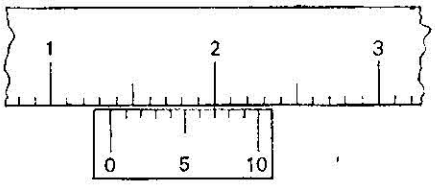
Kenya Certificate of Secondary Education

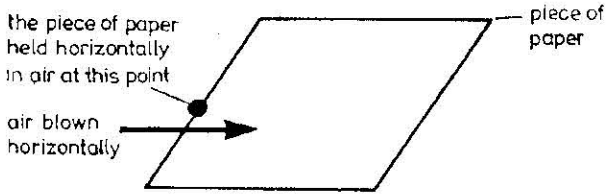
Physics Mock Examination 2014

1. What is the reading of the vernier calipers shown in the figure below? (1 mark)



2. A gas is heated from 20^0C to 80^0C at constant pressure. What is the ratio of its volumes at the two temperatures? (2 marks
3. A drop of rain $1cm^3$falls from rest through a height of 100m. What is its momentum as it hits the ground. (2 marks)

4. Air is blown over a piece of paper as shown below



State what is observed. (1 mark)

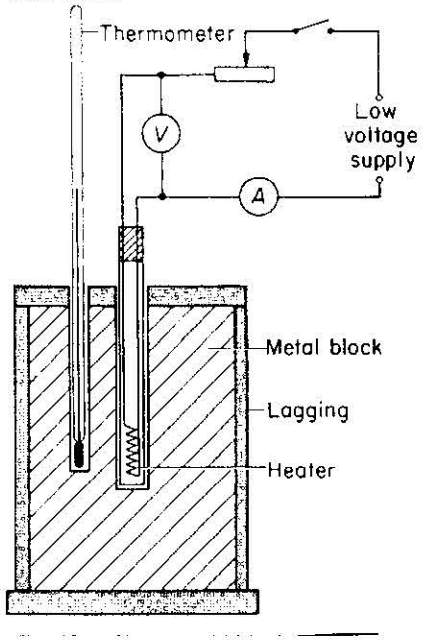
5. The diagram below shows a container fitted with two pistons P and Q. The system is in equilibrium. When equal masses are placed on each piston at the same time. Explain what happens (2 marks)
6. A single elastic cord has a length of 24cm when a mass of 20g is suspended from it. The length of the cord becomes 30cm if the mass is increased to 50g. When three similar such chords are used in parallel and a 150g mass suspended from it, what will be the extension of each chord? (3 marks)
7. Explain why a hollow glass sphere just floats in cold water in a copper can but sinks when the water is heated. (2 marks)
8. A theatre measures 100mx80mx25m. The air inside it has a density of $1.3kg/m^3$ when it is cool. Calculate the mass of the air contained in the room. (2 marks)
9. Smoke particles in an air cell viewed under a microscope exhibit Brownian motion. What accounts for the random motion of smoke particles? (1 mark)
10. Why are people who are maimed or have lost one leg provided with crutches? (1 mark)
11. A bullet is fired horizontally from the top of a platform 60m high. If the initial speed is 200m/s, determine the maximum horizontal distance covered by the bullet. (3 mark

SECTION B(55 MARKS)

Answer ALL the questions in the spaces provided

14(a) Define specific heat capacity (1 mark)

b) The figure below shows apparatus that a student uses to make an estimate of specific heat capacity of iron. The power of the heater is known



i) State four readings the student must take to find the specific heat capacity of iron.

(2 marks

ii) How could you use the measurements above to find the specific heat capacity of iron.

(2 marks)

ii) Explain why the value obtained above with this apparatus is higher than the actual value.

(1 mark)

iv) State one addition to the apparatus that would help improve the accuracy of the value obtained. (1 mark)

c) 20g of a certain fuel produces 3.5×10^7 J/kg of heat when burnt in a plentiful supply of oxygen. This mass of fuel was burnt and the heat obtained was used without loss to heat 400g of a liquid originally at 10°c. After all the heat has been absorbed by the liquid , 140g of it remained as a liquid. The specific heat capacity of the liquid was 2.5×10^3 J/KgK and its boiling point was 80°c . Calculate the specific latent heat of vapourization of the liquid. (ignoring heat losses , the thermal capacity of the container and any liquid evaporated before reaching boiling point). (4 mar

15(a) Define the term velocity ratio (1 mark)

b) Draw a labeled diagram of a block and tackle system which has a velocity ratio of 7. (2 marks)

b) This pulley system has an efficiency of 70%. Calculate.

i) Its mechanical advantage (2marks)

ii) Effort required to raise a load of 122N (2 marks)

iii) The work done by a man using this machine in raising the load through a vertical distance of 3.0m. (3 marks)

iv) The time taken to do this if his average rate of working is 150W. (2marks)

16(a) i) State Archimedes principle (1 mark)

ii) Explain one application of Archimedes principle in real life (2 marks)

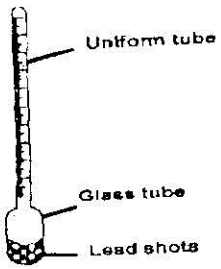
b) The mass of the fabric of a large balloon is 700kg. The balloon is inflated with $2000m^3$ of helium. The balloon is attached to a cable fixed to the ground and released to still air (density of air and helium are $1.25kg/m^3$ and $0.18kg/m^3$ respectively)

i) Draw the forces acting on it (2 marks)

ii) Determine the tension in the cable (3 marks)

iii) What would be the acceleration of the balloon if the cable is cut? (3 marks)

c) The figure below shows a simple hydrometer



i) State the purpose of the lead shots in the glass bulb (1 mark)

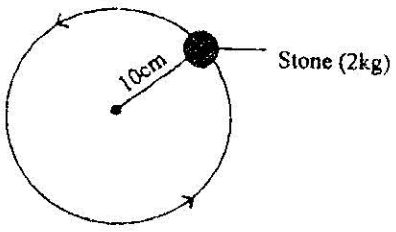
ii) How would the hydrometer be made more sensitive (1 mark)

iii) Describe how the stem is calibrated to measure relative density (2 marks)

17(a) Define centripetal force (1 mark

b) The figure below shows a stone moving with uniform speed in a horizontal circle

Indicate on the figure the centripetal force(T) (1 mark)



c) If the stone takes 15 seconds to describe an arc length of 5cm. Calculate

i) The angle it subtends at the centre (2 marks

ii) The angular velocity ω (2marks)

iii) linear velocity V of the stone (2 marks)

iv) the centripetal force (T) (2 marks)

18. A block of mass 200g rests on a rough a horizontal table. A force of 0.6N pulls the block so that it moves with a constant acceleration of $1m/s^2$ calculate

i) the time it takes to travel a distance of 200m (2 marks)

ii) the frictional force between the block and the table (2marks)

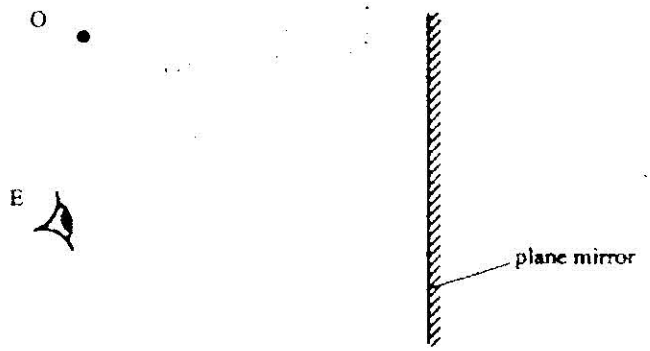
iii) The coefficient of kinetic friction between the two forces (2marks

iv) Apart from the normal reaction and frictional force , name other force (1mark)

JOINT EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
Paper 2
2 hours

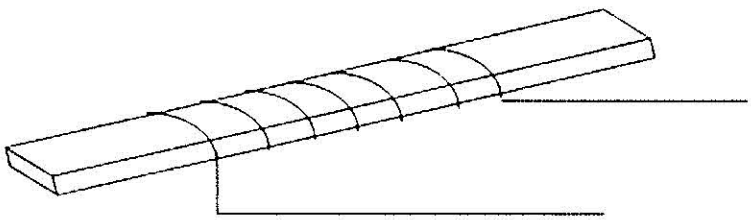
SECTION A (25 MARKS)

1. The diagram below shows an object **O** placed in front of a plane mirror

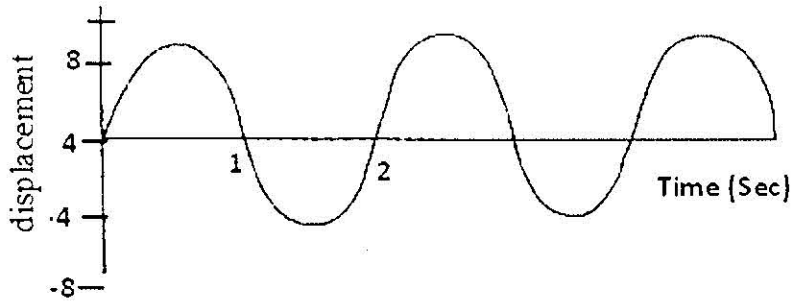


Draw rays to locate the position of the image as seen by the eye **E** through the mirror.

2. Outline how a gold leaf electroscope can be charged positively through induction. (3mks)
3. (i) The diagram below shows one method of demagnetization. Complete the diagram for demagnetization to take place. (1mk)



(ii) In the diagram below, show the arrangement of the dipoles after demagnetization. (1mk



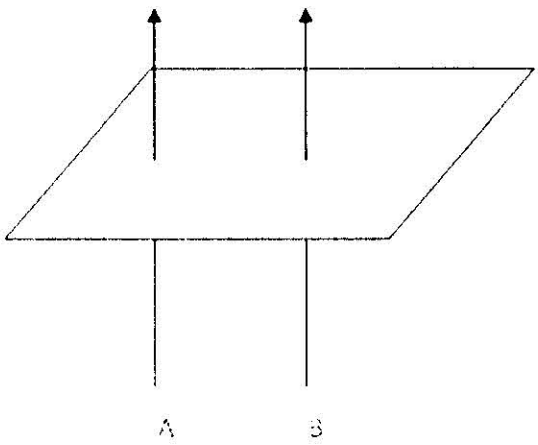
4. Determine the frequency of the wave. (3mks)
5. A child drops a rock down a well 25 m deep and hears the sound of the rock hitting the water 2.32 seconds after the rock is dropped .Calculate the speed of sound in air. (3mks)

(Take acceleration due to gravity g = 10 m/s^2 and air resistance is negligible)

6. (a) Distinguish between ultraviolet rays and infra- red rays. (1mk)

(b) State two applications of ultraviolet rays. (2mks)

7. State two advantages of a C.R.O over a moving coil meter in measuring voltage. (2mks)
8. The figure below shows two parallel current carrying conductors A and B cutting through a piece of card board.



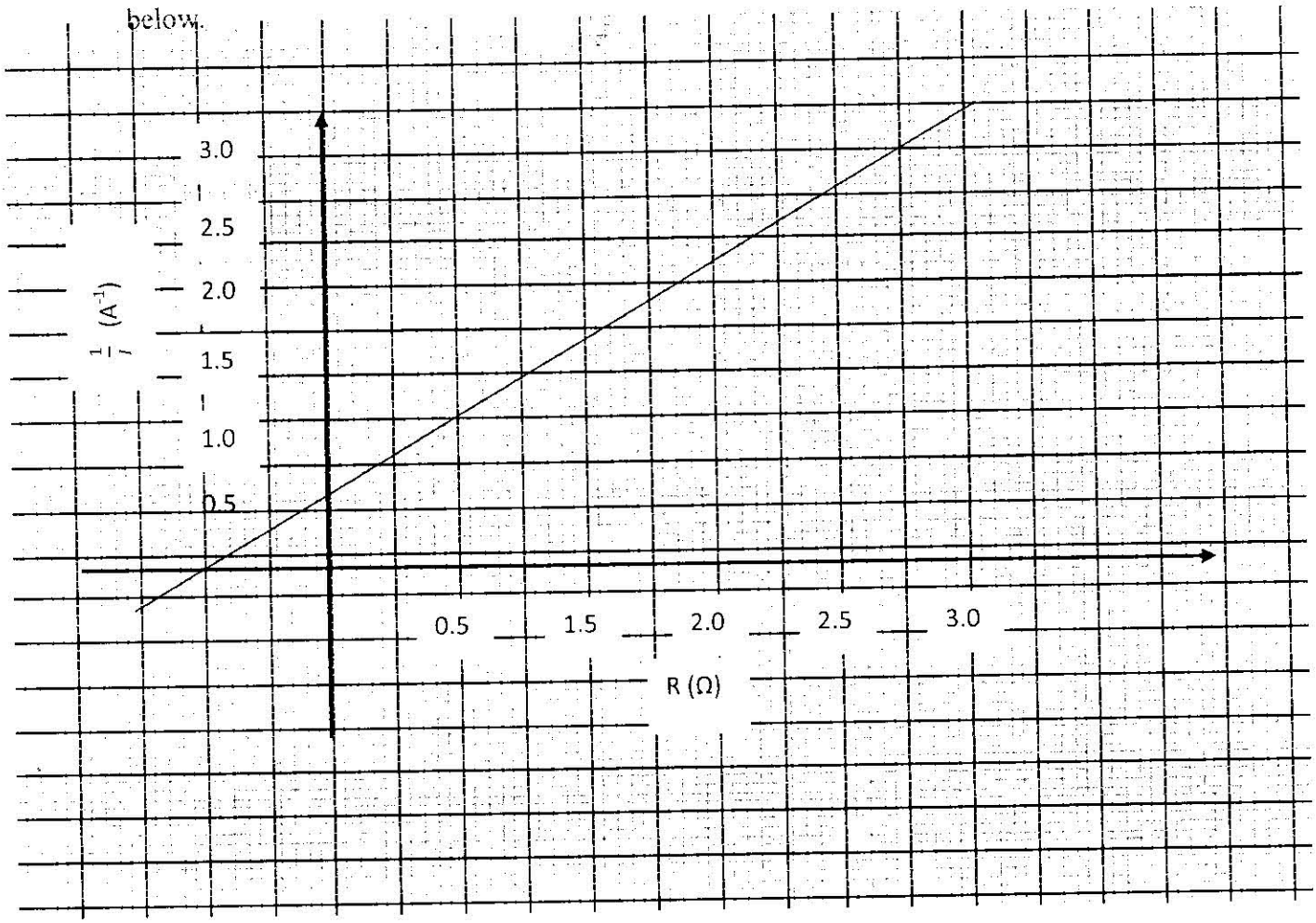
(i) Sketch the magnetic field pattern produced. (2mks)

(ii) Identify the nature of the force between them. (1mk)

9. Derive an expression for the total electrical energy converted into heat in a wire of resistance R when a current I is maintained for a time t. (3mks)

SECTION B (55 MARKS)

10. (a). A dry cell of Emf E and an internal resistance,r is used to drive a current through various resistors of resistance R and the values of $\frac{1}{I}$ and R plotted on a graph as shown below.

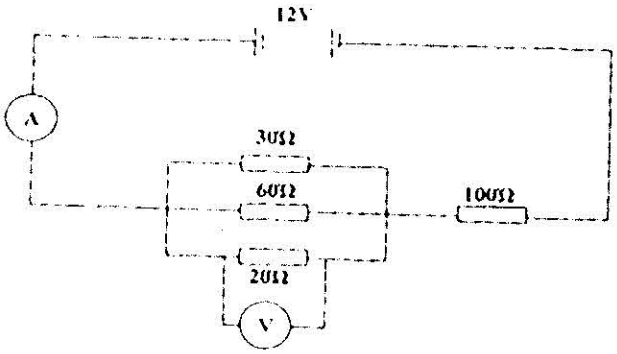


The variables I and R are related by the equation $\frac{1}{I} = \frac{R}{E} + \frac{r}{E}$

(i) Use the graph to determine the Emf, E of the cell. (3mks)

(ii) State the significance of the x - intercept. (1mk)

(b) The diagram below shows four resistors connected together in circuit.

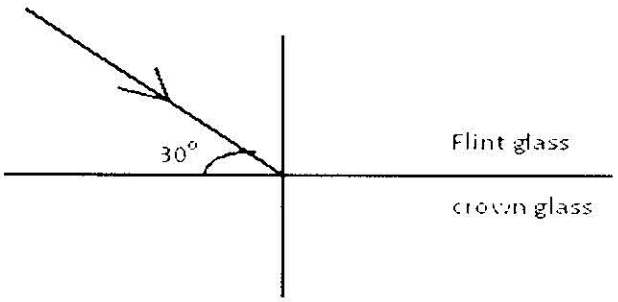


Determine;

(i) The ammeter reading (3mks)

(ii) The Voltmeter reading (3mks)

11. (a) Light passes from a prism made of flint glass of refractive index 1.89 to a second prism made of crown glass of refractive index 1.52 as shown in the diagram below.



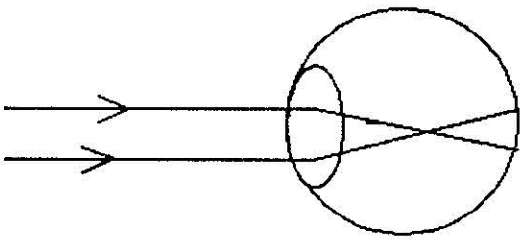
Given that the angle between the interface and the incident ray is 30^0,

(i) Determine the critical angle for the pair of media. (3mks)

(ii) Show the direction of light and indicate the angles after the ray of light hits the interface.

(b) State Snell's law. (1mk)

(c) The figure below shows a defect of the human eye.



(i) State two possible causes of the defect. (2mks)

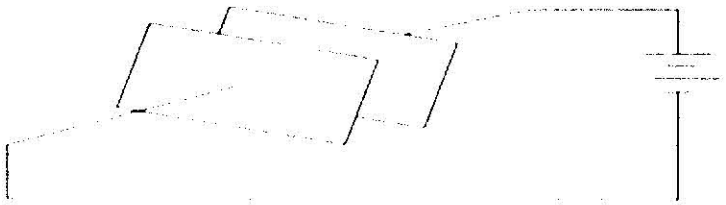
(ii) Show on the diagram how the defect above is corrected. (1mk)

12. (a) (i) Give a reason why the caps of a lead acid accumulator are opened during charging.

(1mk)

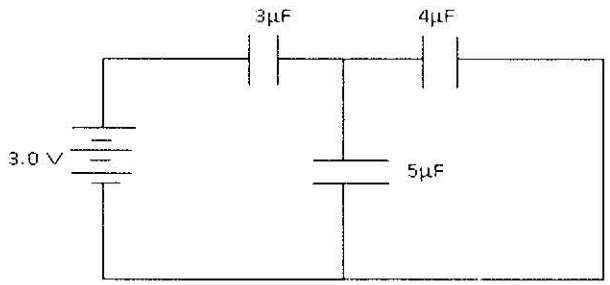
(ii) Name the electrolyte used in the lead acid accumulator. (1mk)

(b) The diagram below shows a parallel plate capacitor.



(i) State one way by which the capacitance of the capacitor above can be reduced. (1mk)

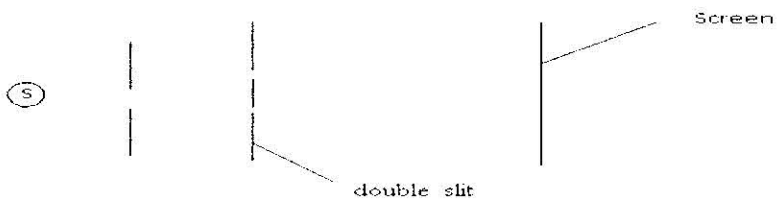
(c) Three capacitors are connected as shown.



(i) Calculate the total capacitance of the circuit above. (3mks)

(ii) Calculate the total energy stored by the capacitor network above. (3mks)

13. (a) In an experiment to observe interference of light waves, a double slit is placed close to the source S of light as shown in the figure below.



i) State the function of the double slit. (1mk)

ii) Describe what is observed on the screen. (2mks)

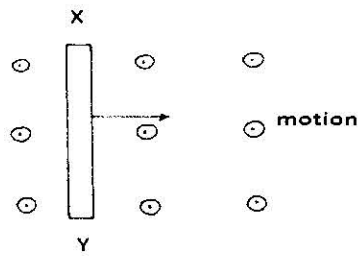
iii) State what is observed on the screen when the slit separation is reduced. (1mk)

(b) Using suitable diagrams differentiate between refraction and diffraction of water waves (2mks

(c) State the conditions that are necessary for the formation of stationary waves. (2mks)

14. (a) State three possible ways in which power is lost in a transformer. (3mks)
(b) State Faraday's law of electromagnetic induction. (1mk)

(c) The figure below shows a conductor XY moving in a region of uniform magnetic field.



(i) Indicate the direction of the induced current in the conductor and state the rule used in arriving at the answer. (2mks)

(ii) Suggest **two** ways of increasing the magnitude of the induced current in the conductor. (2mks)

(c) State two differences between a direct current and an alternating current generator (2mks)

15. (a) Distinguish between a real image and a virtual image (1mk)

(b) The distance between an upright image and the object produced by a curved mirror is 40 cm. The image is 3 times as tall as the object.

(i) State the type of mirror used. (1mk)

(i) Determine the object distance. (2mks)

(ii) The radius of curvature of the mirror (4mks)

(iii) State one application of the mirror as used question (b) above. (1mk)