NAME _____ INDEX NO. _____

CANDIDATE'S SIGNATURE _____

DATE _____

232/1
PHYSICS
PAPER 1
THEORY
JULY 2011
2 HOURS

KIBWEZI SECONDARY SCHOOL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 1
THEORY
2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the space provided at the top of this page
- This paper has two sections A and B
- Answer all the questions in the two sections
- Working of numerical questions must be clearly shown
- Marks may be given for correct working even if the answer is wrong
- Mathematical tables or scientific calculator may be used
- Take: Accelerelation due to gravity, g = 10m/s^2: Melting point of ice = 273K

For Official use only

Section	Question	Max score	Candidate score
A	1 – 11	25	
B	12	11	
	13	15	
	14	11	
	15	10	
	16	8	
Grand total		80	

This paper consists of 12 printed pages

Turn Over

1. A micrometer screw gauge has a zero error of +0.04mm. Draw a section of such a micrometer screw gauge used to take an actual measurement of 7.58mm. (2mks)

2. The figure below shows three identical springs which obey Hooke's law. Determine the value of x. (2mks)

Fig 1 8.5cm

3. Name and explain the feature that make a retort stand stable. (2mks)

4. In an oil drop experiment a student estimated the diameter of an oil molecule as 1.6×10^{-9}m. Given that the volume of the oil drop was $0.25mm^3$ determine the area of the oil patch formed. (3mks)

5. A rain drop falling from 500m high is not likely to attain a velocity of 100ms-1. Explain (1mk)

6. The figure below shows two identical metal bulbs A and B interconnected by a uniform U-shaped glass tube containing light oil. Bulb A is painted black while bulb B is painted white. A heater is placed equidistant from the bulbs. State and explain the observation when the heater is switched on for sometime. (2mks)

Fig 2

7. The volume of a certain mass of a gas at 37^0C and 800mmHg is 300cm^3. Find the volume of the gas at -43^0C and 950mmHg. (3mks)

8. The figure below shows a light rod balanced due to action of forces shown G is a magnet of weight 4N and H is a permanent magnet fixed on the table. Determine the force between G and H stating whether it is attractive or repulsive. (3mks)
Fig 3

9. Water flows in a horizontal pipe of varying diameter as shown below. If cross sectional area of A is 4.5cm^2 and that of B 54cm^2. The rate at which water flows at A is 66m/s, calculate the speed of water through B. (3mks)
Fig 4

10. State two factors that affect the surface tension. (2mks)

11. A car is initially moving at 25m/s. calculate the deceleration of the car if it is brought to rest over a distance of 25m. (2mks)

SECTION B (55 MARKS)

12. A block of metal A having a mass of 40kg requires a horizontal force of 100N to drag it with uniform velocity along a horizontal surface
(i) Calculate the coefficient of friction (3mks)

(ii) Determine the force required to drag a similar block of metal B of mass 30kg along the same horizontal surface. (2mks)

(iii) If the two metal blocks A and B are connected with a tow-bar and a force of 210N is applied to pull the two along the same surface, calculate

(a) The tension in the tow-bar. (1mk)

(b) The acceleration. (2mks)

(iv) If the tow-bar is removed and the 30kg mass moves around a horizontal smooth path of radius 10m at constant speed 24m/s, calculate the centripetal force. (3mks)

13. (a) Define density and state its SI units. (2mks)

(b) The figure below shows a set up used to determine density of a liquid
Fig 5

The rod was submerged into the liquid to various lengths L and corresponding reading of spring balance F recorded. The metal rod had a uniform cross-sectional area of $5 \times 10^{-2} m^2$. The table below shows the results obtained.

L (cm)	0.5	1.0	1.5	2.0	2.5
F (N)	12	9	6.2	3.4	0.4

(i) On the grid provided plot a graph of F (y – axis) against L (5mks)

(ii) Write down an equation relating F, L, the density, d of the liquid the weight, w, of the rod in air and cross-sectional area A, of the metal rod. (3mks)

(iii) Use your graph and the equation in (ii) above to find, W and d. (5mks)

14. (a) The figure below shows a part of a tape pulled through a ticker by a trolley. If the frequency of the timer is 50Hz, calculate the acceleration of the trolley. (3mks)

Fig 6

(b) A car starts from rest and accelerates at $3m/s^2$ for five seconds. It maintains a constant speed attained and covers a distance of 150m. It then decelerates at $6m/s^2$ to rest.

(i) Sketch a velocity time graph for the above information. (3mks)

(ii) Determine the distance covered. (3mks)

(iii) Determine the average speed for the whole journey. (2mks)

15. (a) Trapped air in a bulb may be used as thermometric substance. State:-
(i) One property of air that would enable the temperature to be measured. (1mk)

(ii) One limitation of such a thermometer. (1mk)

(b) The figure below shows a set up used by a student to show thermal expansion of a wire.
Fig 7

(i) What three other items not shown in the figure would be needed in order to perform the experiment? (3mks)

(ii) What purpose does the stone serve? (1mk)

(c) A 20kw immersion heater is used to heat $5m^3$ of water from 28^0 to 100^0C. Given that 40% of the heat is lost to the surrounding calculate the time needed for heating process. Take density of water = $1000kg/m^3$ and specific heat capacity of water as 4200J/Kgk. (4mks)

16. (a) An effort of 250N raises a load of 900N through 5m in a machine. If the effort moves through 25m, find

(i) The useful work done in raising the load. (2mks)

(ii) The work done by the effort. (2mks)

(iii) The efficiency of the machine (2mks)

(b) Why is the efficiency of the machine above less than 100% (2mks)

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

KIBWEZI SECONDARY SCHOOL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 1
THEORY
MARKING SCHEME

1.

Any correct diagram 2mks

2. $\frac{F_1}{X_1} = \frac{F_2}{X_2}$ = constant or $\frac{M_1}{X_1} = \frac{M_2}{X_2}$ = constant

$\frac{40 - 20}{8.5 - 5} = \frac{60 - 20}{X - 5}$ √1

$\frac{20}{3.5} = \frac{40}{X - 5}$

$20(x - 5) = 40 \times 3.5$

$X - 5 = 7$

$X = 12$ cm √1

3. Broad base or wide base or large bottom area
Broad base increases stability
Or Low centre of gravity
The lower the COG the more stable a body is
Stating – 1mk explanation 1mk

4. $d = \frac{V}{A}$ or $A = \frac{V}{d}$ √ formula

$= \frac{0.25 \times 10^{-7}}{1.6 \times 10^{-9}}$ √ substitution

$= 0.15625 m^2$ √

This paper consists of 5 printed pages

Turn Over

5. - Viscous drag/friction due to air√
- Up thrust force√

6. - Oil level on side A goes down while that of side √B rises up. Air in bulb A is heated more or expands more since black surface√ is better absorber of heat.

7. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ √ formula

T1 = 37 + 273 = 300
T2 = -43 + 273 = 230

$V_2 = \frac{P_1V_1T_2}{T_1 P_2}$

$= \frac{800 \times 300 \times 230}{300 \times 950}$ √

$= 193.6842cm^3$√

8. Anticlockwise moment = clockwise moment
16 x 5 = 40 x (4 + x)√
$\frac{80}{40} = 4 + x$
2 = 4 + x
X = - 2N√
Negative sign means repulsion force√

9. $a_1V_1 = a_2 V_2$
4.5 x 66 = 54 x V_2√
$V_2 = \frac{4.5 \times 66}{54}$√
= 5.5m/s√

10. - Temperature√
- Impurities√

11. $V^2 = U^2 + 2as$√
V = 0, U = 25, S = 25
$0 = 25^2 + 2a \times 25$
0 = 625 + 50a
$a = \frac{-625}{50}$
$= -12.5m/s^2$√

SECTION B

12. (i) $\mu = \frac{F}{R}$ √
=> R = μg
= 40 x 10
= 400N
$\mu = \frac{100}{400}$√
= 0.25√

(ii) $F = \mu R$

$= 0.25 \times 30 \times 10$√

$= 75N$√

(iii) (a) $T = P - F$

$= 210 - (100 + 75)$

$= 210 - 175$

$= 35N$√

(b) $F = ma$, $F = T$

$35 = (40 + 30)\ a$√

$a = \frac{35}{70}$

$= 0.5m/s^2$√

(iv) $Fc = \frac{MV^2}{r}$√

$= \frac{30 \times 24^2}{10}$√

$= 1728N$√

13. (a) Density is the ratio of mass √of a substance to its volume

SI units = Kg/m^3√

(ii) $F = W - U$√

$U = V \times d \times g$ _____ g is alliteration due to gravity

$= A \times L \times d \times g$√

$= ALdg$ A is the cross- sectional area

$\therefore F = W - ALdg$.√

(iii) $W = 15N$ (y – intercept)√

$Slope = \frac{9 - 12}{(1 - 0.5) \times 10^{-2}} = \frac{-3}{0.5 \times 10^{-2}}$√

$= -600N/M$√

$Slope = Adg$

$d = \frac{slope}{Ag}$√

$= \frac{600}{5 \times 10^{-2} \times 10} = \frac{600}{0.5}$

$= 1200Kg/m^3$√

14. $T = \frac{I}{F} = \frac{1}{50} = 0.02$

$U = \frac{3}{0.02} = 150$ cm/s√

$V = \frac{0.5}{0.02} = 25$cm/s√

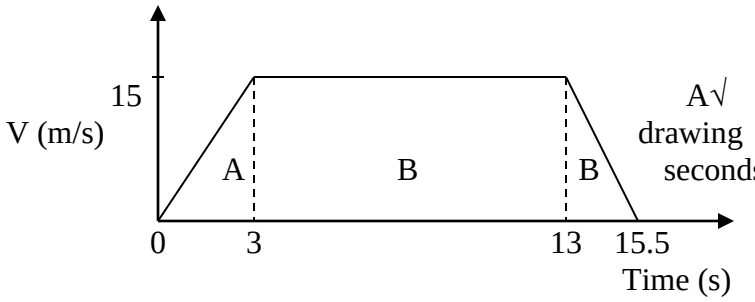
$a = \frac{V - U}{t} = \frac{25 - 150}{0.02 \times 5}$

$= \frac{-125}{0.1}$

$= -1250 cm/s^2$

$= -12.50 m/s^2$√

(b) (i)



A√

drawing 2mks (15m/s and time = 15.5 seconds)

(ii) Distance = area under the graph√

$= \frac{(10 + 15.5)}{2} \times 15$√

= 191.25m√

Or

Area A = ½ x 3 x 15 = 22.5

Area B = 15 x 10 = 150 } 2mks

Area C = ½ x 2.5 x 15 = 18.75

191.25m √ans

(iii) Average speed = $\frac{\text{Total distance}}{\text{Total time}}$√

$= \frac{191.25}{15.5}$

= 12. 339m/s √

15. (a) (i) – Air expands on heating√

- Volume of air is proportional to temperature√

Any one 1mk

(ii) Air can be compressed√

(b) (i) – Source of heat√

- Metre rule to measure heat√
- Pointer or scale√

(ii) - To make the wire straight√

- To remove kink from the wire√

C. MCθ = 60% pt

$\theta = 100 - 28 = 72^0$ √

M = V x d = 20kw = 20,000w

$= 5 \times 1000 = 5 \times 10^3$kg.

$$t = \frac{mc\theta}{0.6p}$$

$$\frac{5 \times 10^3 \times 4200 \times 72}{0.6 \times 20,000}$$ √

$$= \frac{5 \times 4200 \times 72}{12}$$

= 126000 seconds√

= 2100 minutes

16. (a) (i) useful work = work done on the load

Or work output = load x load distance√

= 900 X 5

= 4500J√

(ii) Work done by effort = work input

= Effort x effort distance

= 250 x 25√

= 6250J√

(iii) Efficiency = $\frac{\text{work output}}{\text{Work input}} \times 100\%$√

$= \frac{4500}{6250} \times 100\%$

= 72%√

(b) – Energy used to overcome friction√

- Energy used to lift the movable parts√

NAME _____ **INDEX NO.** _____

CANDIDATE'S SIGNATURE _____

DATE _____

232/2
PHYSICS
PAPER 2
THEORY
JULY 2011
2 HOURS

KIBWEZI SECONDARY SCHOOL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 2
THEORY
2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the space provided above
- This paper consist of two sections A and B
- Answer all the questions in the two sections A and B in spaces provided
- All working must be shown in the spaces provided in this booklet.
- Non – programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

For Examiner's use only

Section	Question	Max score	Candidate score
A	1 – 10	25	
B	11	13	
	12	14	
	13	11	
	14	10	
	15	7	
Grand total		80	

This paper consists of 12 printed pages

Turn Over

SECTION A (25 MARKS)

1. In a form 2 class, the students used the method shown to make a magnet

(i) Name the method used (1mk)

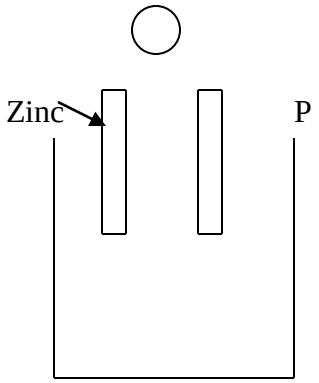
(ii) State the polarities at the ends A and B. (2mks)

A _____

B _____

2. An electric kettle is rated 3kw, 250v. Determine the resistance of the coil. (3mks)

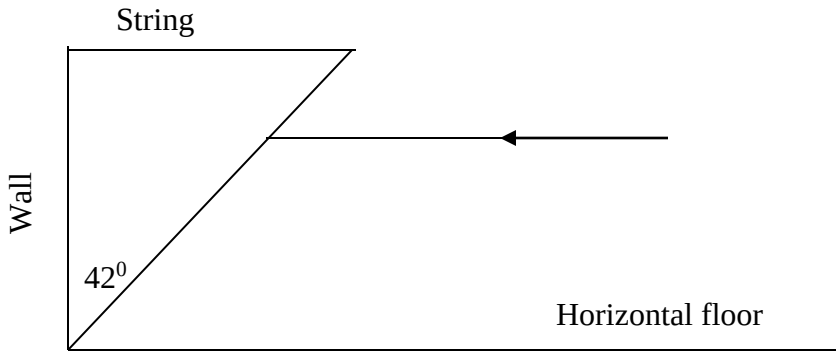
3. The figure below shows a simple cell



(i) Name the electrode P (1mk)

(ii) State and explain what happens to the bulb (2mks)

4. The figure below shows a plane mirror suspended by a string and making an angle of 42^0 with the wall



A ray of light strikes the mirror as shown. Determine the angle between the reflected ray and the horizontal floor. (2mks)

5. Explain the term doping as used in semiconductors (2mks)

6. Refering to their mode of working, distinguish between a fuse and a circuit breaker in electric circuits (2mks)

7. With the aid of a diagram, explain how a convex lens can be used as a magnifying glass. (2mks)

8. State the motor rule (1mk)

9. Sketch a possible set up that can be used to achieve full wave rectification using two diodes. (2mks)

10. (a) Draw a displacement – time graph for a transverse wave with a wavelength of 30cm, and amplitude 2.5cm
(Show at least two complete oscillations) (2mks)

(b) Assuming that the period of the wave above is 0.5 seconds, determine the velocity of the wave. (3mks)

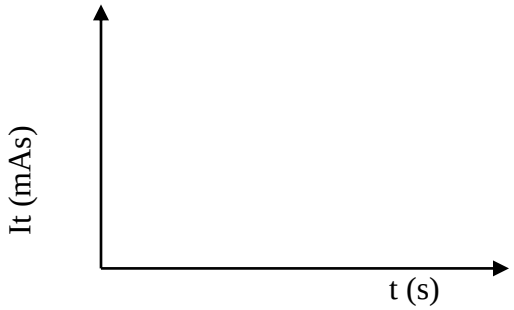
SECTION B (55 MARKS)

11. (a) Define capacitance of a capacitor. (1mk)

(b) You are provided with the following: A 500 μf uncharged capacitor, 6v power source, rheostat (100-10,000Ω), a voltmeter, a milliameter, a switch, a stopwatch and connecting wires

(i) Draw a circuit diagram that can be used to charge the capacitor. (3mks)

(ii) In the axes below sketch a graph showing how the charge increases with time. (1mk)



What is the purpose of the stopwatch in this experiment (1mk)

(c) The figure below shows three capacitors with a 10V battery across
3μf 5μf 4μf 10V

Calculate the charge stored in the 5mf capacitor. (4mks)

(d) You are provided with a copper rod, a wooden rod and a negatively charged electroscope. You are instructed to touch the cap of the electroscope with the rods in turn.

(i) State your observation in the process. (1mk)

(ii) Explain your observation in (i) above. (2mks)

12. In an experiment to determine the focal length of a convex lens, a student obtained the following results

Image distance (v)	22.5	24	26.3	30	37.5	60
Magnification (m)	0.5	0.6	0.75	1.0	1.5	3.0

(a) In the grid provided plot a graph of M (y-axis) against V. (5mks)

(b) From your graph, determine the power of the lens (5mks)

(c) State two cases under which the lens above can produce magnified images. Use diagrams to illustrate your answer. (4mks)

13. The current in a wire resistor, R varied with voltages as shown in the table below:-

voltage (v)	1.05	1.40	1.80	2.20	2.60
Current (mA)	150	200	250	300	350

(a) Plot a graph of V (y-axis) against current (5mks)

(b) From the graph, determine the resistance of the wire (3mks)

(c) You are given 3 known resistors K, L, M the wire resistor, R above a galvanometer and a 3v power source. Draw a set up to show how you would use the wheat stone bridge method to determine the resistance of R. (2mks)

14. (a) Define mutual induction (1mk)

(b) State how the following energy losses in a transformer are minimized. (2mks)

(i) Hysteresis loss

(ii) Eddy currents

(c) A transformer is connected to a d.c power source. The secondary coil is then connected to a zero-centre galvanometer. State and explain the observation made on the galvanometer when the power is switched on. (3mks)

(d) State four ways in which the induced e.m.f in both a.c and d.c. generator can be increased. (4mks)

15. (a) State two uses of infrared radiation (2mks)

(b) State any three properties of electromagnetic waves. (3mks)

(c) The activity of a radioactive substance initially at 400 counts per second reduces to 50 counts per second in 36 minutes. Determine the half-life of the substance (2mks)

232/2
PHYSICS
PAPER 2
THEORY
JULY/AUGUST 2011

KIBWEZI SECONDARY SCHOOL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 2
THEORY
MARKING SCHEME

1. (i) Double (divided) stroked method√
   (ii) A – S√
   B – N√

2. $R = \frac{V^2}{P}$√ $= \frac{250 \times 250}{3000}$ √
   $= 20.83\Omega$√

3. (i) Copper√
   (ii) – The bulb goes off after a short time√
   - The strength of the current supplied √decreases because of cell defects / or polarisation

4. $r = 42^0$ but i = r i = 42√

   Required Angle = 84^0 √($42^0 + 42^0$ – alternate angles)

5. The introduction of an impurity into a pure semi conductor√; to improve its conductivity√;

6. - Fuse is a wire of low melting point that melts when a certain amount of current is exceeded√; A circuit breaker is a magnetic device that disconnects the circuit through an electromagnet when a certain amount of current is exceeded;√

This paper consists of 8 printed pages

Turn over

7. 2F F F 2F

Check

- Object between lens and f
- Virtual image
- Correct rays
- Correct lens
- Image beyond F

√

8. If the left hand is held with the thumb, the first finger and the second finger mutually at right angles so that the first finger points in the direction of the magnetic field and the second finger in the direction of the current, then the thumb points in the direction of motion.√

9.

Any correct set – up√√

10. (a) Scm

(b) $f = \frac{V}{\lambda}$ but $f = \frac{I}{T} = \frac{1}{0.5} = 2$

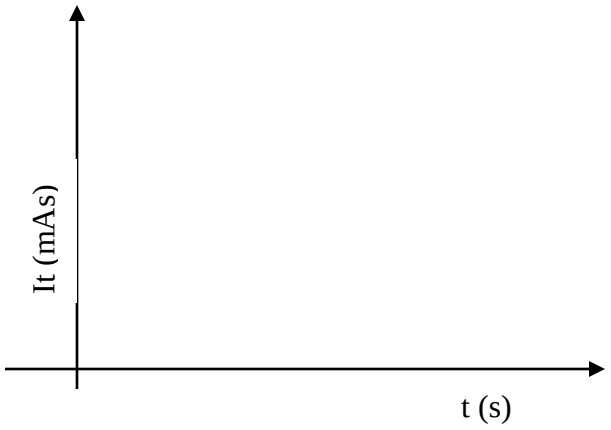
$V = \lambda f \surd = 30 \times 2 \surd$

$= 60 m/s \surd$

11. (a) charge stored per unit voltage√

(b) (i)

(ii)



(iii) To take different times for the different current values√

(c) $\frac{I}{C_T} = \frac{1}{3} + \frac{1}{9} = \frac{4}{9}$

$\therefore C_T = \frac{9}{4} = 2.25mf \surd$

Total charge $Q = VC = 2.25 \times 10^{-6} \times 10 = 2.25 \times 10^{-5} C$

P.d across $3\mu f = \frac{Q}{C} = \frac{2.25 \times 10^{-5}}{3 \times 10^{-6}} = 7.5 volts \surd$

P.d across $5mf$ and $4\mu f = 10 - 7.5 = 2.5V \surd$

Charge stored in $5\mu f = VC = 2.5 \times 10^{-6} \times 5 = 12.5 \surd \times 10^{-6}$

$= 1.25 \times 10^{-5} C \surd$

(d) (i) The copper rod cause the leaf to fall while wooden rod does not.√

(ii) Copper being a good conductor√; allows electrons to flow thereby discharging the electroscope.√

12. (a) Refer the grid

(b) Power $= \frac{1}{f}$ √but f = intercept on√ v –axis = 15cm√

$P = \frac{1}{0.15}$√ $= 6.67 m^{-1} = 6.67$√D

Alternatively

Slope $= \frac{1}{f}$ $\therefore f = \frac{1}{\text{Slope}}$ √ $= 1 \div \left[\frac{3 - 0.5}{60 - 22.5}\right]$ √

$f = \frac{37.5}{2.5}$ $= 15$cm √$= 0.15$m

$\therefore \quad P = \frac{1}{F} = \frac{1}{0.15} = 6.67 m^{-1} = 6.67$D

(c) (i) When object is between f and 2f√

(ii) When object is between lens and f√

13. (a) Refer to grid

(b) R = gradient √

$= \frac{2.6 - 1.4\ \surd}{(3.5 - 2) \times 10^{-1}} = \frac{1.2}{0.15} = 8\Omega\surd$

(c)

Any correct diagram √√√

$\frac{R}{L} = \frac{K}{M}$, when bridge is balance

L K

14. (a) When a changing current in one coil induces a current in another coil placed to close to it.√

(b) (i) By using a core of a soft magnetic material/ a material that magnetises and demagnetises easily√
(ii) Laminating the core√

(c) – Galvanometer deflects to a maximum then back to zero√
- As the d.c increases from zero to maximum (changing current), there is induced e.m.f hence induced current.√

At maximum no change in direct current; no changing magnetic field hence no induced current√

(d) – Increasing speed of rotation√
- Increasing number of turns in the coil√
- Using stronger magnet√
- Winding coil on a laminated soft iron core√

15. (a) – Cooking, heating and drying
- Warming green houses
- Photography
- Heating – seeking missiles

(b) - Travel with the speed of light in vacuum
- Do not require a medium for transmission
- Transverse in nature
- Posses energy in the form E =hf
- Carry no change

(c) 400 $\xrightarrow{t\,½}$ 200 $\xrightarrow{t\,½}$ 100 $\xrightarrow{t\,½}$ 50

3 half – life's

3 t ½ = 35

t ½ = 12 mins

NAME _____ INDEX NO. _____

CANDIDATE'S SIGNATURE _____

DATE _____

232/3
PHYSICS
PAPER 3
PRACTICAL
JULY 2011
2 ½ HOURS

KIBWEZI SECONDARY SCHOOL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 3
PRACTICAL
2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

(a) Answer ALL the questions in the spaces provided in the question paper
(b) You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper. Read the whole paper carefully before commencing your work
(c) Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them
(d) Candidates are advised to record their observations as soon as they are made
(e) Non programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

For examiner's use only

Question 1

	a (iii)	b (i)	b (ii)	b (iii)	h	i	j (i)	j (ii)	
Max score	6	5	3	1	1	1	2	1	20
Candidates score									

Question 2

	a	b (i)	b (ii)	c	d	e	
Max score	1	1	7	5	3	3	20
Candidates score							

TOTAL	40

This paper consists of 8 printed pages

Turn over

Question 1

PART I

Your are provided with the following

- One voltmeter
- One ammeter
- Six connecting wires
- Three crocodile clips
- One dry cell
- One metre long nichrome wire mounted on millimeter scale
- Half metre rule or meter rule

(a) (i) Connect the apparatus provided as shown in the circuit in Fig 1. MN is a Nichrome wire

Fig 1 A M P N V Crocodile clips

Leave the crocodile clip next to the cell unconnected. (This clip should be disconnected when no readings are being taken)

(ii) Adjust the lengths MP of nichrome wire to 100cm using the crocodile clip at P.
Connect the crocodile clip next to the cell and record the voltmeter and ammeter reading in the table 1

(iii) Repeat (a) (ii) for lengths of MP = 80cm, 60cm, 40cm, 20cm, 10cm and 5cm and complete table 1

Length MP (cm)	100	80	60	40	20	10	5
P.d (V)							
Current (I) (A)							

Table 1 (6mks)

(b) (i) On the grid provided plot a graph of the p.d across the cell (y-axis) against current (I) (5mks)

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

(iii) Determine the y – intercept of the graph. (1mk)

PART II

You are provided with the following apparatus

- A glass block
- A plane mirror
- A optical pins
- A soft board
- Cello tape
- 2 plain sheets of paper
- Ruler
- A protractor
- 4 office pins

Proceed as follows

(a) Using the cello tape provided fix the plane mirror to the glass block along one long side as shown in figure 2 with the reflecting surface to the face of the glass block

Breadth Plane mirror Glass block P_1 P_2 P_3 P_4 10^0 B C X Fig 2 A

(b) With use of optical pins, secure firmly a white plane paper on the soft board and place the glass block together with the attached mirror.
(c) Draw the outline of the glass block together with the mirror
(d) Remove the block and the mirror and draw normal at B, somewhere quarter way the length of the outline you drew in (c) above.
(e) Draw a ray AB incident at B at an angle of 10^0
(f) Replace the glass block together with the attached mirror so as to exactly fit the outline in (c)
(g) Place two pins P_1 and P_2 along the 10^0 line locate the image of P_1 and P_2 as they appear to be in a straight line when viewed through the glass block. Place pins P_3 and P_4 so that the image of P_1 and P_2 are not seen.
(h) Remove the glass block together with the attached mirror from the outline and produce pin P_1 P_2 so that they meet at B and extend further inside the glass block outline
Also extend pins P_3P_4 in order to meet the other line from P_1P_2 at point C. measure and record distance X (the apparent depth)

X = _____ cm (1mk)

(i) Measure the breadth, b, of the glass block
b = _____ cm (1mk)

(j) Determine the refractive index n of the glass block

$n = \frac{b}{x}$ (2mks)

Correct use of plain paper (1mk)

Question 2

You are provided with the following apparatus

- A 200ml beaker
- A metre rule
- A retort stand, clamp and Boss
- A 100g mass
- A 50g mass
- Three pieces of thread

Proceed as follows

(a) Balance the metre rule horizontally by suspending it from the stand and clamp with one of the threads. Record the balance point G

G = _____ cm (1mk)

(b) (i) Suspend the 100g mass from the metre rule at a point X = 5cm from the point of suspension G. With the 100g mass completely immersed in the water in the beaker hang the 50g mass from the metre rule and adjust its position until the system is in equilibrium as shown in figure 3. Note the point of suspension P of the mass.

P = _____ (1mk)

Fig 3 Water Metre rule 100g 50g G P X Y

(ii) Repeat the process for values of x = 10cm, 15cm, 20cm and 27cm. record the values of Y in the table 2

NB: During each experiment ensure that the position of the thread through position G does not change

X cm	Position of 50g mass	Y cm
5		
10		
15		
20		
25		
27		

Table 2 (7mks)

(c) Plot a graph of y (y-axis) against X (5mks)

(d) Determine the slope S of the graph (3mks)

(e) Find the density (ρ) of the liquid given that

$$S = \frac{0.68 - 12 \times 10^{-5} \rho}{0.32}$$ (3mks)

232/3
PHYSICS
PAPER 3
PRACTICAL
JULY 2011

KIBWEZI SECONDARY SCHOOL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 3
PRACTICAL
MARKING SCHEME

Question 1

PART I

(a) (iii)

Length MP (cm)	100	80	60	40	20	10	5
P.d (V)	1.45	1.35	1.25	1.20	1.05	0.85	0.80
Current (I) (A)	0.050	0.075	0.100	0.150	0.225	0.325	0.375

@ value of V ½ mk max points 6 – 3mks
@ value of I ½ mk max points 6 – 3mks

(b) (i) On graph paper

P.d (V) Current I (A) x 10^{-2} 1.0 2.0 3.0 0 5 10 15 20 25 30 35 40 45 50 55 60

Axis – labelled with units – 1mk
Scale – simple & uniform – 1mk
Plotting – 4 correctly plotted points @ ½ mk – 2mks
Line – negative gradient – 1mk
Straight passing through 3 correctly plotted points

(ii) $\text{Slope} = \frac{\Delta V}{\Delta I} = \frac{1.5 - 0.25}{-(60 - 0) \times 10^{-2}}$

$= \frac{1.25}{-6 \times 10^{-1}}$

$= -2.083\Omega$

Extraction of intervals from graph – 1mk
Evaluation – 1mk
Accuracy – 1mk

(iii) y – intercept = 1.5V

This paper consists of 5 printed pages

PART II

(h) X = 4.0 cm $\pm$ 0.1 1mk

(i) b = 6.0 cm $\pm$ 0.2 1mk

(j) $n = \frac{6.0}{4.0} = 1.5$

Substitution – ½ mk
Evaluation – ½ mk
Accuracy – 1mks

Correct use of plain paper - 1mk

Question 2

(a) G = 50.0 cm $\pm$ 1.0 1mk

(b) (i) P = 41.0 cm 1mk

X cm	Position of 50g mass	Y cm
5	41.0	9.0
10	32.0	18.0
15	24.5	25.5
20	15.8	34.2
25	6.6	43.4
27	2.0	48.0

½ mk @ max 4 points = 2mks 1 mk @ max 5 points = 5mks

NB: Values of position of 50g mass may be increasing depending on the side the 50g mass is Placed

- Values of Y must be increasing.

(c) (cm) x (cm) 5 10 15 20 25 30 35 10 20 30 40 50 Δx Δy

Axis – labelled with units – 1mk
Scale – simple & uniform – 1mk
Plotting – 4 correctly plotted points @ ½ mk max
4 points – 2mks
Line – straight passing through 3 correctly plotted points within one small square – 1mk

(d) Slope = $\frac{\Delta Y}{\Delta X} = \frac{40 - 15}{23 - 8.5}$ intervals – 1mk

$= \frac{25}{14.5}$ evaluation -1mk

$= 1.724$ accuracy – $\frac{1mk}{3mks}$

(e) $1.724 = \frac{0.68 - 12 \times 10^{-5}ϱ}{0.32}$

$(1.724 \times 0.32) - 0.68 = -12 \times 10^{-5}ϱ$

$-0.12832 = -12 \times 10^{-5}ϱ$

$ϱ = \frac{-0.12832}{-12 \times 10^{-5}}$

$= 1069.3$

Correct substitution – 1mk
Correct evaluation – 1mk
Accuracy - $\frac{1mk}{3mks}$