NAME____ INDEX NO __________________________

CANDIDATE'S SIGNATURE_____________

DATE_________________________________

232/1
PHYSICS
THEORY
PAPER 1
JULY/AUGUST 2011
1 HOUR 40 MINUTES

MAKUENI/KATHONZWENI JOINT EXAMINATION 2011
Kenya Certificate of Secondary Education
PHYSICS
THEORY
PAPER 1
1 HOUR1 40 MINUTES

INSTRUCTIONS

This paper consists of two sections A and B.
Answer all the questions in the spaces provided.
All workingS must be clearly shown.
Mathematical tables and electronic calculators may be used.

For examiner's use only

SECTION	QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	1-12	25	
B	13	10	
	14	10	
	15	12	
	16	14	
	17	9	
		GRAND TOTAL	80 MARKS

TOTAL CANDIDATE'S SCORE

Section A [ ] + section B [ ] = [ ]

This paper consists of 11 printed pages

1. An oil drop of radius 0.15mm forms a oil film of radius 7.0cm on water. Assuming that the oil film to be one molecule thick, estimate the diameter of the oil molecule. (3mks)

2. Distinguish between latent heat of fusion and specific latent heat of fusion of a substance. (2mks)

3. A trolley is moving at a uniform speed along a track. A piece of plasticine is dropped on the trolley and it sticks on it. Explain why the trolley slows down. (1mk)

4. A mass of 8kg is whirled round in a vertical circle using a rope of length 80cm, if it takes 2.5cycles in 1 second, calculate the maximum tension the rope experiences. (4mks)

5. State one advantage of an alkaline cell over a lead-acid cell. (1mk)

6. A cube of ice rests on a bimetallic strip at room temperature. The strip is made of brass and iron

Sketch to show the shape of the bimetallic strip. (1mk)

7. Fig 2 below represents a pin-hole camera

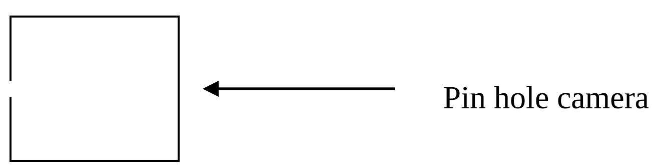

Fig 2

Sketch rays to show the formation of an enlarged image in the camera. Label both the object and the image (2mks)

8. Fig 3 below shows a pulley used to raise a load of 100N

(a) What is the velocity ratio of the system? (1mk)

(b) Determine the mechanical advantage (1mk)

9. Fig 4 below shows a solid cylinder standing on a horizontal surface. The cylinder is in stable equilibrium
Cylinder Surface Fig 4

Sketch on the space provided the cylinder in neutral equilibrium (1mk)

10. The fig 5 below shows a manometer attached to a gas supply. If the atmospheric pressure is 103360pa, calculate the pressure of the gas supply. (Density of mercury = 13600Kg/m^3, g = 10N/kg) (4mks)

11. Dust particles in still air appear to move randomnly. Explain its cause. (1mk)

12. A pipe of radius 2mm is connected to another pipe of radius 6mm. If water flows in the narrower pipe at a speed of 3m/s, what is the speed in the wider pipe. (3mks)

SECTION B (55 MARKS)

13. (a) What basic physical quantity can be measured using a simple pendulum. (1mk)

(b) The figure below shows a tape made from a ticker tape timer. The frequency of the ticker timer was 100Hz.

Find

(i) The time taken for one tick interval. (1mk)

(ii) Velocities between points AB and DE (3mks)

(iii) Acceleration of the body from point A to E (2mks)

(c) A girl dropped a stone from the top of a tower 45m tall and a boy projected another stone vertically upwards at 25m/s at the same time. Determine the time taken for the two stones to meet (3mks)

14. (a) Study the circuit in fig 9 below and use it to answer the questions that follow

I_2 I_1 I 4V

Find

(a) The effective resistance (4mks)

(b) The ammeter reading (3mks)

(c) The current through 4Ω resistor

15. (a) Using kinetic theory of gases explain how a decrease in volume of a gas causes arise in pressure of the gas, if the temperature is kept constant. (3mks)

(b) The figure below shows a set up that may be used to verify Boyle's law
Pressure gauge Burette A   Trapped air Burette B

(i) State the measurements that should be taken in the experiment. (2mks)

(ii) How would you ensure that the temperature of the trapped air is kept constant during the experiment (1mk)

(iii) Explain how the measurements taken in (i) above may be used to verify Boyle's law (3mks)

(c) A narrow glass tube sealed at one end contains air trapped by a thread of mercury 10cm long. When horizontal the air column is 25cm long. Calculate its length when the tube is vertical with the open end upper most, if the atmospheric pressure is 76cm of mercury (3mks)

16. (a) Define the term heat capacity. (1mk)

(b) You are provided with apparatus shown in Fig 11 and a stop watch
Lasgged calorimeter

Describe an experiment to determine the specific latent heat of steam, L, using the set up. In your answer clearly explain the measurements to be made and how these measurements could be used to determine, L, (6mks)

(c) A block metal of mass 150g is dropped into a lagged calorimeter of heat capacity $40Jk^{-1}$ containing 100g of water at 25^0C. The temperature of the resulting mixture is 34^0C (specific heat capacity of water = $4200Jkgk^{-1}$)

Determine

(i) Heat gained by the calorimeter (2mks)

(ii) Heat gained by water (1mk)

(iii) Heat lost by metal block (1mk)

(iv) Specific heat capacity of the metal block (3mks)

17. (a) Define

(i) Pressure (1mk)

(ii) Upthrust (1mk)

(b) A solid metal block of cross-sectional area $4cm^2$ and density $2500kg/m^3$ is fully immersed in water supported by a thread which is attached to a spring balance as shown in the diagram.

Water Area = $4cm^2$ 12cm

(i) Calculate the force due to the liquid on the top face of the block. (4mks)

(ii) If the upward force acting on the bottom face is 1.5N. Calculate the volume of the block. (3mks)

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THEORY
PAPER 1
MARKING SCHEME

SECTION A (25 MARKS)

1. Volume of drop = volume of patch

$\frac{4\pi r^3}{3} = \pi r^2 h$ √1

$\frac{4\pi}{3} \times (0.15)^3 = \pi \times 70^2 \times h$ √1

$h = 9.18 \times 10^7$ mm√1

2. Latent heat of fusion: Amount of heat absorbed to change the state of a material from solid state to liquid without temperature change.√ 1
Specific latent heat of fusion: Amount of heat absorbed to melt a unit mass of a substance without change in temperature.√1

3. Plasticine increases the mass of the body leading to decrease in velocity.√1

4. $W = 2\pi f$√1
$= 2 \times 3.142 \times 2.5$
$= 15.71$ rod/s√1
$T = mw^2r$√1
$= 8 \times 15.71^2 \times 0.8$
$= 1579.5$N√1

5. Alkaline cells last longer than lead acid cells √1
Or
Alkaline cells remain uncharged for longer periods than lead acid√1
Or
Alkaline cells can withstand rough handling compared to lead-acid cells√1 Shape √1

6.

This paper consists of 5 printed pages

Turn Over

7. Object Two rays√1 Images√1

8. (a) VR = 1√1

(b) $MA = \frac{L}{E}$

$= \frac{100}{100}$

= 1√1

9. Cylinder in a horizontal position

10. P = hδg√1 + Atmospheric pressure√1

= 0.5 x 13600 x 10 + 103360√1

= 171360 N/M^2√1

11. Dust particles are hit by air molecules which are in random motion.√1

12. $A_1V_1 = A_2V_2$√1

$\pi \times 2^2 \times 3 = \pi \times 6^2 \times V_2$√1

$V_2 = \frac{\pi \times 2^2 \times 3}{\pi \times 6^2}$

= 0.3333 m/s√1

SECTION B (55 MARKS)

13. (a) Time√1

(b) (i) $T = {}^1/_f$

$= {}^1/_{100}$ = 0.01 sec√1

(ii) Between AB, $V = \frac{\text{Displacement}}{\text{time}}$ √1= $\frac{2cm}{0.01\ s}$ = 200cm/s√1

DE, $V = \frac{\text{displacement}}{\text{time}}$ = $\frac{10cm}{0.01\ s}$ = 1000cm/s√1

(iii) Acceleration = $\frac{V - U}{t}$ = $\frac{(1000 - 200)}{(0.01 \times 4)} \frac{cm}{s}$ = $\frac{800}{0.04}$√1

= 20,000cm/s

= 200m/s.√1

(c) Eqn 1 Dropping

$Sd = ut \times ½ gt^2$ u = 0

$Sd = ½ gt^2$√1

but Sd + Dn = 45m

∴ $45 = ½ gt^2 + 25t -$ ~~$½ gt^2$~~

25t = 45

t = 1.85 seconds

Eqn 2 upwards

$Su = ut - ½ gt^2$

$Su = 25t - ½ gt^2$

u = 25 √1

14. (a) Effective resistance

4 + 1 = 5Ω√1

2 + 3 = 5Ω√1

$\frac{5 \times 5}{5 + 5}$ = 2.5Ω√1

2.5 + 5.5 = 8Ω√1

(b) V = IR√1

4 = 1 x 8 √1

I = $^4/_8$ = 0.5A√1

(c) $I = I_1 + I_2$ √1

$I_2 = I_1$√1 $I_2 = \frac{0.5A}{2}$ = 0.25A√1

I = 0.5A

15. (a) If volume is decreased, <u>distance between adjacent molecules is reduced√</u>, <u>leading to increase√ in the rate at which, molecules collide√</u>. Increased rate of collisions increases the pressure.

(b) (i) – Volume√

- Pressure√

(ii) Allowing the air to adjust to room temperature before taking the readings.√

(iii) – Plot a graph of P against V√

- A curved line results√
- From the graph calculate the product of PV which will be a constant√

Or

- Plot a graph of P against $^I/_V$√
- A straight line graph is produced√
- Slope of the graph is PV√

(c) Pressure due to mercury (P_2) = 76 + 10

= 86cmHg

$P_2V_2 = P_1V_1$

$P_2L_2A = P_1L_1A$√

86 x L_2 = 76 x 25√

L_2 = 22.09cm√

16. (a) Heat required to raise temperature of as body by 1 degree celcius/centrigrade√1

(b) Measurements

- Initial mass of water & calorimeter – m_1√1
- Finial mass of water & calorimeter – m_2√1
- Time taken to evaporate water ($T_1 – T_2$) = t_1√1
- Heat given out by heater = heat of vaporization = ml√1

$pt = (m_l – m_2)l$√1

$L = \frac{pt}{m_1 – m_2}$√1

(c) (i) $H = M_C C_C \Delta T$√1

$= \frac{40}{1000} x (34 – 25)$

= 40 x 9

= 360J√1

(ii) $H = M_w C_w \Delta T$

$= \frac{100}{1000} x 4200 x (34 – 25)$

= 3780√1

(iii) $H = M_m C_m \Delta T$

$= \frac{150}{1000}$kg x 6 x C

= 9.9 cm√1

Or (i) + (ii) = 4140J

(iv) Heat lost by metal = heat gained by calorimeter + heat gained by water√1

$\frac{150}{1000}$ x cm x 66 = 4140√1

$CM = \frac{4140}{0.15 x 66}$ = 418J/Kgk

Or 9.9 Cm = 360 + 3780

CM = 418J/KgK√1

17. (a) (i) Pressure is force of thrust per unit area√

(ii) Upthrust is an upward force experienced by a body which is partially or wholly immersed in a liquid.√

(b) (i) P = hpg√

= 0.12 x 1000√ x 10

= 1200N/M^2√

$P = \frac{F}{A}$

F = 1200 x 0.0004√

= 0.48N√

(ii) Upthrust = 1.5 – 0.48

= 1.02N√

Weight of displaced water = pvg

1.02 = 1000 x V x 10√

V = $1.02 \times 10^{-4} m^3$√

(iii) Weight of block = pvg

= 2500 x 1.02 √x 10^{-4} x 10

= 2.55N√

Apparent weight = 2.55 – 1.02√

= 1.53N√

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DATE_________________________________

232/2
PHYSICS
THEORY
PAPER 2
JULY/AUGUST 2011
1 HOURS 40 MINUTES

MAKUENI KATHONZWENI JOINT EXAMINATION 2011
Kenya Certificate of Secondary Education
PHYSICS
THEORY
PAPER 2
1 HOUR 40 MINUTES

INSTRUCTIONS

This paper consists of two sections A and B.
Answer all the questions in the spaces provided.
All working must be clearly shown.
Mathematical tables and electronic calculators may be used.

For examiner's use only

Section A 1 – 13	Candidate's score	Total marks 25 marks
Section B 55 marks	14 15 16 17 18	9 13 7 15 11
	GRAND TOTAL	80 MARKS

TOTAL CANDIDATE'S SCORE

Section A [ ] + section B [ ] = [ ]

This paper consists of 11 printed pages

Turn over

SECTION A (25 MARKS)

1. State two differences between images formed by plane mirrors and those formed by a pin-hole camera (2mks)

2. The energy spent by a lead acid accumulator is 45J in moving 8C of charge from one point to another. Calculate the potential difference between the terminals of the battery. (3mks)

3. The diagram below shows a bar magnet being withdrawn from a solenoid.

The center zero galvanometer is observed to deflect in the direction shown. What is the polarity of the magnet. (1mk)

4. Arrange the following radiations in order of increasing frequency
Ultraviolet, Microwaves, blue light, red light (1mk)

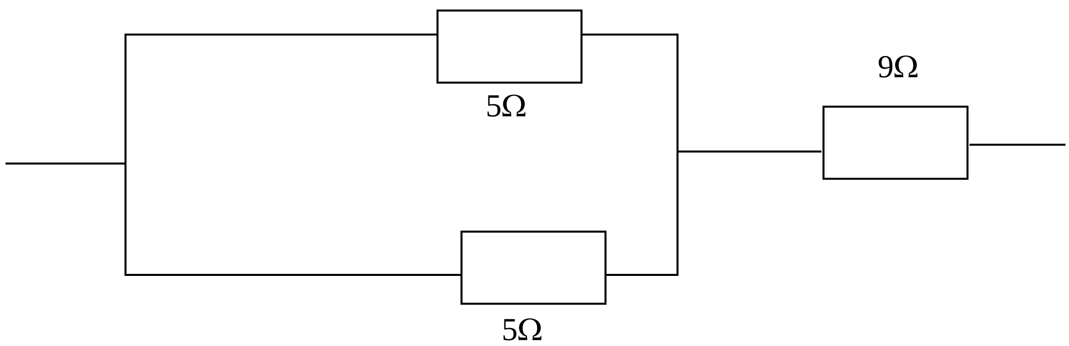
5. The following is part of radioactive decay process/series

$$ {}^{234}_{83}\text{Bi} \xrightarrow{\beta} {}^{a}_{84}\text{X} \longrightarrow {}^{230}_{b}\text{Y} $$

Determine the values of a and b

a = ________________________ b = _______________________________ (2mks)

6. The figure below shows part of an electrical circuit. The current through the 9Ω resistor is observed to be 1A.



State the value of the current through each of the 5Ω resistors (1mk)

7. An electric heater 480Ω is connected to a 240V main supply. Determine the energy dissipated in 5 minutes. (3mks)

8. State one property of X – rays which makes it possible to detect fractured bones. (1mk)

9. Two soft iron rods are placed inside a coil of wire connected to a battery as shown in the figure below. State the effect on the rods when the switch is closed. (2mks)

10. State any two disadvantages of direct transmission system (no transformer used) (2mks)

11. Define the term "accommodation" as applied to human eye (1mk)

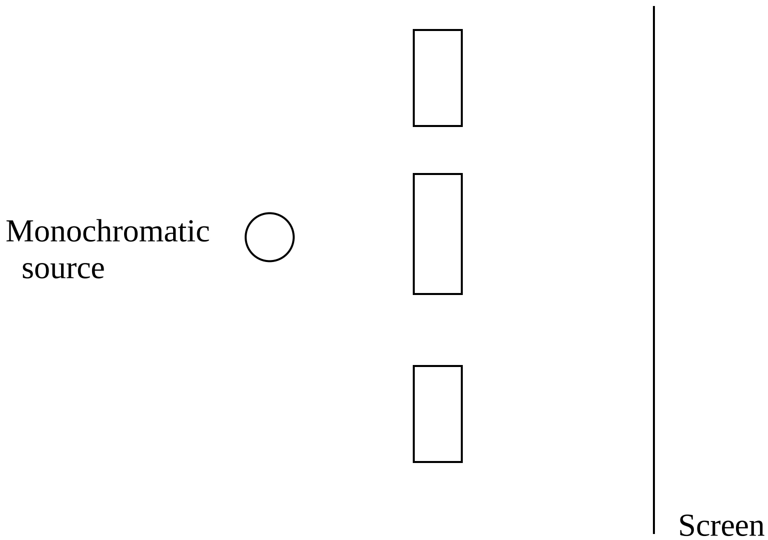
12. The time – keeper of a 110m races stands near the finishing tape and starts his stop-watch on hearing the bang from the starting pistol. When should he have started his stop-watch (speed of sound = 330 m/s) (3mks)

13. P – type and Y – type semiconductors are made from a pure semi conductor by a process known as 'doping'. Explain how doping produces a P-type semi-conductor. (3mks)

SECTION B (55 MARKS)

14. (a) State the relationship between frequency wavelength and energy of a wave (2mks)

(b) In an experiment to observe interference of light waves, a double slit was placed close to the source as shown below

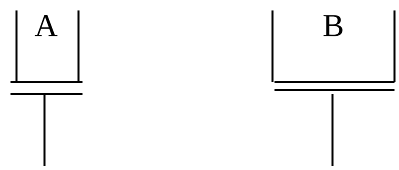


(i) Describe what is observed on the screen (2mks)

(ii) State what would be observed when the slits S_1, S_2 is reduced. (3mks)

(c) State the difference between transverse and longitudinal wave (2mks)

15. (a) Two metal cans A and B of different sizes rest on two identical gold-leaf electroscopes as shown in the figure 2 below. Each can is given exactly the same quantity of negative charge.



(i) Copy the diagram and show on it the divergence of the leaves on each electroscope. Explain your answer. (3mks)

(ii) Which will have been charged to the greater potential? Give a reason (2mks)

(iii) If the two cans are now carefully connected, without either being earthed, which way will electrons flow? (1mk)

(iv) Give a reason for your answer to part (c) above (1mk)

(b) The figure 3 below shows a system of capacitors connected to 100V supply.
4μ 6μf 8μf figure 3

(i) Calculate the total charge Q, flowing through the circuit (3mks)

(ii) Calculate the potential difference across 4mf capacitor. (3mks)

16. (a) (i) State any one property which is common to electromagnetic waves. (1mk)

(ii) State two properties of light that are different from sound waves. (2mks)

(b) (i) One range of frequencies used in broadcasting varies from 0.70 x 10^6 Hz and 2.5 x 10^6Hz. What is the longest wavelength in this region. (3mks)

(ii) In electromagnetic spectrum, name the region that can ionise air. (1mk)

17. (a) What is mean't by radioactivity. (1mk)

(b) With an aid of a labelled diagram explain the working of a Gelger – muller tube as a detector of radiation (5mks)

(c) In an experiment to determine the half life of a certain radioactive substance, the activity in disintegrations per minute was measured for sometime. The table below shows the results obtained

Time in minutes	0	10	20	30	40	50	60	70	80
Activity in disintegrations per minute	152	115	87	66	50	38	20	12	6

On the grid, plot a suitable graph and use it to determine the half life (t ½) of the substance. (7mks)

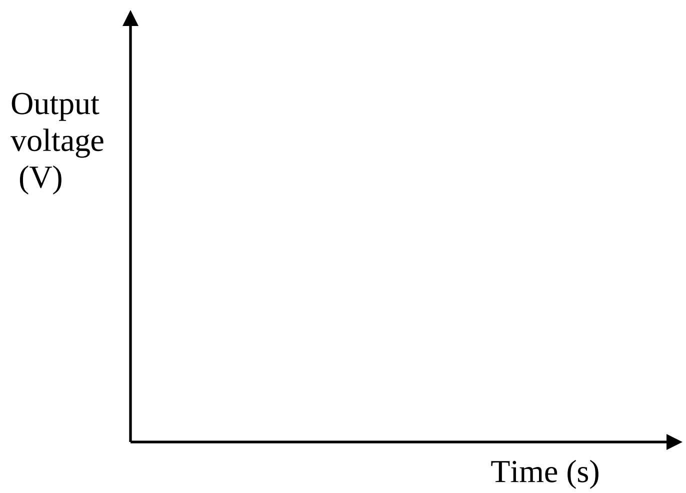
(d) At time t = 40 minutes, the activity of a sample of a certain radioactive isotope with half – life of 12 minutes is found to be 480 disintegrations per minute. Determine the time which the activity was 3840 disintegrations per minute. (2mks)

18. The figure below shows a circuit of a rectifier using two diodes D_1 and D_2

(i) What is rectification? (1mk)

(ii) Explain how rectification output is produced from the set up when an a.c input is connected across AB (4mks)

(iii) On the axes provided below sketch the graph of output voltage against time for the rectifier. (1mk)



(iv) A capacitor is now connected across XY. Explain the effect of the capacitor on the output. (2mks)

(b) Explain briefly what happens to the depletion layer when a diode is forward biased. (2mks)

(c) What is Zener diode? (1mk)

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PHYSICS
THEORY
PAPER 2
JULY/AUGUST 2011

MAKUENI/KATHONZWENI JOINT EXAMINATION 2011
Kenya Certificate of Secondary Education
PHYSICS
THEORY
PAPER 2

MARKING SCHEME

SECTION A (25 MARKS)

1. In a plane mirror image is
   Erect virtual√1
   In a pin – hole camera image is
   Inverted virtual√1

2. Potential difference = work done/charge transferred √1
   $= \frac{45}{8}$ √1
   = 5.625v√1

3. North√1

4. Microwaves – red light – blue light – ultraviolet√1

5. a = 234√1
   b = 82√1

6. 0.5A√1

7. E = VIt
   $= I^2Rt$
   $E = \frac{V.V.t}{R}$ √1
   $= \frac{240 \times 240 \times 5 \times 60}{480}$
   = 36,000J√

8. They penetrate matter√1

9. They will repel√1 since they acquires same polarity√1

This paper consists of 5 printed pages

10. - A large current transmitted over long distance is risk.√1
- To carry high currents, the cables have to be very thick. The cost of such thick cables is quite high.√1
- The power dissipated as heat (I^2R) in the cables during the power transmission is very high√1
(Any of the correct two answers above)

11. - The ability of the eye lens to focus both near and far objects√
- The changing of thickness of an eye lens in order to focus objects of various distances from an eye on the retina√
(Any of the two above)

12. Time taken to hear the bang = $\frac{\text{distance}\surd}{\text{Speed of sound in air}}$
$= \frac{110\text{m}}{330\text{m/s}}$
= 0.33 √1seconds before hearing the bang√1

13. - Doping a pure semiconductor with a group 3 impurity√1
- Only 3 outermost electrons of pure semiconductor bonds with the 3 outmost electrons of the impurity√1 leaving one unbonded electron on the pure semiconductor which moves round within the conductor leaving holes√1

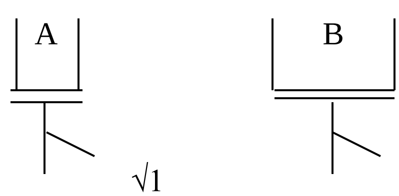
SECTION B (55 MARKS)

14. (a) - The higher the frequency the high or the energy√1
- The shorter the wavelength the higher the energy√1

(b) (i) Dark and bright fridges√1, with central fringe bright√
(ii) Separation of fringes√ increases/number of fringes decreases√1

(c) In transverse waves the displacement of waves particles is perpendicular to the wave motion√1 in longitudinal waves the displacement of the waves particles is parallel to the direction of wave motion√

15.



Larger deflection smaller deflection

Can B which is larger than can A has a larger capacitance i.e. it can store more charge before its potential reaches the value at which sparking occurs and it discharges.√1

(ii) - Can B√1
- The larger the surface area the higher the capacitance.√1

(iii) From can B to can A√1

(iv) The discharging on can A of small surface area is high than on can B, hence the potential of can A is less than that of can B√1

B (i) Q = CV

Combined capacitance for 4μf and 8μf = 4 + 8

= 12μf

Combined capacitance for the whole system, $C = \frac{12 \times 6}{12 + 6}$

= 4mf√1

Q = CV√1

$= 4.0 \times 10^{-6} \times 100$

$= 4.0 \times 10^{-4}C$ √1

(ii) Pd. Across 6mf, $V = \frac{Q}{C}$√1

$= \frac{4.0 \times 10^{-4}}{6.0 \times 10^{-6}}$

= 66.7V√1

P.d across 4mf capacitor = 100v – 66.7v

= 33.3v

16. (a) (i) – They carry no charge

- They are transverse in nature
- They travel with the same speed in vacuum

(Any 1 correct one mark)

(ii) – Light travels in vacuum while sound does not travel in vacuum

- Speed of light in vacuum is 3.0×10^8m/s while that of sound in vacuum is 330m/s
- Light is a transverse wave while sound is a longitudinal wave

(Any two correct each one mark)

(b) (i) The low the frequency the long the wavelength √1

$\lambda = \frac{c}{f}$√1

$= \frac{3.0 \times 10^8}{0.7 \times 10^6}$ = 428.57m√1

(ii) X – rays (Gamma rays) √1

17. (a) Radioactivity is the spontaneous disintegration of unstable nuclei so that it stabilizes.√1

(b) Labeling – 3 marks

- When radiation enters the mica window the argon gas is ionised√1; the electrons go to anode and +ve ions go cathode√1; thus a discharges is suddenly obtained (PULSE) between anode and cathode, and registered by counter√1. The discharge persists for a short time due to the quenching effect of halogen vapour.

(c) t ½ = everage = film
= 24.5 min

(d) 480 t ½ 960 t ½ 1920 t ½ 3840
3 t ½ = 3 x 12 = 48 min

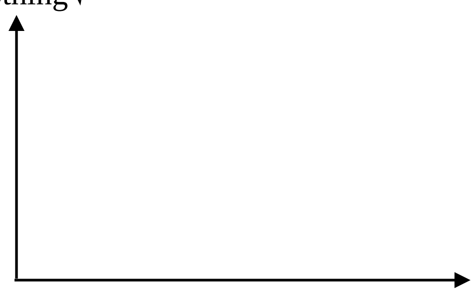
18. (i) This is the transforming of an alternating voltage into a direct voltage
(ii) In the 1st half – cycle D_1 is formed √biased. While D_2 is reverse biased. Current flows through AD_1BCA√1
In the 2nd half cycle, D_2 √1is forward biased while D_1 is reverse biased current flows through DD_2BCD.√1

(iii) Output voltage √

Time (s)

(iv) For smoothing√

Output (V)



Time (sec)

(b) When a diode is forward biased, fixed ions in the depletion layers regains holes and electrons thus reducing significantly.√2

(c) A diode designed to go beyond the break – down voltage.√1

NAME____ INDEX NO __________________________

CANDIDATE'S SIGNATURE_____________

DATE_________________________________

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

MAKUENI/KATHONZWENI JOINT EXAMINATION 2011
Kenya Certificate of Secondary Education
PHYSICS
PRACTICAL
PAPER 3
2 ½ HOURS

INSTRUCTIONS

This paper has two questions. You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before starting your work.
Marks are given for clear record of the observations made, their suitability and accuracy and the use made of them.
Mathematical table and electronic calculators may be used.

For Examiner's use only

Q1	Question no	
	Maximum score	
	Candidates score	
Q2	Question no	
	Maximum score	
	Candidate score	

This paper consists of 7 printed pages

1. You are provided with the following apparatus

- An ammeter (0 – 1.0A)
- A voltmeter (0 – 2.5v)
- A resistance wire PQ mounted on a mm scale.
- Two new dry cells
- A switch
- A cell holder
- Six connecting wires

(a) Set up the apparatus as shown below.

(b) Starting with L = 0.2m, close the switch. Record the value of I, the current through the wire and V, the p.d across it. Enter your results in the table drawn below.

L (M)	0.2	0.4	0.5	0.6	0.7	0.8
I (A)						
P.d (V)						
$R = {}^{V}/_{I}$ (Ω)						
${}^{1}/_{I}$ (A^{-1})						

(8mks)

(c) Repeat part (b) above for the values of L, shown in the table
Record the corresponding values of I and V. calculate the values of R and ${}^{I}/_{I}$ and enter the values in the table.

(d) On the grid provided, plot a graph of R (y – axis) against ${}^{1}/_{I}$ (x-axis) (5mks)

(e) Determine the slope, S of your graph (3mks)

(f) If the graph obeys the equation

$$R = {}^{E}/_{I} - r$$

Determine:

(i) The value of E (1mk)

(ii) The value of r (2mks)

(g) Draw a simple circuit you can use to determine the E.M.F of a single cell. (1mk)

Question Two

Your are provided with the following

- A metre rule.
- 3 pieces of thread.
- A clamp, boss and stand.
- A mass labelled W.
- 2 masses of 20g.
- A mass of 50g.
- 2 masses of 10g.

Procedure:

(a) Using thread suspend the metre rule from the stand and note down the centre of gravity G.

G = ____ cm mark (1mk)

(b) (i) Hang the mass labelled W from the 65 cm mark. Suspend the 50g mass from the other side and adjust its position till the system is in equilibrium as shown in the figure below.

(ii) Measure distances x and y

X = ______________________________ metres (1mk)

Y = ______________________________ metres (1mk)

(c) (i) Maintaining the point of suspension f the metre rule at G and the mass labelled W at 65 mark. Repeat the experiment for masses of 70, 80, 90, 100 and 120g. Enter the results in the table below.

Mass (g)	Weight F (N)	Distance x (m)	$^1/_X$ m^{-1}
50			
70			
80			
90			
100			
120			

(ii) Plot a graph of F against $^I/_X$ (5mks)

(iii) Determine the slope, S of the graph. (3mks)

(iv) Given that $F = \frac{WY}{X}$ where W is a constant, find it's value. (3mks)

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MARKING SCHEME

1.b

L (M)	0.2	0.4	0.5	0.6	0.7	0.8	
I (A)	0.4	0.31	0.25	0.22	0.20	0.19	$\pm$ 0.05
P.d (V)	1.6	1.9	2.0	2.1	2.2	2.4	$\pm$ 0.1
R = $^V/_I$ (Ω)	4.00	6.13	8.00	9.55	11.00	12.63	2mks
$^1/_I$ (A^{-1})	2.50	3.22	4.00	4.55	5.00	5.26	2mks

I values – all correct – 2mks
At least 4 correct 1mk
V values – all correct – 2mks
At least 4 correct – 1mk

(e) $S = \frac{11-4}{5-2.5} = \frac{7}{2.5} = 2.8 \pm 0.1$

Correct Intervals – 1mk
Evaluation – 1mk
Accuracy – ½ mk
Unit – ½ mk

(f) (i) 2.8V - 1mk

(ii) –r = -3 realising – r = y intercept – 1mk
r = 3 Ω with unit - 1mk

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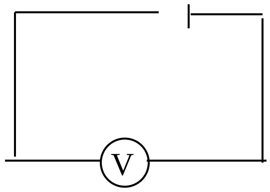
Turn Over

(g)



Question Two

G = 50.0 mark (1mk)
X = 0.3m (1mk)
Y = 0.15m (1mk)

(c) (i)

Mass (g)	Weight F (N)	Distance x (m)	$^1/_x$ m^{-1}
50	0.5	0.300	3.30
70	0.7	0.214	4. 67
80	0.8	0.188	5.32
90	0.9	0.167	5. 99
100	1.0	0.150	6. 67
120	1.2	0.125	8.00
	2mks	2mks	2mks

X values $\pm$ 0.2cm
For every row, all values correct – 2mks
At least 4 correct – 1mk

(c) (iii) $S = \frac{1.2 - 0.5}{8 - 3.3}$

$\frac{0.7}{4.7}$

= 0.149NM $\pm$ 0.01

Correct Intervals – 1mk
Evaluation – 1mk
Accuracy – ½ mk
Unit - ½ mk

(iv) S = WY

$0.149 = 0.15W$

$W = \frac{0.149}{0.15}$

$W = 0.993N \pm 0.01$

Correct substitution – 1mk

Evaluation – 1mk

Accuracy – ½ mk

Unit – ½ mk

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MAKUENI /KATHONZWENI DISTRICT EXAMINATION
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CONFIDENTIAL INSTRUCTIONS

Q1. Each candidate requires the following

- A voltmeter (0-2.5V).
- A cell holder to hold two cells in series.
- Two new dry cells.
- An ammeter (0-1A).
- Six connecting wires, four with crocodile clips.
- A switch.
- Nichrome wire (S.W.G 32) 1m long mounted on a mm scale.

Q2.

- A metre rule.
- 3 pieces of thread each about 20cm long.
- 2 masses of 20g each.
- 2 masses of 50g or 100g mass.
- A complete stand.
- One 10g mass.

This paper consists of 1 printed page