to produce a full wave rectified a.c (3mks)

(ii) Name other two uses of a junction diode (2mks)

(c) The graph in fig shows a forward bias characteristic of a P-N junction

I(MA) A P.d(V) 0

The depletion layer increases from O to A. explain what is meant by depletion layer (3mks)

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PHYSICS
PAPER 2
(THEORY)
JULY/AUGUST 2011

FORM 4 MID – YEAR ASSESSMENT TEST 2011
Kenya Certificate of Secondary Education
PHYSICS
PAPER 2
THEORY
MARKING SCHEME

1. The keepers are good magnetic materials concentrating the magnetic field √and making the dipoles to form closed loops.√

2. Large currents can be drawn.√
   Requires less maintaince.√

3. Divergence of leaf decreases.√
   Positive charges are attracted√ at the cap hence reducing the √charges at the rod and leaf thus decrease in divergence.

4. Easily magnetized √and demagnetized.

5. F

6. (i) None√ (1mk)
   (ii) Wavelength √
   Velocity√

7. $Q = CV$√
   $= 2000 \times 10^{-6}\ F \times 6$√
   $= 12000 \times 10^{-6}$
   $= 1.2 \times 10^{-2} C$√

8. $E = I^2RT$√
   $= 13^2 \times 8.5 \times 1.5 \times 60$√
   $= 1.293 \times 10^5 J$√

This paper consists of 4 printed pages

Turn Over

9. Diode A.C Source R To C.R.O AC Source√Diode √ Terminals to C.R.O√

10. 1 min later the reading fall to
½ x 200 = 100√
3 minutes later the reading falls
½ x ½ x ½ x 200
= 25 microAmps√

11. (a) (i) Transverse wave
- Water waves
- Waves on a string √any one

(ii) Longitudinal wave
- Sound wave√

(iii) In transverse waves, the vibration of the particles is at right angles to the direction of wave travel √
In longitudinal, the vibration of the particles is in a direction parallel to the direction of the wave travel√

(b) (i) 4√

(ii) $f = \frac{1}{T}$ √$= \frac{1}{0.001}$ √= 1000HZ√

(c) V = Fɮ√

$ɮ = \frac{v}{f}$

$= \frac{3 \times 10^8}{3 \times 10^6}$√

$= 1 \times 10^2$

= 100m √

12. (a) The induced current flows in such a direction that its magnetic effect oppose the change producing it

(b) (i) As the diaphragm vibrates, it causes the coil to <u>move back and forth</u> in the magnetic field <u>cutting the field lines</u>, this causes a <u>varying emf to be</u> induced in the coil which causes a varying current to flow.

(ii) Increasing number of turns in the coil increasing the strength of the magnet

(c) (i) $\frac{V_P}{V_S} = \frac{N_P}{N_S}$ √

$\frac{2000}{200} = \frac{400}{V_S}$

$V_S = 40V$ √

$P = I_S V_S = 800W$

$I_S = \frac{800w}{40V}$

$= 20A$ √

(ii) $P_P = P_S$ √

$800W = 400 \times IP$

$IP = \frac{800}{400}$

$= 24A$ √

13. (a) (i) Short sighted

(ii) Concave lens

(iii) Diverging rays √

Converge at the retina √

(b) U = 15cm

f = -12cm

(i) $\frac{1}{f} = \frac{1}{U} + \frac{1}{V}$ √

$\frac{1}{V} = \frac{1}{f} - \frac{1}{u}$

$= \frac{1}{-12} - \frac{1}{15}$ √

$= \frac{-5 - 4}{60}$

$V = \frac{60}{-9}$

$= -6.67cm$

$= -6.7cm$

(ii) Virtual

Diminished

Upright

(iii) $M = \frac{V}{U}$ √

$= \frac{-20}{45}$

$= -0.44$ √

(iv) $P = \frac{1}{F}$

$= \frac{1}{12}$

$= 0.0833D$

14. (a) R V A 2 cells√

Resistor parallel to voltmeter√

(b) Obtain the E.M.F√

- Vary√ R and obtain the corresponding√ values of I and V

(c) (i) V = E at y intercept√

3V – reading off√

(ii) Slope = 0.5√

-I r = 0.5√

r = 0.5Ω√

15. (a) Intrinsic is a pure semi-conductor where the charge carriers come from within.
Extrinsic is an impure semi – conductor which contains impurity atoms group 3 or 5, the charge carriers arise from the impurity atoms

(b) (i) AC R D_1 D_2

Correct symbols

Working circuit

(ii) – Protect a circuit from damage by a reversed power supply
- As a switch
- In charging a battery using solar panel

} any two

(c) It is a region in a junction diode occupied by <u>uncovered ions</u> which set up a <u>potential barrier</u> or p.d

It occurs when the mobile charge current from either sides of the junction <u>recombine</u>

NAME _____ INDEX NO. _____

CANDIDATE SIGNATURE _____

DATE _____

232/3
PHYSICS
PAPER 3
(PRACTICAL)
JULY/AUGUST 2011
2 ½ HOURS

FORM 4 MID – YEAR ASSESSMENT TEST 2011
Kenya Certificate of Secondary Education
PHYSICS
PAPER 3
PRACTICAL
2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index numbers in the spaces provided above.
(b) Answer ALL the questions in the spaces provided in the question paper
(c) You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work.
(d) Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them
(e) Candidates are adviced to record their observations as soon as they are made
(f) Mathematical tables and electronic calculators may be used
(g) This paper consists of printed pages

Question 1

	a	c	e	f	g	h	Total
Maximum score	2	1	7	5	3	2	20
Candidates score							

Question 2

	d	g	h	i	j	k	l	Total
Maximum score	1	7	5	3	2	1	1	20
Candidates score								

Grand Total | |

This paper consists of 7 printed pages

Turn Over

1. You are provided with the following

A 50g mass
Stand and clamp
G – clamp
Thread
Half metre rule
A metre rule with a pointer fixed at one end
Vernier callipers

Proceed as follows

(a) Using the vernier callipers provided measure the width w and thickness h of the metre rule

w _____ cm (1mk)

h _____ cm (1mk)

(b) Clamp the metre rule at the edge of the bench at 20cm mark using the G-clamp. The metre rule will remain fixed in this position through out the experiment.

(c) Support the half metre rule vertically as shown and record the pointer reading y when the metre rule is not loaded (the position of half metre rule should remain the same through out the experiment)

Pointers reading y = _____cm (1mk)

G-clamp Bench Metre rule X 50g mass Half metre rule L

(d) Using the thread provided, hang the 50g mass at a distance x = 10cm. The distance L is now 70cm. Record the pointer reading in table 1.

(e) By varying the position of the 50g mass for values of L = 60cm, 50cm, 40cm, 30cm, 20cm, and 10cm record corresponding pointer readings.

Complete table

Distance L (cm)	Pointer reading a (cm)	Depression d= a-y (cm)	$K = \frac{50}{d}$ g/cm
70			
60			
50			
40			
30			
20			
10			

(7mks)

(f) Plot a graph of K (y axis) against L (5mks)

(g) Determine the slope s of the graph at L = 30cm (3mks)

(h) Determine the constant q, given that

$Q = AS + K_1$ where A is the cross-sectional area of the metre rule, S and K_1 are the slope and value of k at L = 30cm respectively (2mks)

2. You are provided with the following
   - Candle
   - Plane mirror
   - Metre rule
   - Lens
   - Lens holder
   - A cardboard with cross wire at its centre
   - Screen

Proceed as follows

a) Attach the plane mirror to the lens using cello tape
b) Set up the apparatus as shown below

lens Plane mirror Metre rule d x

Ensure that the candle plane is at the same height as the cross wires.
(c) Place the cardboard with cross wire at the 0cm mark
(d) Move the lens along the metre rule until a sharp image of the crosswire is formed alongside the object cross wire
Measure the length d
d = _____ (1mk)

Now set up the apparatus as shown below
x u v

(e) Set U = 20cm and adjust the screen until a clear image of the cross wire appears on the screen. Measure the value of V and record in the table
(f) Repeat the procedure (e) above for other values of U and complete the table below

(g)

U (cm)	25	30	35	40	50
V (cm)					
M = v/m					

(7mks)

(h) Plot a graph of m against v (5mks)

(i) Determine the slope s of the graph (3mks)

(j) Given that the equation of the graph is given by

$M = \frac{V}{n} - 1$ where n is a constant, determine the value of n (2mks)

(k) Find n_1 the value of v when m = o (1mk)

(i) What physical quantity does n represent (1mk)

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FORM 4 MID – YEAR ASSESSMENT TEST 2011
Kenya Certificate of Secondary Education
PHYSICS
PAPER 3
PRACTICAL
MARKING SCHEME

Question 1

(a) Width w = 2.82 $\pm$ 0.1 √1mk
Thickness t = 0.62 $\pm$ 0.1 √1mk

(c) Pointer reading a = 4.5 cm √1mk
(Read candidates value)

Table 1

L (cm)	Pointer reading x (cm)	Depression d = x – a (cm)	K = $\frac{50}{d}$ of 1cm
70 60 50 40 30 20 10	6.0 5.8 5.5 5.1 4.9 4.7 4.5	1.5 1.3 1.0 0.6 0.4 0.2 0.1	33. 33 38.46 50.00 83.33 125 250 500
	½ √mk each	5-7 √2mks 4-5 √1mk	5-7 √2mks 4-5 √1mk
	Max 3mks	Less than 4 0 mk	Less than 4 0mk

(7mks)

(f) Graph
Axes labelled with units √1mk
Scale – simple and uniform √1mk
Plotting √2mks
Curve with negative gradient √1mk
Max 5mks

This paper consists of 4 printed pages

Turn Over

(g) Slope

- a tangent at L = 30cm√ 1mk
- correct intervals√ 1mk
- correct evaluation√ 1mk

$$S = \frac{350 - 50}{5 - 39}$$

$$= -8.82$$

(h) A = w x h

= 2.82 x 0.62

= $1.7484cm^2$

q = 1.7484 x -8.82 + 125√ mk

For substitution

= 109.58√ mk

2. (d) d = 18 $\pm$ 1cm

(g) Table 2

U (cm)	25	30	35	40	45	50
V (cm)	49.0	36.5	32.0	28.0	26.0	25.0
$M = {}^{v}/_{u}$	1.96	1.22	0.91	0.70	0.58	0.5

V – 1 mark each for maximum 5mks $\pm$ 0.5

M – 5 -6 values – 2mks

3 – 4 values 1mk

(h) Graph

Axes labeled with units √	1mk
Scale	1mk
Plotting	2mks
Straight line with positive gradient	1mk

(i) Slope

$$S = \frac{\Delta M}{\Delta V} = \frac{(20-7.5)\sqrt{} \times 10^{-1}}{50 - 29} = 0.0595\sqrt{}$$

Accuracy 0.052 – 0.058√

(j) $n = \frac{1}{\text{Slope}} = \frac{1\sqrt{}}{0.0595} = 16.81\sqrt{}$

(k) $n_1 = 16.5$ √

(l) n_1 is focal length of the lens√

Magnification m x 10-1 Image distance (cm)

0 5 10 15 20 25 10 20 30 40 50 60

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FORM 4 MID – YEAR ASSESSMENT TEST 2011
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CONFIDENTIAL

QUESTION 1

- A 50g mass
- Stand and clamp
- Thread (about 20cm long)
- Half metre rule
- A metre rule with a tooth pick fixed at one end
- A vernier callipers
- A G-clamp

QUESTION 2

- Candle
- Plane mirror
- Some cellotape
- Lens of focal length 18cm
- Lens holder
- A card board with cross wire at its centre
- White screen

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