PHYSICS MOCKS

COMPRISES OF 10 TRIALS OF MOCKS

(BOTH PAPER 1 AND PAPER 2 ARE PRESENT IN EACH TRIAL)

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(SERIES 1)

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NAME……ADM NO……

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PHYSICS MOCKS

SERIES 1 TRIAL 1 PAPER 1

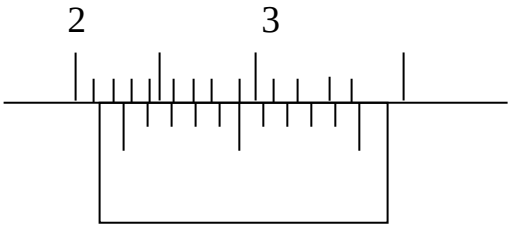
Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

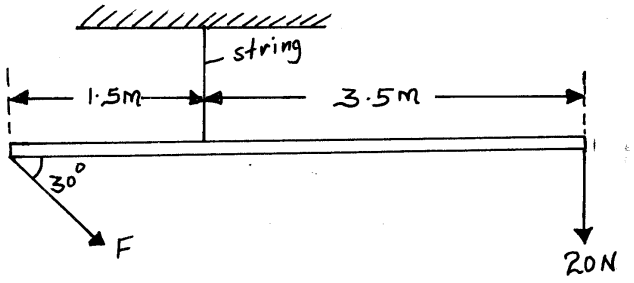
SECTION A (25 Marks)

1. Figure below shows part of a scale of a vernier calipers. What is the reading indicted by the scale? **(2 marks)**



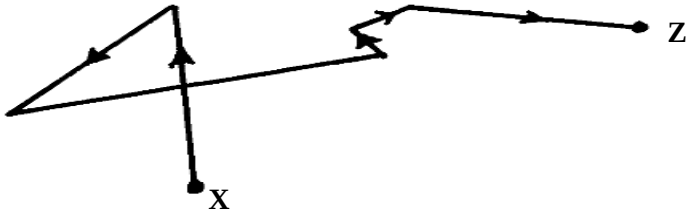
2. A horse pipe of internal diameter 4 cm is connected to a sprinkler with 25 holes each of diameter 0.04 cm, the water in the pipe flows at a speed of 5 cm/s. Determine the velocity with which the water leaves the sprinkler. **(3 marks)**

3. The figure below shows a uniform bar of weight 8N. It is acted on by two forces as shown.



Determine the value of F. **(3 marks)**

4. The figure below shows a path taken by a gas molecule moving from point x to z



(a) Explain how this movement can be observed **(1 mark)**

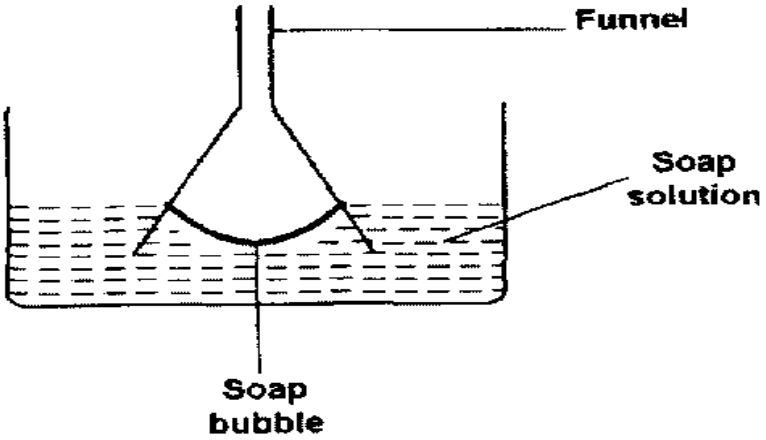
(b) State in full, the law of motion that governs movement from **x** to **z** **(1 mark)**

5. **a)** State ***one*** factor that a bimetallic strip relies on for its working **(1 mark)**

b) Two objects made of the same material and having the same mass are heated to a temperature of 35°C above that of the atmosphere and then allowed to cool in still air for 30 minutes. State one factor that will determine their final temperature **(1 mark)**

6. **(a)** What is surface tension? **(1 mark)**

(b) The figure below shows a funnel dipped into a liquid soap solution.



Explain what happens to the soap bubble when the funnel is removed. **(2 marks)**

7. A solid displaces 8.5cm^3 of liquid when floating on a certain liquid and 11.5cm^3 when fully submerged in the liquid. The density of the solid is 0.8g/cm^3, determine upthrust on the solid when it is floating **(3 marks)**

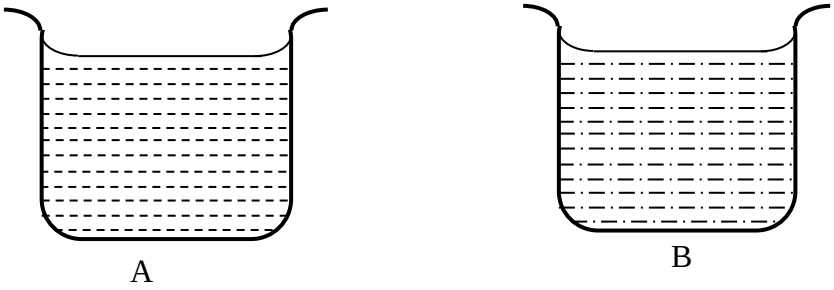
8. Fifty drops of oil have a volume of 1.0cm^3. If a drop of oil forms an oil patch of diameter 20cm, determine the size of the oil molecule. **(2 marks)**

9. In a faulty mercury-in-glass thermometer was found that the mercury level stands at 3 cm mark in the tube at 0^0 C and 18 cm when in steam above boiling water at normal atmospheric pressure. Calculate the temperature when the mercury stands at 12 cm mark. **(3 marks)**

10. Give ***two*** reasons why mercury is preferred to water in the manufacturing of barometers **(2 marks)**

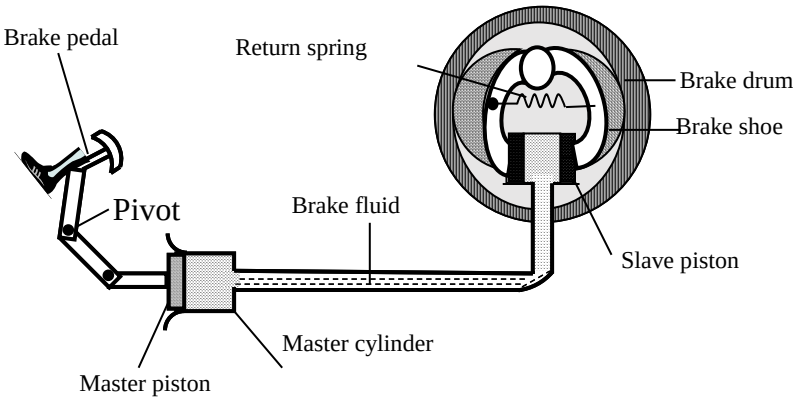
SECTION B (55 Marks)

11.(a) The figure below shows two containers filled with two different liquids to the same height.



It was found that the pressure at the bottom of A is greater than that at B. Explain **(1 mark)**

(b) The figure below shows a car braking system. The brake fluid is an oily liquid.



The brake drum rotates with the wheel of the car.

(i) Explain how pushing the brake pedal makes the brake rub against the drum. **(4 marks)**

(ii) The cross-sectional area of the master piston is 2.0cm^2. A force of 140N is applied to the master piston.

(I) Calculate the pressure created in the brake fluid by the master piston. **(2 marks)**

(II) The cross-sectional area of each slave piston is 2.8cm^2. Calculate the force exerted on each slave piston by the brake fluid. **(2 marks)**

(III) The force exerted on the master piston is greater than the force applied by the foot on the brake pedal. Using the principle of moments, explain this. **(2 marks)**

12. (a) State two factors that affect the magnitude of centripetal force of an object moving along a curved path. (**2 marks)**

(b) A stone is tied to a light string of length 0.5m. If the stone has a mass of 20g and is swung in a vertical circle with a uniform angular velocity of 6 revolutions per second, determine.

(i) The period T. **(2 marks)**

(ii) The tension of the string when the stone is at

I. The bottom of the swing. **(3 marks)**

II. The top of the swing. **(2 marks)**

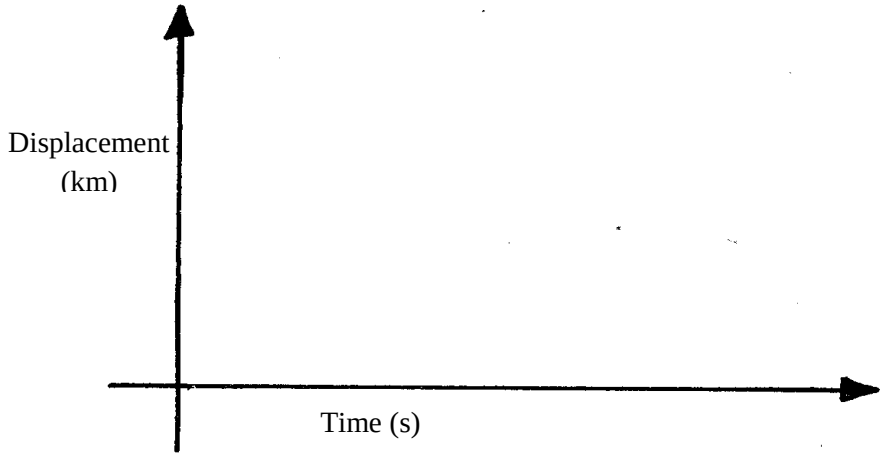
III. The linear velocity. **(3 marks)**

13.a) Define the term uniform acceleration. **(1 mark)**

b) A rocket was launched vertically upwards with uniform acceleration of $100ms^{-2}$ for 20 seconds. After this the rocket was acted upon only by a constant gravitational force.

(i) Calculate the maximum height reached by the rocket **(3 marks)**

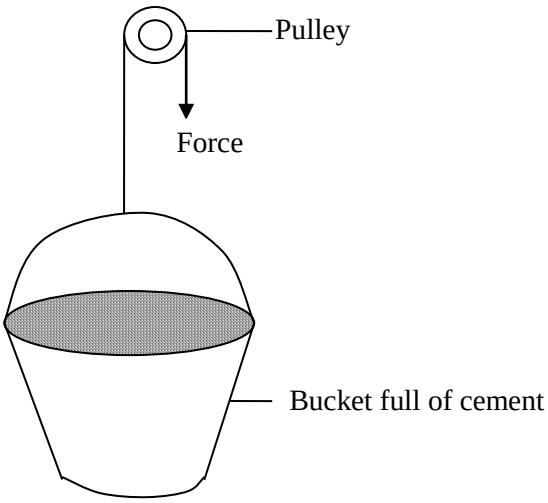
(ii) Draw to scale, on the axes provided below, the displacement – time graph for the motion of the rocket. **(2 marks)**



(iii) State Newton's second law of motion. **(1 mark)**

(iv) A car of mass 800Kg is initially moving at a speed of 25m/s. Calculate the constant force required to bring the car to rest over a distance of 20m. **(4 marks)**

14.A worker on a building site raises a bucket full of cement at a slow steady speed using the pulley as shown below.



The weight of the bucket and cement is 200N. The force F exerted by the worker is 210N

a) State why F is bigger than the weight of the bucket and cement**.** **(1 mark)**

b) The bucket is raised through a height by 4m. Determine the distance through which the worker pulls the rope**.** **(1 mark)**

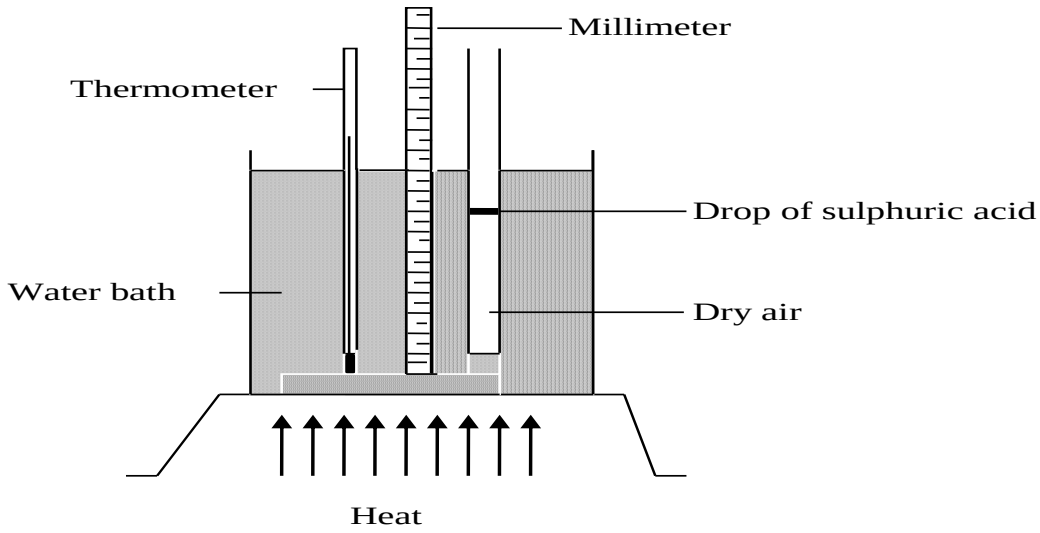
c) How much work is done on the bucket and cement? **(2 marks)**

d) State the kind of energy gained by the bucket**.** **(1 mark)**

e) Determine the total work done be the worker. **(3 marks)**

f) Calculate the efficiency of the machine used by the water. **(2 marks)**

15.a) The figure below shows a set-up that may be used to verify Charles' law.



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

(ii) Explain how the measurements taken in **(i)** above may be used to verify Charles' law. **(2 marks)**

(iii) A certain mass of hydrogen gas occupies a volume of $1.6cm^3$ at a pressure of 1.5×10^5 pa and temperature of 12^o C. Determine its volume when the temperature is 0^oC at a pressure of 1.0×10^5 pa**.** **(2 marks)**

(b) (i) An electric kettle connected to a 250V mains supply draws a current of 4.0A. It contains 1 litre of water with 1 kg of ice, all at 0^0C. Neglecting all heat losses, including heat absorbed by the kettle, find the time taken for all the ice to be just melted. (Take specific latent heat of fusion to be 3.34×10^5 J/kg and latent heat of vaporization is 2.26×10^6 J/kg Specific heat capacity of water is 4.2J/g). **(2 marks)**

(ii) Determine the time taken until half the contents of the kettle boils away. **(3 marks)**

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PHYSICS MOCKS

SERIES 1 TRIAL 1 PAPER 2

Kenya Certificate of Secondary Exams

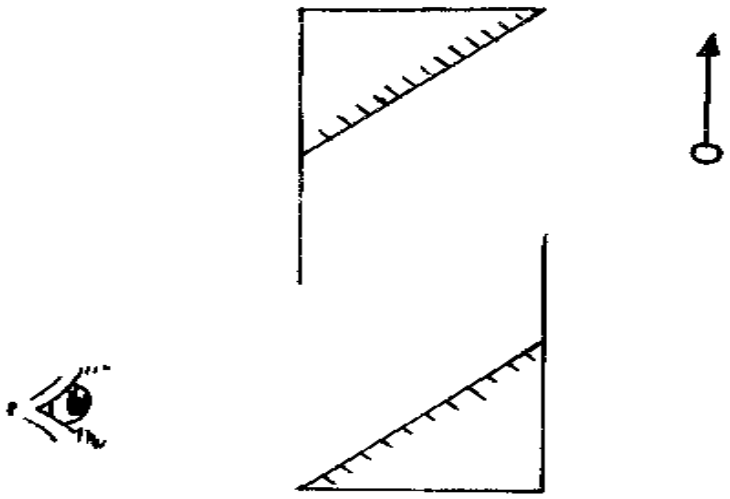
TIME:2HRS

Answer all the questions

SECTION A (25 MARKS)

1. **a)** Distinguish between a real and virtual image **(1 mark)**

   b) Complete the diagram below to show how the object is viewed **(2 marks)**



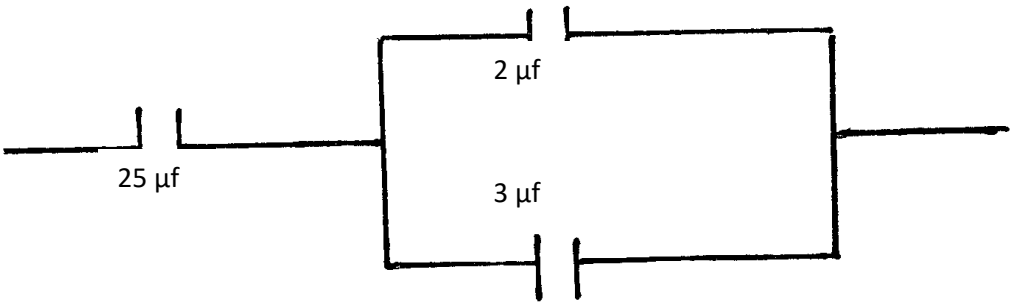
2. A concave mirror has a focal length of 8cm. A real object of length 2cm is placed 12cm from the mirror. Calculate the distance of the image from the mirror. If the length of the image formed is 4cm. **(3 marks)**

3. **a)** Explain what is meant by soft iron being a soft magnetic material. **(1 mark)**

   (i) How do you can make the bell ring only once and not continuously **(1 mark)**

   (ii) Explain **(2 marks)**

4. Find the effective capacitance of the following circuit **(2 marks)**



5. State ***one*** factor that affects the speed of sound through a solid **(1 mark)**

6. The following is a part of a radio – active series.

$$^{210}_{83}X \xrightarrow{r} {}^{210}_{84}Y \xrightarrow{\propto} {}^{c}_{d}Z$$

Identify the radiation r, find the values of c and d. **(3 marks)**

r-

c -

d-

7. A hair drier is rated 2000W, 240V. Determine its resistance. **(2 marks)**

8. The refractive index of glass is $^{3}/_{2}$ and that of water is $^{4}/_{3}$. Calculate the refractive index of glass with respect to water. **(2 marks)**

9. State ***two*** advantages of an Alkaline battery over a Lead Acid accumulator **(2 marks)**

10. In an X-Ray machine, give the reasoning behind the following

a) Using a concave shaped cathode **(1 mark)**

b) Evacuating the X-Ray Machine **(1 mark)**

SECTION B (55 MARKS)

11.a) Fig 5 shows plane waves in a ripple tank. The water is deeper in section A & C than in section B.

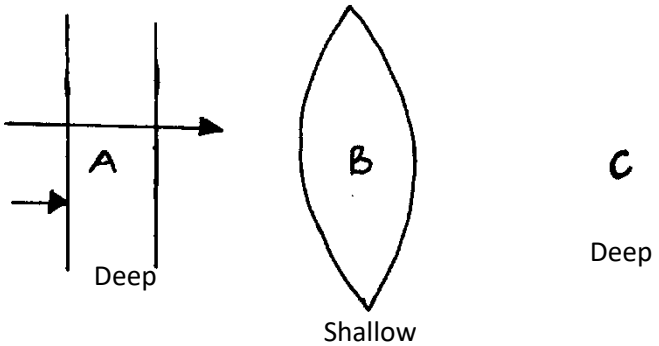


Fig. 5

Draw the waves after passing section B. **(2 marks)**

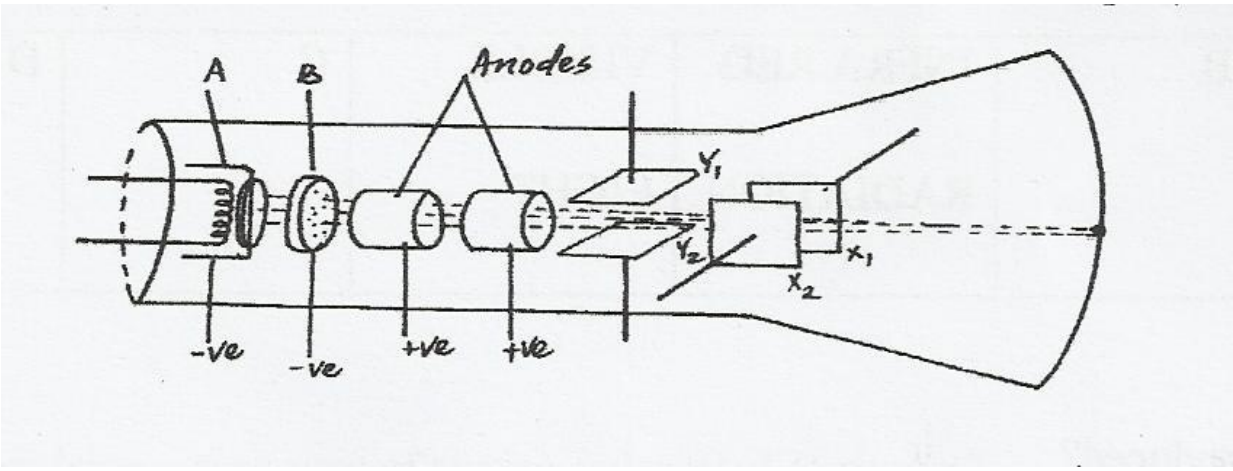
b) State two conditions necessary for production of interference. **(2 marks)**

c) A tube of length 36cm is closed at one end. It is resonance with a tuning fork of frequency 256Hz sounded above the open end. Given that the velocity of sound in air is 334m/s determine.

i) The wavelength of the wave generated by the tuning fork **(2 marks)**

ii) The end correction of the tube **(2 marks)**

12. Figure 10 below shows the main features of cathode ray oscilloscope (C.R.O)

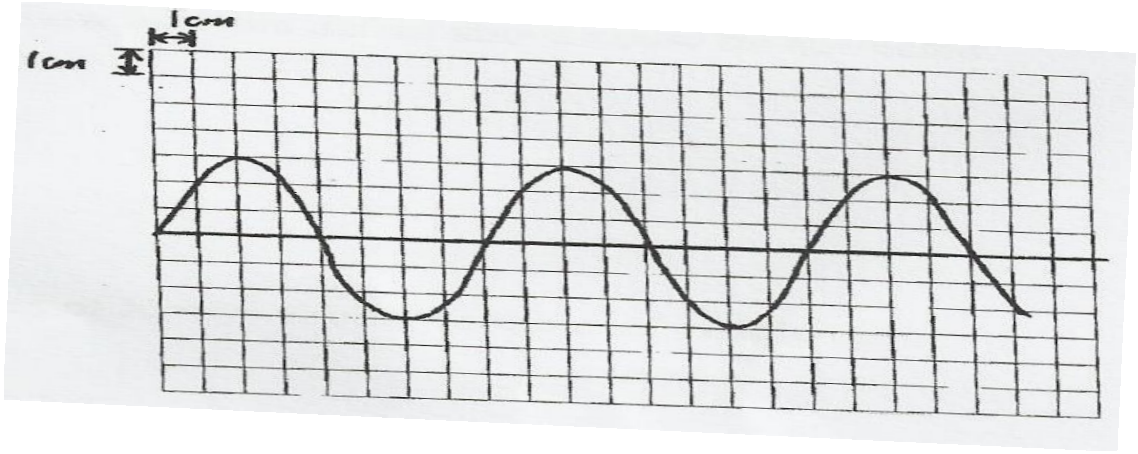


a) (i) Name the parts labeled A and B. **(2 marks)**

(ii) State the function of B and briefly outline how it works. **(2 marks)**

(iii) State ***two*** function of the anodes. **(2 marks)**

b) The output of an a.c generator was connected to the input of the cathode ray oscilloscope whose time base settling was 5 milliseconds per centimetre and the y-gain at 10 volts per centimetre, the figure below shows the waveform displayed on the screen of the C.R.O.



Determine

i. The park voltage of the generator. **(2 marks)**

ii. The frequency of the voltage. **(2 marks)**

13.(a) Define doping **(1 mark)**

(b) Distinguish between a p-type and n-type semi-conductors **(2 marks)**

(c) Give one example of a semi-conductor and one example for a conductor. **(2 marks)**

(d) What is meant by donor impurity in a semiconductor? **(1 mark)**

(e) Why is a capacitor included in a bridge circuit? **(1 mark)**

(f) Sketch the graph for when a load is connected to a CRO, in a bridge circuit where a capacitor has been used. **(3 marks)**

14.a) i) What is meant by photoelectric effect? **(1 mark)**

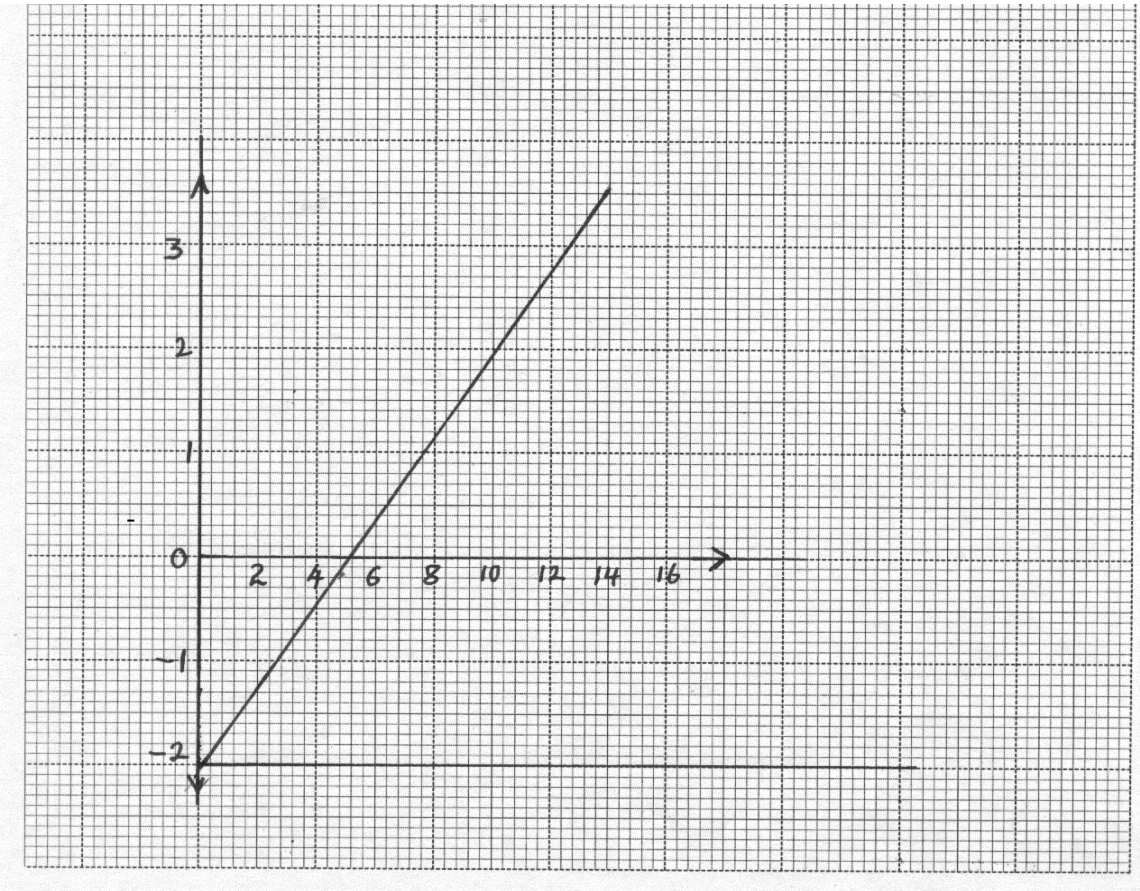
ii)(I) You are provided with highly polished Zinc Plate, electroscope, source of ultra-violet rays, and materials for charging the electroscope. Draw a setup of the apparatus and show how electric effect may be demonstrated in a laboratory. **(2 marks)**

(II) Explain how the set up can be used to determine the nature of photoemission taking place. **(3 marks)**

(b) (i) State ***two*** factors that affect photo- electric emission. **(2 marks)**

(ii) When a certain photoelectric surface is illuminated with light of different frequencies, the corresponding stopping potential was measured.

The graph below shows how frequency (f) varies with stopping potentially, Vs.



Given that eVs = hf-ϕ, determine the values of h and ϕ from the graph. **(5 marks)**

(electronic charge = 1.6×10^{-19}C)

15.a) i) State ***two*** properties of a wire that make it suitable as a fuse. **(2 marks)**

ii) Two fuses of the same length and material may be rated differently. What physical property determines the rating of such fuses? **(1 mark)**

b) Long distance power transmission is done at very high voltages. Explain how this is achieved and why it is necessary to transmit at high voltage **(3 marks)**

c) In most 3 – pin plugs the earth pin is normally longer/ explain why. **(1 mark)**

16.a) State Lenz's law of electromagnetic induction. **(1 mark)**

b) A transformer with 2000 turns in the primary circuit and 150 turns in the secondary circuit has its primary circuit connected to an 800V a.c source. It is found that when a heater is connected to the secondary circuit, it produced heat at the rate of 1000W. Assuming 100% efficiency, determine the;

i. Voltage in the secondary circuit. **(2 marks)**

ii. Current in the primary circuit. **(2 marks)**

iii. Current in the secondary circuit. **(1 mark)**

iv. State the type of transformer represented above. **(1 mark)**

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PHYSICS MOCKS

SERIES 1 TRIAL 2 PAPER 1

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TIME:2HRS

Answer all the questions

SECTION A (25 MARKS)

1. The **figure 1,**shows a micrometer screw gauge that has a zero error of +0.02. State the actual reading of the micrometer screw gauge. **(1mk)**

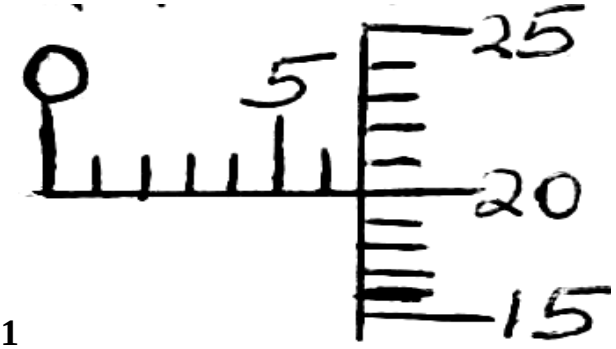


Fig. 1

2. In the **figure 2,** the U-tube contains two immiscible liquids P and Q. If the density of Q is 900kg/m^3 and that of P is 1200kg/m^3, calculate the height of liquid Q**.(3mks)**

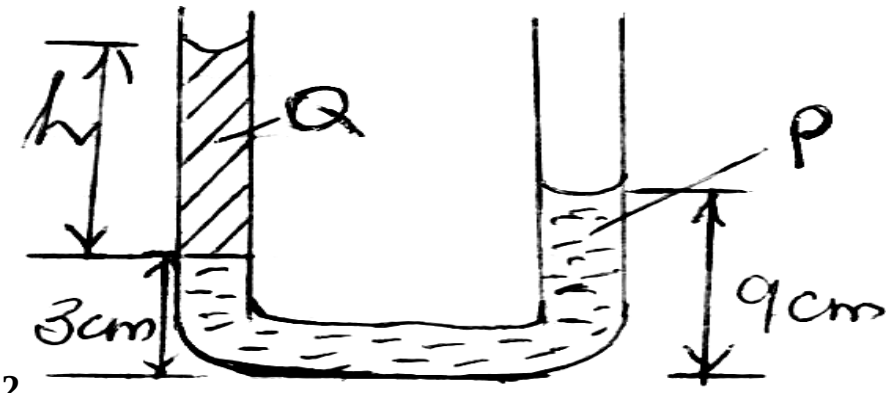


Fig. 2

3. A force of I0N towards the right hand side and 6N towards the left hand side acts upon a body. What is the resultant force? **(2mks)**

4. A trolley of mass 1.5kg moving with a velocity of $1.2ms^{-1}$ collides inelastically with a second trolley of mass 0.5kg moving in the opposite direction with a velocity of $0.2ms^{-1}$.

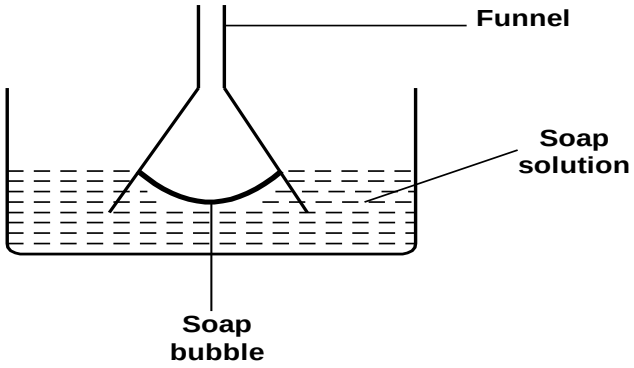
(a) What is an inelastic collision? **(1mk)**

(b) Determine the velocity of the trolleys after collision**.** **(2mks)**

5. a) What is surface tension? **(1mark)**

b) **Figure 3**, shows a funnel dipped into a liquid soap solution.

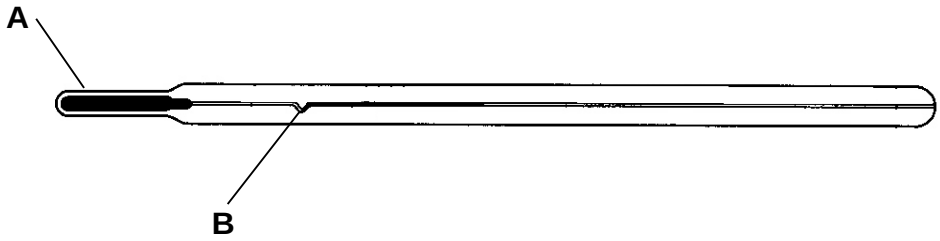
Fig. 3



Explain what happens to the soap bubble when the funnel is removed. **(1mark)**

6.Figure 4,shows a clinical thermometer which is not graduated.

Fig. 4

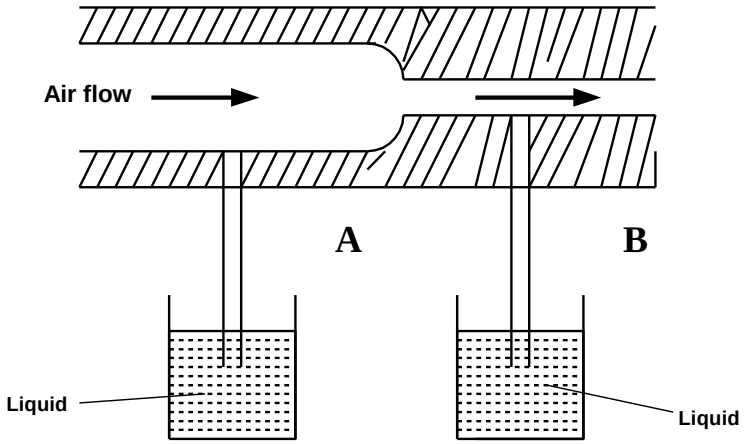


a) Name the parts indicate with letters: A and B **(1 mark)**

b) Mark the appropriate scale range in degrees Celsius **(1 mark)**

7. Figure 5, shows air flowing through a pipe of non-uniform cross-sectional area. Two pipes A and B are dipped into liquids as shown.

Fig. 5



a) Indicate the levels of the liquids in Pipe A and pipe B. **(1 mark)**

b) Explain your answer in 7 (a) above. **(1 mark)**

8. The **figure 6**, shows a flask fitted with a glass tube dipped into a beaker containing water at room temperature. The cork fixing the glass tube is tight.

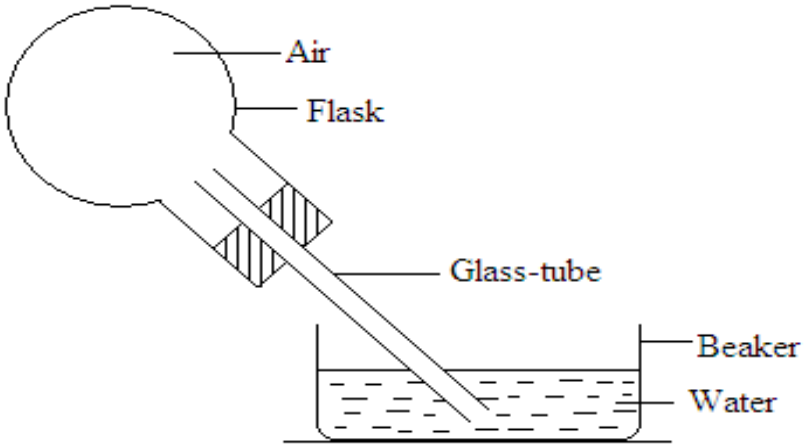


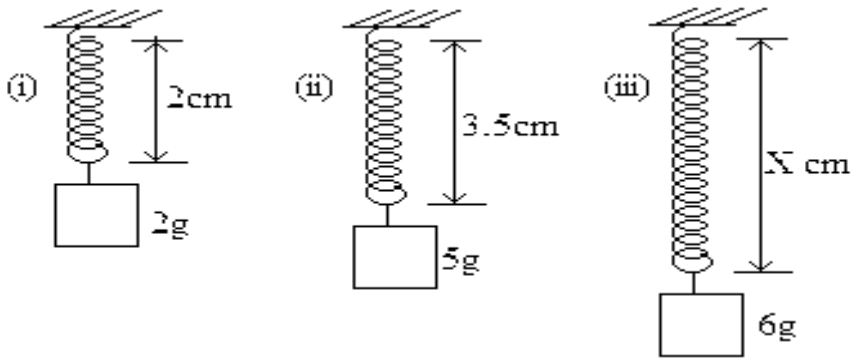
Fig. 6

State with reason what would be observed if cold water is poured on to the flask.

(2marks)

9. The **figure 7**, shows three identical springs which obey Hooke's law.

Fig.7



Determine the length Xcm. **(3 marks)**

10. Using the idea of particles, explain why the pressure inside the tyre is increased when it is pumped up **(2marks)**

11. Give one fact which shows that heat from the sun does not reach the earth surface by convection. **(2marks)**

12.(a) Give a reason why water is not suitable as a barometric liquid. **(1 mark)**

(b) Explain why a lift pump is unable to raise water from a borehole where the level ofwater is 20m below the ground level. **(1 mark)**

SECTION B (55 Marks)

Answer ALL questions in this section in the spaces provided.

13.a) A force of 7.5N stretches a certain spring by 5 cm. Calculate the work done in stretching this spring by 8.0 cm. (3 marks)

b)Figure 8, shows a cross-section of a handle of a screw jack 70 cm long. The pitch of the screw is 0.8 cm

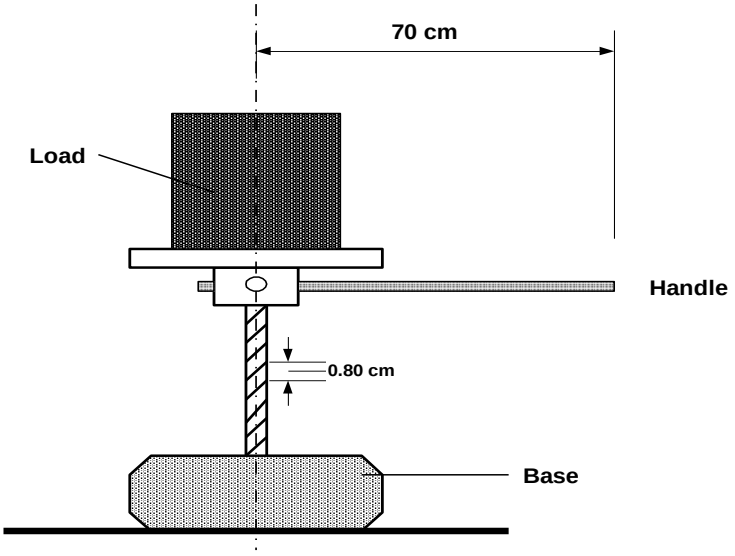


Fig. 8

Given that the efficiency is 65%, calculate:

i) the velocity ratio of the system **(2 marks)**

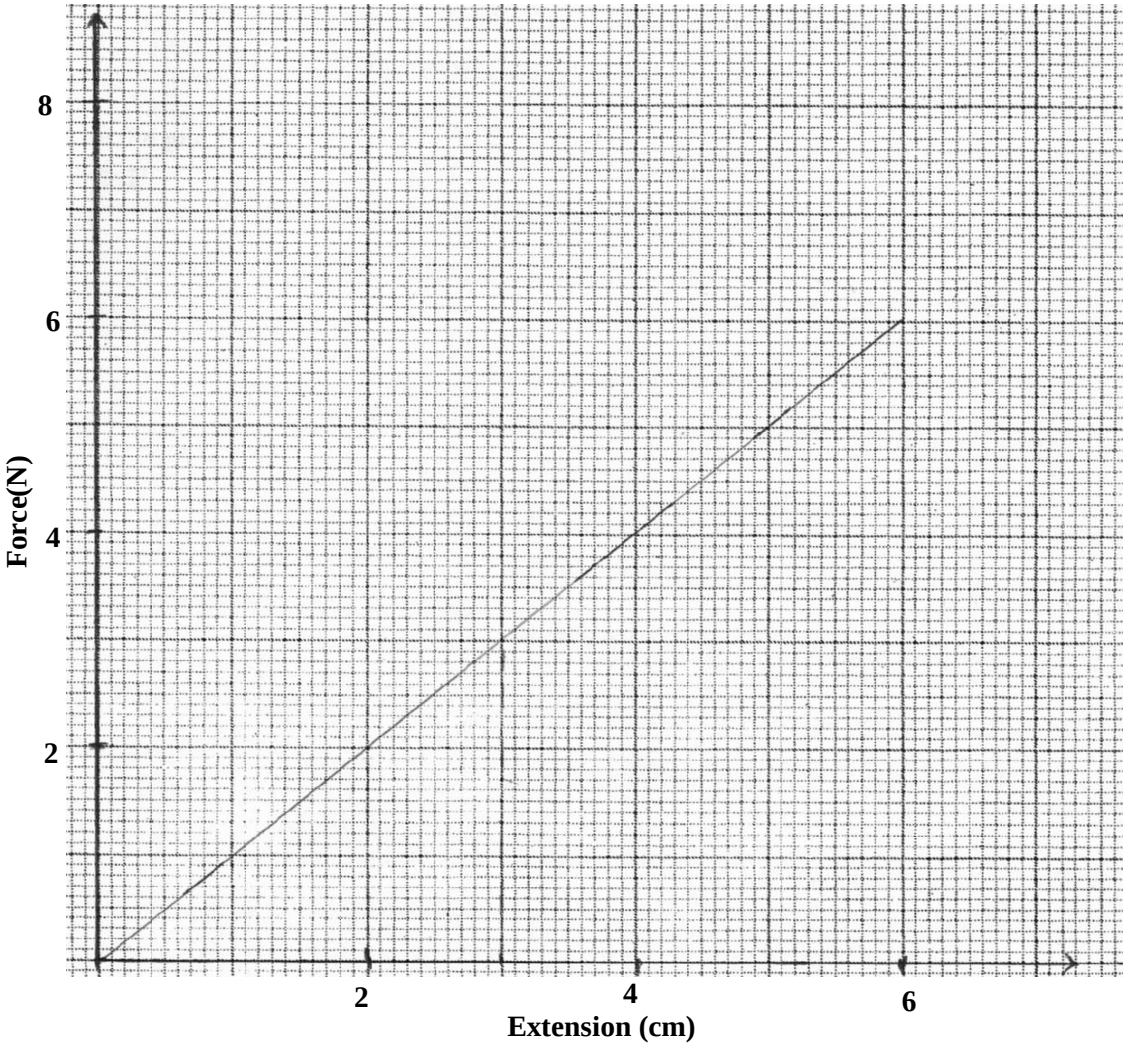
iii) the mechanical advantage of the screw jack. **(2 marks)**

iii.) Sketch a graph of efficiency against Load **(1 mark)**

iv.) Draw a single moving pulley with a velocity ratio of 2. **(2 marks)**

14.(a) State Hooke's law **(1mark)**

(b) The graph provided is of force (y-axis) against extension.



(a) From the graph determine the work done in stretching spring by 3cm **(3marks)**

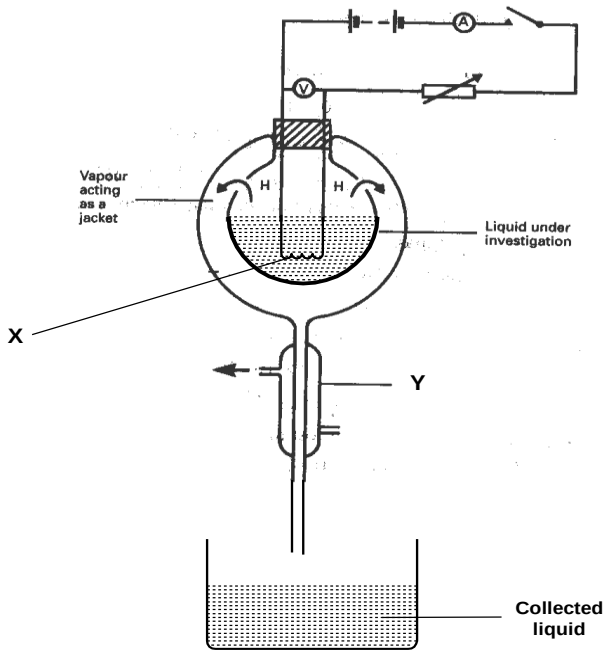
(ii) Use the graph to determine the spring constant. Give your answer in SI units **(3marks)**

(iii) State three factors that affect the spring constant **(3marks)**

15. Define latent heat of vaporization. **(1 mark)**

b) Figure 9, shows a set up by a student to determine the specific latent heat ofvaporization of a liquid.

Fig. 9



i) Identify the parts labelled X and Y **(2 marks)**

ii) State the measurements that should be taken. **(2 marks)**

Iii) Describe how the set up can be used to determine the specific latent heat of vaporisation of the liquid. **(5 marks)**

iv) What is the purpose of the condenser? **(1 mark)**

16. a)i) State Archimedes's Principle. **(1 mark)**

(ii) An object weighs 1.04N in air, 0.64N when fully immersed in water and 0.72N when fully immersed in a liquid. If the density of water is 1000 kg m^{-3}, find the density of the liquid. **(4 marks)**

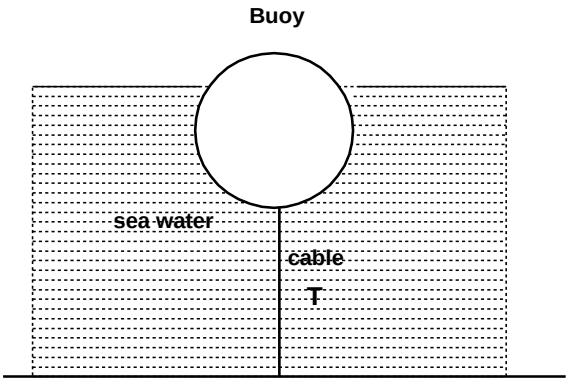
b) i) State the law of floatation **(1 mark)**

ii) Give a reason why a steel rod sinks in water while a ship made of steel floats on water. **(1 mark)**

iii) Draw a clearly labelled diagram of a common hydrometer, which is suitable for Measuring the densities of liquids varying between 1.0 and 1.2 g cm^{-3}. **(2 marks)**

iv) Figure 10,shows a buoy, B, of volume 40 litres and mass 10 kg. It is held in position in sea water of density 1.04 g cm^{-3} by a light cable fixed to the bottom so that $\frac{3}{4}$ of the volume of the buoy is below the surface of the sea water. Determine the tension T in the cable. **(4 marks)**

Fig.10

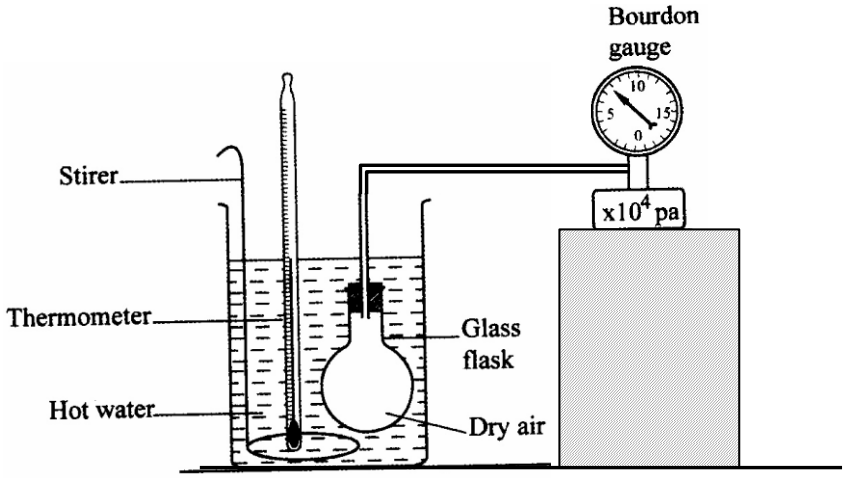


17.a) State Pressure Law **(1 mark)**

b)State one basic assumption of the kinetic theory of gases. **(1marks)**

c) Figure 11, shows a set up that may be used to verify Pressure law.

Fig. 11



i. State the measurements that may be taken in the experiment. **(2 marks)**

ii) Explain how the measurement in (i) above may be used to verify Pressure law.

(4 marks)

d) A bicycle tyre is pumped to a pressure of 2.2×10^5 pa at 23°c. After a race the pressure is found to be 2.6×10^5 pa. Assuming the volume of the tyre did not change, what is the temperature of the air in the tyre. **(3 marks)**

NAME……ADM NO……

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PHYSICS MOCKS

SERIES 1 TRIAL 2 PAPER 2

Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

SECTION A– 25 MARKS

1. The figure 1 below shows a pinhole camera.

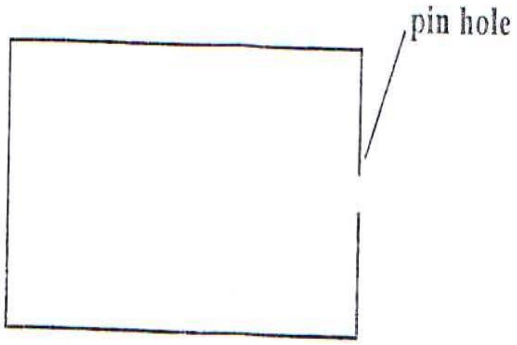


Fig 1

Sketch rays to show the information of a diminished image in the camera. Label both the object and the image. **(2 Marks)**

2. The figure 2 below shows the displacement-time graph for a certain wave.

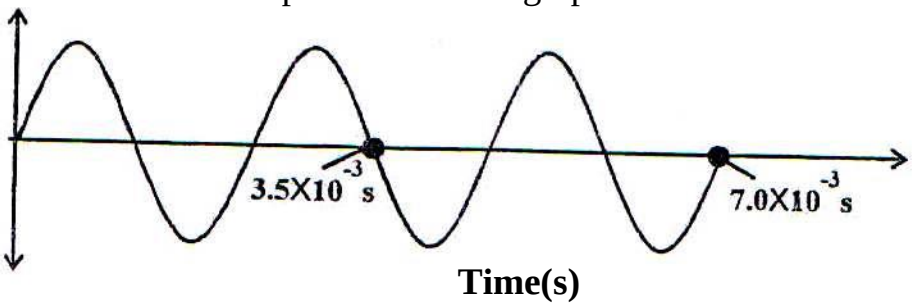


Fig 2

Determine the frequency of the wave. **(3 Marks)**

3. A metal of resistance R_1 is rated P watts, V volts while another of resistance R_2 is rated 2P watts volts $\frac{V}{2}$ volts. Determine $\frac{R_1}{R_2}$ **(3 Marks)**

4. A leaf electroscope A is charged and placed on the bench. Another unchanged leaf electroscope B is placed on the same bench and moved close to A until the caps touch. State and explain what is observed on the leaves A and B**.** **(2 Marks)**

5. An unmagnetised steel rod is clamped facing North-South direction and then hammered respectively for sometime. When tested, it is found to be magnetized. Explain this observation. **(2 Marks)**

6. Give a reason why it is necessary to leave the caps of cells open when charging an accumulator. **(1 Mark)**

7. An electromagnet is made by winding insulated copper wire on an iron core. State the two changes that could be made to increase the strength of the electromagnet. **(2 Marks)**

8. Determine the speed of light in water given the speed of light in air is 3.0 x 10^8m/s and the refractive index of water is 1.33. **(2 Marks)**

9. In an x-ray tube it is observed that the intensity of x-rays increases when potential differences across the filament is increased. Explain this observation. **(2 Marks)**

10. The figure 3 below shows P-N junction connected to a battery. It is observed that the current in figure (a) is greater than in figure (b).

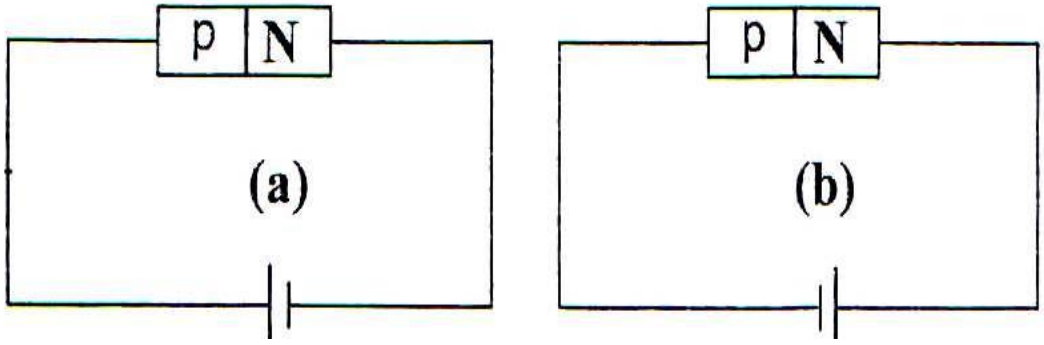


Fig 3

Explain this observation. **(2 Marks)**

11. Explain why A.C electric power is transmitted over long distance at high voltages. **(1 Mark)**

12. The wavelength of a radio wave is 1km. Determine its frequency. Given that V=3.0 x10^8 **(2 Marks)**

13. Identify the problem in the circuit below. **(1 Mark)**

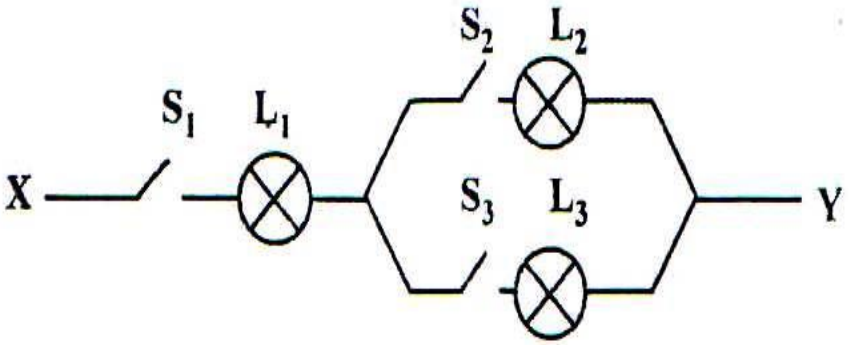


Fig 4

SECTION B – 55 MARKS

14.(a) Figure below shows a pair of parallel plates of a capacitor connected to a battery. The upper plate is displaced slightly to the left.

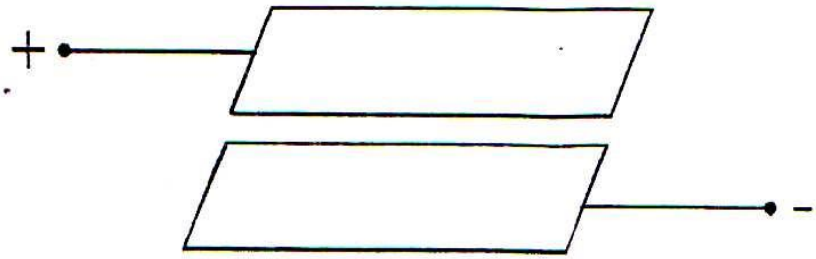


Fig 5

State with reason the effect of this movement on the capacitance. **(2 Marks)**

(b) Figure 6 below is electrical circuit with three capacitors A, B and C of capacitance 4.0μF, 5.0μF and 3.0μF respectively connected to 12V battery.

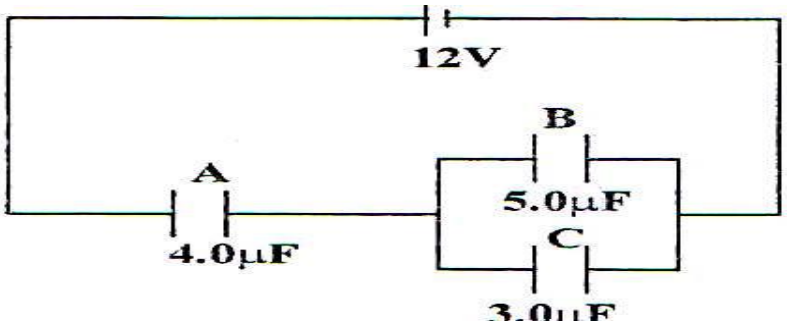


Fig 6

Determine

(i) the combined capacitance of the three capacitors. **(3 Marks)**

(ii) the charge stored in capacitor A. (**2 Marks)**

(iii) the potential difference across the capacitor B. **(2 Marks)**

15. (a) Figure below 7 shows the path of radiation from a radioactive source. The field is perpendicular to the paper and directed out of the paper.

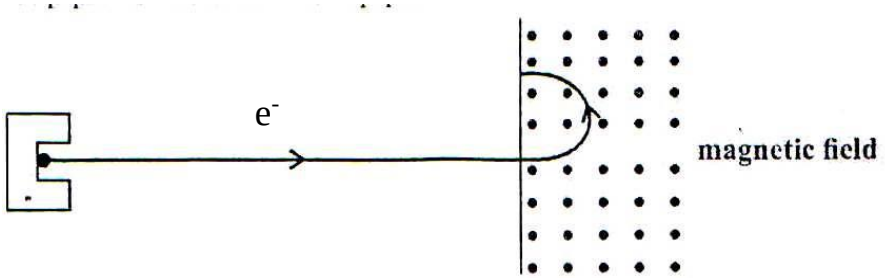


Fig 7

Identify the radiation **(1 Mark)**

(b)(i) State the effect of the radiation on the gas inside the Geiger-Muller tube.

(1 Mark)

(ii) Explain how the large discharge current is created. **(2 Marks)**

(c) The following is a nuclear equation for a fission process resulting from the reaction of a neutron with a Uranium nucleus.

$$^{1}_{0}\text{n} + {}^{235}_{92}U \rightarrow {}^{141}_{56}\text{A} + {}^{y}_{x}\text{Q} + 3{}^{1}_{0}\text{n}$$

(i) Determine the values of x and y. **(2 Marks)**

(ii) State the source of the energy released. **(1 Mark)**

(iii) Explain how this reaction is made continuous in a nuclear reactor. **(2 Marks)**

16.(a) Figure 8 below shows ultra-violet light striking a polished zinc plate placed on a negatively charged gold-leaf electroscope.

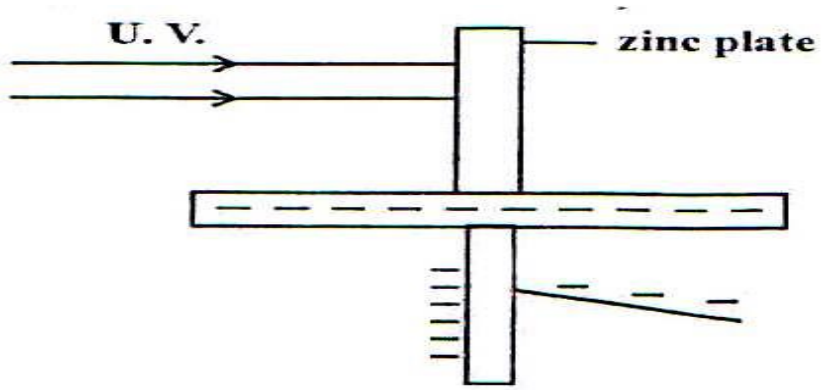


Fig 8

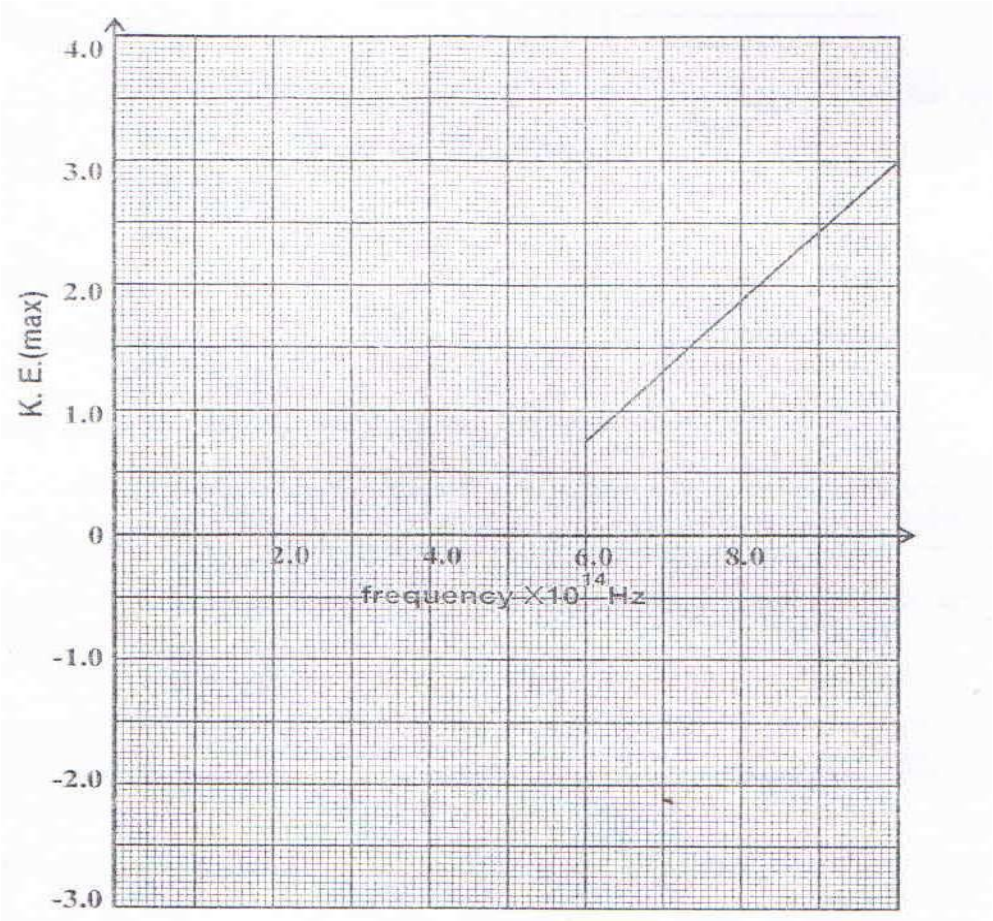
Explain the following observations

(i) The leaf of the electroscope falls **(2 Marks)**

(ii) When the same experiment was repeated with a positively charged electroscope the leaf did not fall**.** **(2 Marks)**

(b)(i) State two factors which determine the speed of photoelectrons emitted by a metal surface. **(2 Marks)**

(ii) In an experiment using a photocell, U.V light of varying frequency but constant intensity was made to strike a metal surface. The maximum kinetic energy ($K.E_{max}$) of photoelectrons for each frequency, f, measured. The graph shows how $K.E_{max}$ varies with f.



Given that $K.E_{max} = hf - Q$, determine the value of the constants h and Q from the graph. **(6 Marks)**

(c) Light of frequency 5.5×10^{14}HZ is made to strike a surface whose work function is 2.5ev. Show that photoelectric effect will not take place (Use the value of h from **(b) (ii)** above) **(4 Marks)**

17.(a) Figure 9 below shows two circuits close to each other.

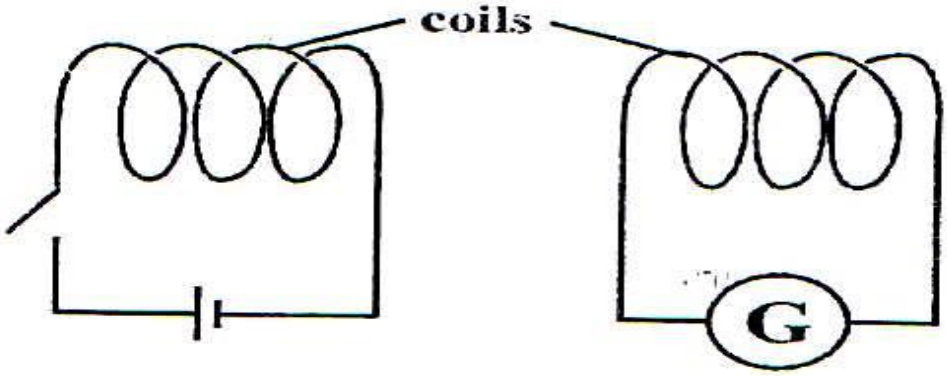


Fig 9

When the switch is closed, the galvanometer shows a reading and then returns to zero. When the switch is then opened, the galvanometer shows a reading in the opposite direction and then returns to zero. Explain these observations. (**3 Marks)**

(b) Explain how energy losses in a transformer are reduced by having:

(i) A soft-iron core. **(2 Marks)**

(ii) A laminated core **(2 Marks)**

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

Determine the current in

(i) The secondary circuit **(3 Marks)**

(ii) The primary circuit **(3 Marks)**

18. **Figure 10** below shows a circuit in which a battery, a switch, a bulb, a resistor P, a variable resistor Q, a voltmeter V and ammeter A_1 and A_2 of negligible resistance are connected. P has resistance of 10Ω. When the switch is closed voltmeter reads 1.5V.

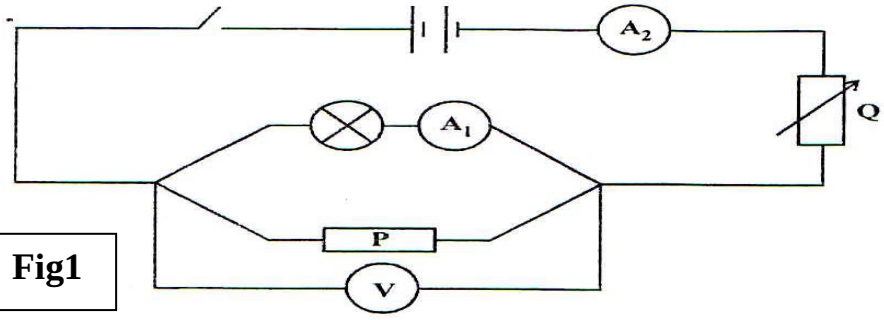


Fig1

(a) Determine

(i) The current passing through P, given that the current through it is 0.1 A .

(3 Marks)

(ii) the resistance of the bulb. **(2 Marks)**

(b) The variable resistor Q is now adjusted so that a larger current flows through A_2

(i) State how this will affect the brightness of the bulb. **(1 Mark)**

(ii) Explain your answer in **b (i)** **(2 Marks)**

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PHYSICS MOCKS

SERIES 1 TRIAL 3 PAPER 1

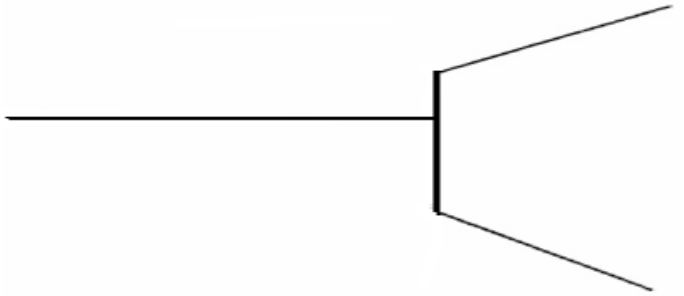
Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

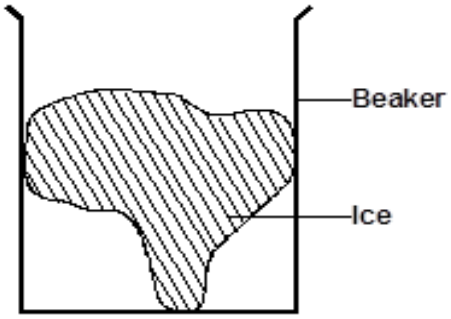
SECTION A: 25marks

1.The figure below shows part of micrometer screw gauge with 50 divisions on the thimble scale. Complete the diagram to show a reading of 5.73mm. **(2 marks)**



2. A bottle containing a smelling gas is opened at the front bench of a classroom. State the reason why the gas is detected throughout the room. **(1 mark)**

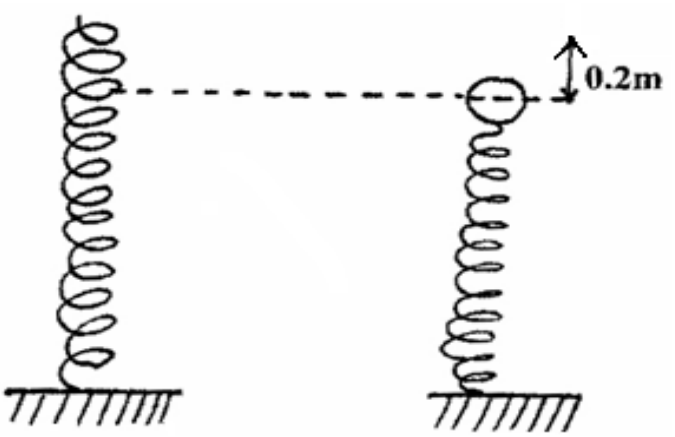
3.The figure below shows beaker containing a block of ice.



State and explain the change in stability when the ice melts**.** **(2marks)**

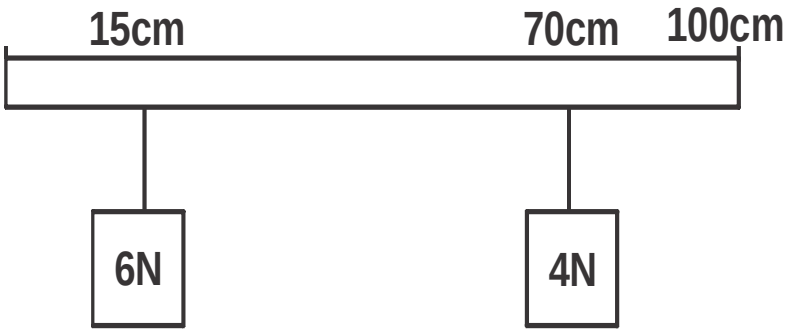
4. An aero plane is moving horizontally through still air at a uniform speed. It is observed that when the speed of the plane is increased, its height above the ground increases. State the reason for this observation. **(2 marks)**

5. A steel ball of mass 0.05kg was placed on top of a spring on a level ground. The spring was then compressed through a distance of 0.2m.



If the spring constant is 15N/m. Calculate the maximum height reached when the spring is released. **(3marks)**

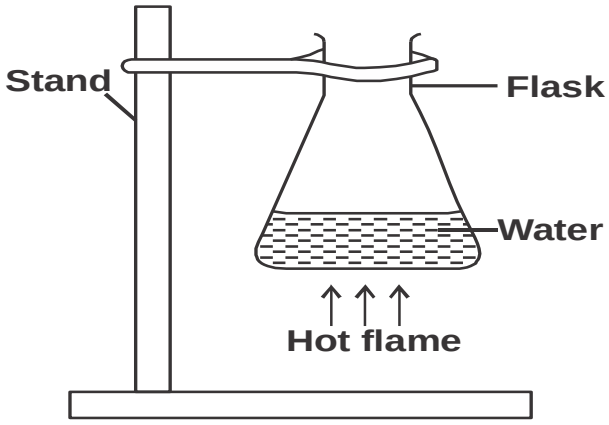
6. The figure below shows a uniform metre rule of weight 3N supporting two weights. The metre rule is pivoted somewhere such that it is horizontally balanced. (Pivot not shown)



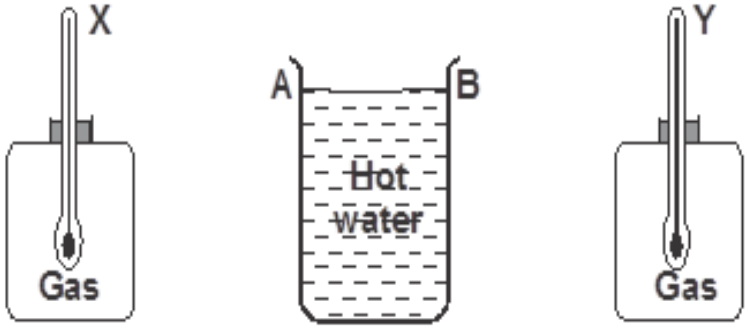
The 6N weight is at 15cm mark while the 4N weight is at 70cm mark. Determine the position of the pivot from zero cm mark**.** **(3 marks)**

7. State one environmental hazard that may occur when oil spills over a large surface area of the sea. **(1 mark)**

8. The figure shows a flat bottomed flask containing some water. It is heated directly with a very hot flame. Explain why the flask is likely to crack. **(2marks)**



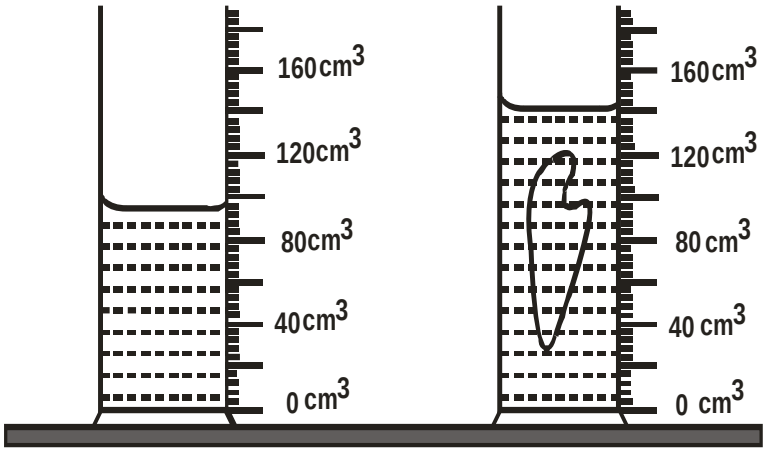
9. The figure below shows a cylindrical container having hot water at 95°C. End A is shiny while end B is dull black. At equal distances from the container is placed two identical gas jars fitted with thermometers X and Y.



Compare the readings of the two thermometers after two minutes **(1 mark)**

10. Give a reason for your answer in **question 9** above **(1 mark)**

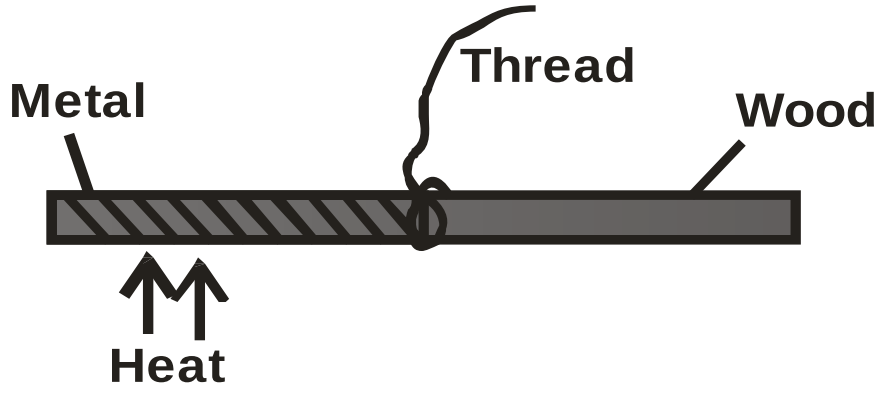
11. The figure below shows the change in volume of water in a measuring cylinder when an irregular solid is immersed in it.



Given that the mass of the solid is 268g, determine the density of the solid in SI units.

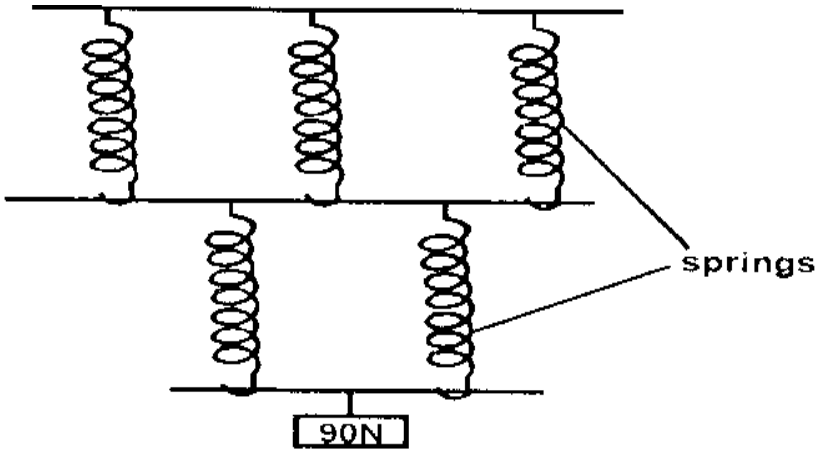
(3 marks)

12. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt **(2 marks)**

13. The spiral springs shown in the figure below are identical. Each spring has a spring constant, *k = 300N/m*

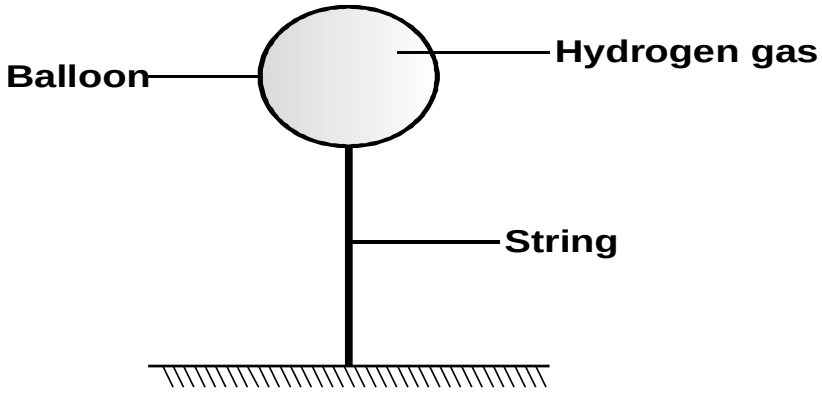


Determine the total extension of the system. (Take the weight of the cross bars to be negligible) **(2 marks)**

SECTION B: 55marks

14. (a) State the Archimedes principle**.** **(1 mark)**

b) A rubber envelope of a hydrogen filled balloon having volume of $2m^3$ is held in position by a vertical string as shown below.



The mass of the balloon is 1.3kg. Given that density of hydrogen is 0.1kg/m³ density of air is 1.3kg/m³. Calculate

(i) the total weight of the balloon including the hydrogen gas. **(2 marks)**

(ii) the up thrust. **(2 marks)**

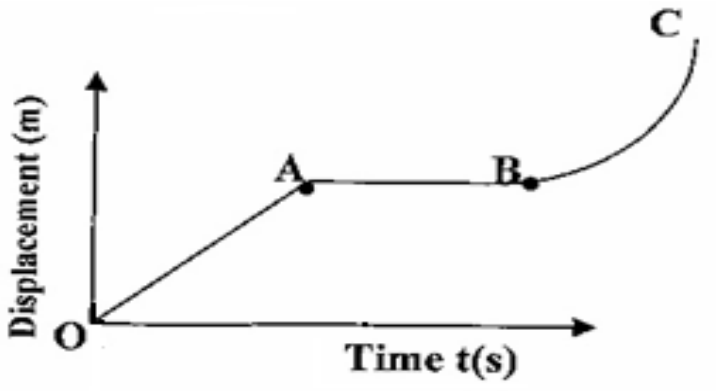
(iii) the tension in the string. **(2 marks)**

(c) A solid weighs 50N in air and 44N when complete immersed in water. Calculate

i) Relative density of the solid. **(2 marks)**

(ii) Density of the solid. **(2 marks)**

15.a) The figure below shows a displacement-time graph of the motion of a particle.



Describe the motion of the particle in the region. **(3marks)**

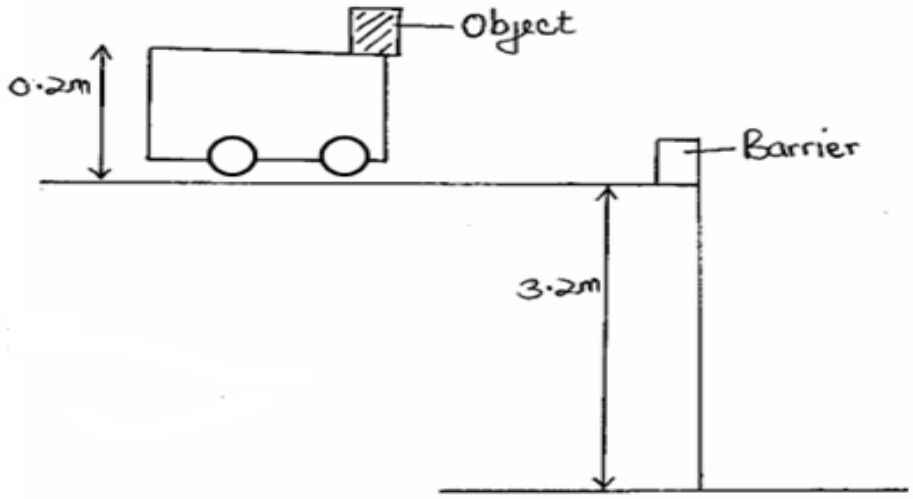
OA-

AB-

BC-

(b) State the Newton's first law of motion. **(1 mark)**

c) The figure below shows a trolley moving towards a barrier at a constant velocity of 20m/s. Use this information to answer the questions that follows.



i) Sketch the path followed by the object after the impact **(1mark)**

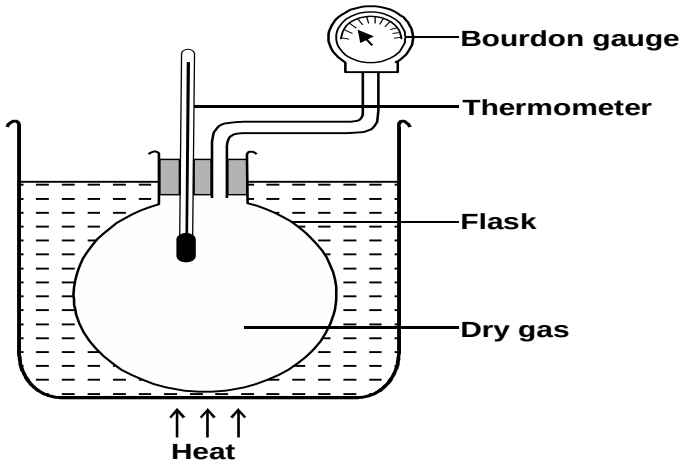
ii) Give a reason why the object on the trolley flies off on impact**.** **(1 mark)**

iii) Determine the time taken by the object to reach the ground. **(2 marks)**

iv) Determine the horizontal distance covered by the object from the point of impact to the point where it reached the ground. **(2 marks)**

16. a) What is meant by absolute zero temperature? **(1 mark)**

b) The set up below was used by a group of form three students to verify pressure law.

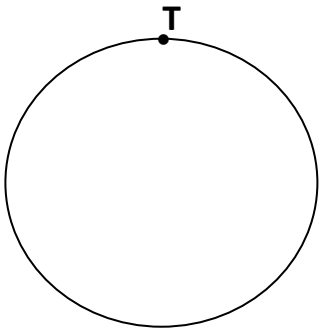


Describe briefly how the set-up can be used to verify pressure law. **(4 marks)**

c) A 4.5cm³ bubble released at the bottom of a dam measured 18cm³ at the surface of the dam. Work out the depth of the dam taking atmospheric pressure to be 10^5 Pa and the density of water as 1g/cm³. **(3marks)**

17(a) One of the factors that affect the centripetal force is the mass of the body. State another factor. **(1mark)**

(b) A mass of 400g is rotated by a string at a constant speed V in a vertical circle of radius 100cm. The tension in the string is 9.2N which is experienced at point T.

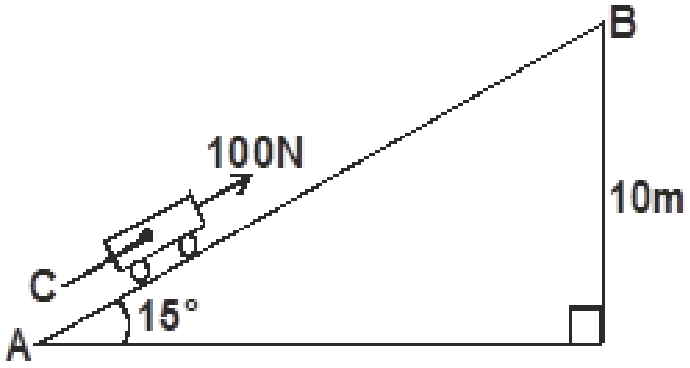


i) Determine the velocity V of the mass at point T. **(3marks)**

ii) Determine the tension in the string at the bottom of the circle. **(2marks)**

c) State two applications of circular motion **(2marks)**

18. The figure below shows an inclined plane, a trolley of mass 30kg is pulled up a slope by a force of 100N parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.



a) What is the work done on the trolley against the gravitational force in moving from A to B**?** **(2marks)**

b) Determine the work done by the force in moving the trolley from A to B **(2 marks)**

c) Determine the efficiency of the system. **(3 marks)**

d) Determine the mechanical advantage of the system. **(3 marks)**

19. a) Explain why it is advisable to use a pressure cooker for cooking at high altitudes. **(1 mark)**

b) A block of metal of mass 150g at 100°C is dropped into a lagged calorimeter of heat capacity 40J/K containing 100g of water at 25°C. The temperature of the mixture is 34°C. (specific heat capacity of water = 4200J/kg/K).

Determine:

(i) Heat gained by the calorimeter. **(2marks)**

(ii) Heat gained by water. **(2marks)**

(iii) Specific heat capacity of the metal block. **(3marks)**

NAME……ADM NO……

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PHYSICS MOCKS

SERIES 1 TRIAL 3 PAPER 2

Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

SECTION A: 25marks

1.The chart below shows an arrangement of different parts of the electromagnetic spectrum.

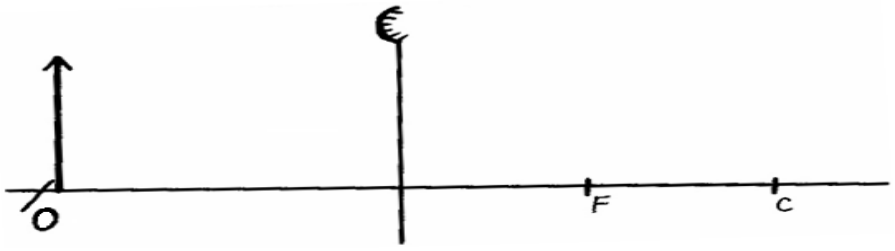
Radio wave	A	Infrared rays	B	Ultra-violet	χ-Rays

Name the radiation represented by

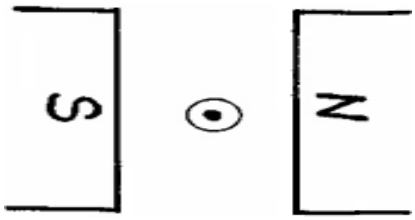
A- **(1mark)**

State one use of radiation represented by **B** **(1mark)**

2. An object O is placed in front of convex mirror as shown in the diagram below. Complete the diagram to locate the position of the image, 1. **(3 marks)**



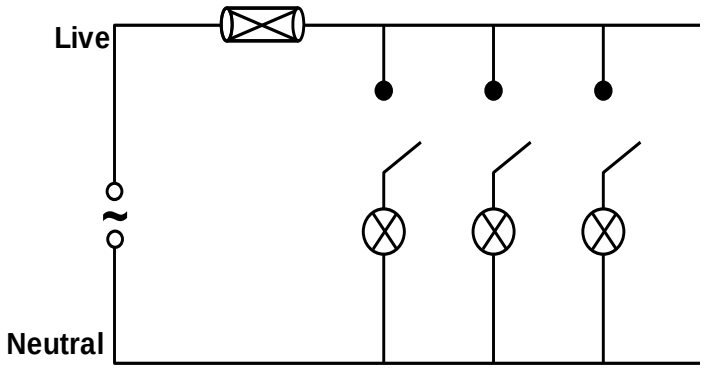
3. The figure below shows a wire carrying current whose direction is out of the paper.The wire is placed in a magnetic field.



(a) Indicate on the figure the direction of the force F, acting on the wire. **(1 mark)**

(b) State what would be observed on the wire if the direction of the current is reversed. **(1 mark)**

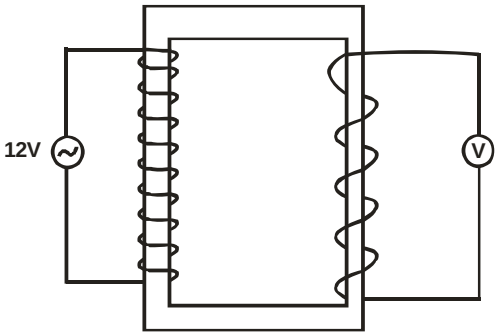
4. The figure below shows part of the lighting circuit of a house.



i) Give a reason why a fuse is included in the circuit. **(1 mark)**

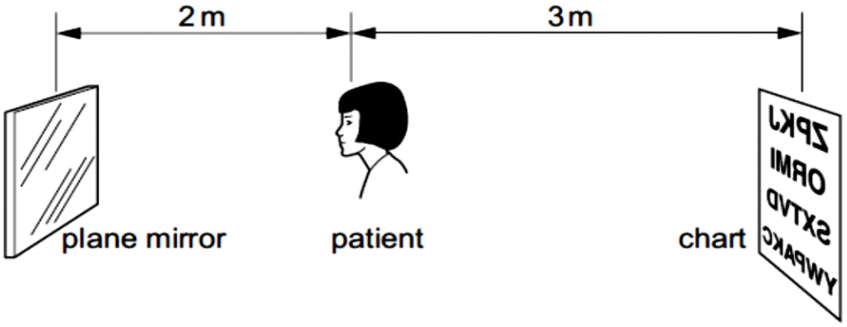
ii) If each lamp has a power of 60W at voltage of 240V. Calculate the current through one lamp when it is switched on. **(2 marks)**

5. Figure 5 below shows a simple transformer connected to a 12v a.c source and an a.c voltmeter.



Determine the reading on the voltmeter. **(2 marks)**

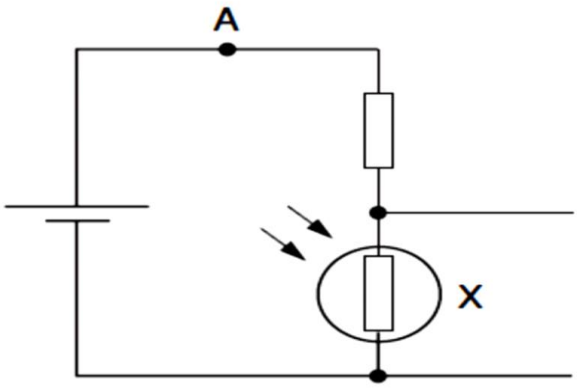
6. The diagram shows a patient having her eyes tested. A chart with letters on it is placed behind her and she sees the chart reflected in a plane mirror.



Determine how far away from the patient, the image of the chart is seen. **(2 marks)**

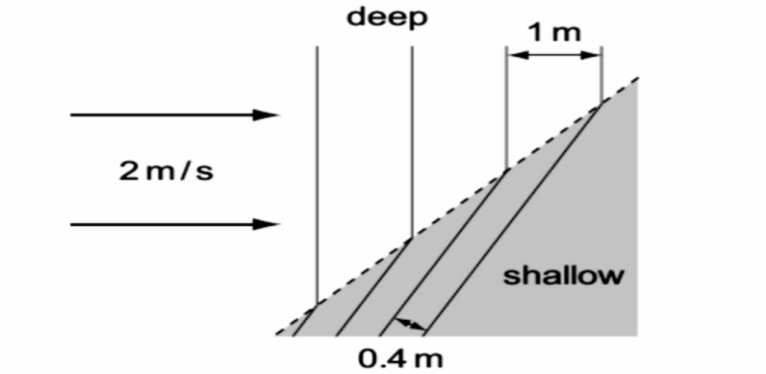
7. State Snell's law. **(1 mark)**

8. The figure below shows an electric circuit.



State and explain how the potential difference across X varies as the light shining on it becomes brighter. **(2marks)**

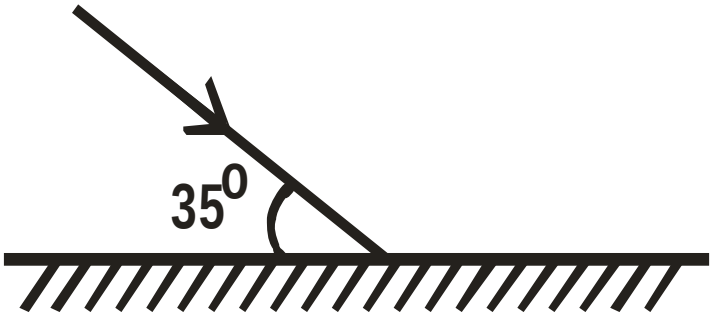
9. Waves pass from deep water to shallow water and refraction occurs.



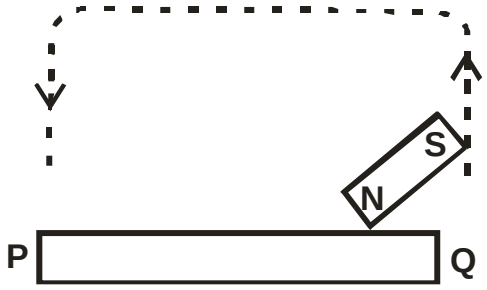
Calculate the speed of the waves in the shallow water **(2 marks)**

10. The diagram below shows a ray of light striking the plane at 35^{o} as shown below.

State the angle of reflection. **(1 mark)**



11. The figure below shows an iron bar being magnetized by stroking it with a magnet.



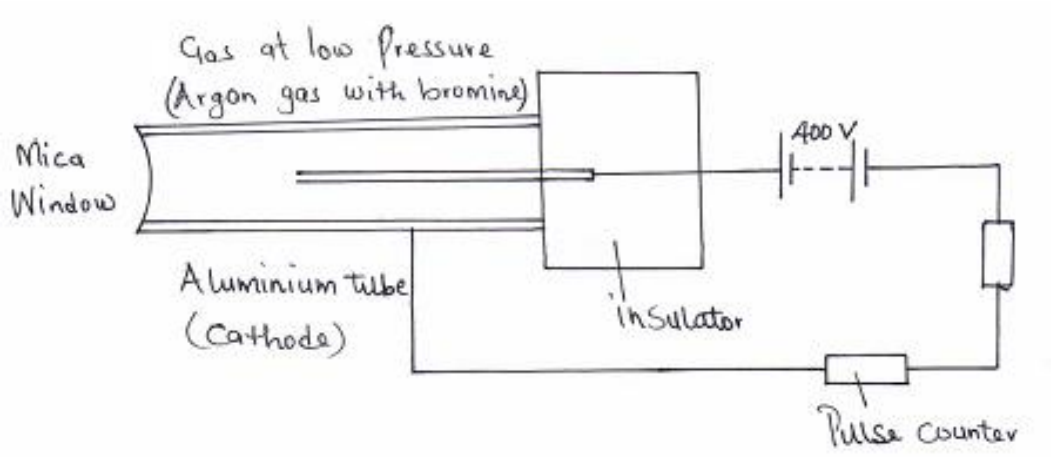
Indicate on the iron bar the polarity of resulting magnet. **(1 mark)**

12. An echo sounder of a ship transmits sound waves to the depth of the sea and receives the echo after 2.4 seconds. If the speed of sound in water is $1600ms^{-1}$, determine the depth of the sea. **(3 marks)**

13. It is observed that when a charged body is brought near the cup of a positively charged electroscope, the divergence of the leaf increases. State the type of charge on the body. **(1mark)**

SECTION B (55 marks)

14. (a) The figure below shows a diagram of a Geiger Muller tube connected to a power supply and a pulse counter.



(i) Why should the argon gas be at low pressure? **(1mark)**

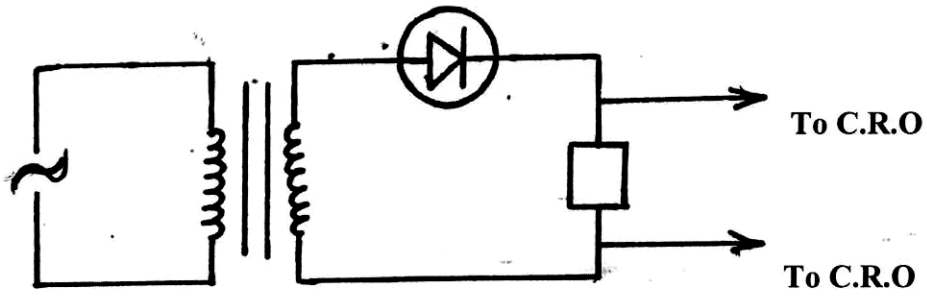
(ii) State the purpose of the bromine gas in the tube. **(1mark)**

(iii) Suggest one way of increasing the sensitivity of the tube **(1mark)**

(iv) Find the value of a and b in the following equation. **(2marks)**

$$^{234}_{92}U \rightarrow ^{a}_{b}X + 2\alpha$$

b) The figure below shows a PN junction diode used in a rectifier.



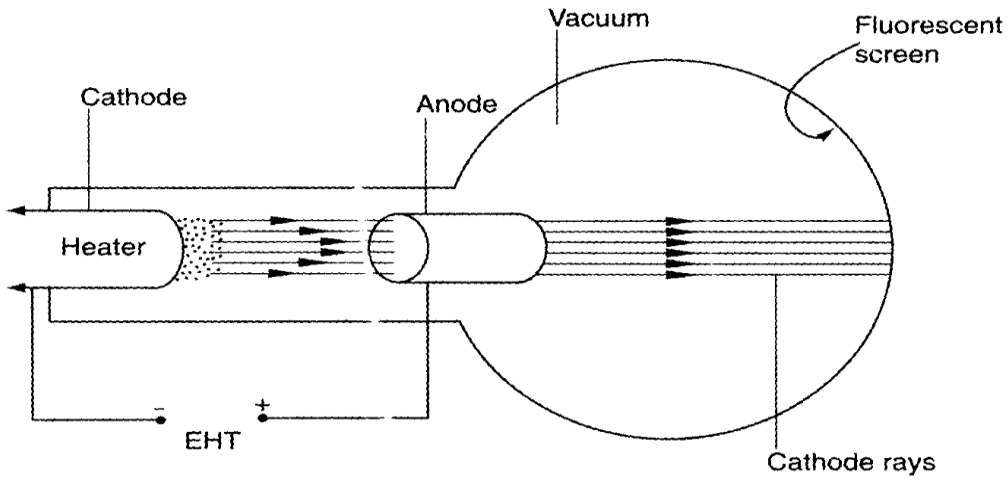
i) What is an extrinsic semi conductor? **(1mark)**

ii) What type of rectification is shown? **(1mark)**

iii) Describe how the rectification is achieved **(2marks)**

iv) In the space provided below, sketch the output signal displayed on the CRO during the rectification process. **(2marks)**

15. The figure below shows a cathode ray tube



a) State the function of the

i) Heater **(1mark)**

ii) Extra High Tension (E.H.T**.)** **(1 mark)**

b) State how the intensity of the fluorescence on the screen can be increased. **(1 mark)**

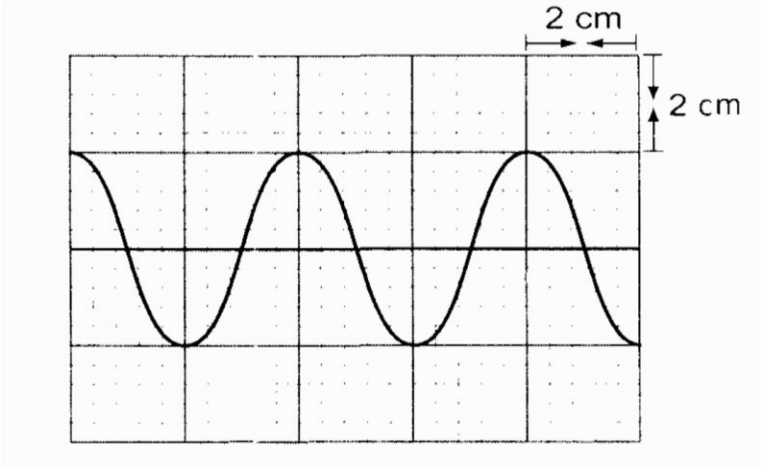
c) State the effect of having air in the tube instead of a vacuum **(1 mark)**

d) State one properties of cathode rays **(1 mark)**

e) Distinguish cathode rays and X-rays **(1 mark)**

f) Give one advantages of using a C.R.O instead of a voltmeter in measuring voltages **(1 mark)**

g) The figure below shows an a.c. voltage. If the Y-gain control reads 10V/cm and the time base reads 5 milliseconds/cm



Calculate:

i) The frequency of the alternating voltage **(2 marks)**

ii) Peak to peak voltage of the alternating voltage **(2 marks)**

16 (a)(i) It is observed that when ultra- violet radiation is directed onto a clean zinc plate connected to the cap of a negatively charged leaf electroscope, the leaf falls .Explain this observation **(2 marks)**

(ii) State why this observation does not occur if the electroscope is positively charged **(1 mark)**

(iii) ,Explain why the leaf of the electroscope does not fall when infra- red radiation is directed onto the zinc plate **(1 mark)**

b)State the effect on the electrons emitted by the photoelectric effect when:

(i) The intensity of incident radiation is increased **(1 mark)**

(ii) The frequency of the incident radiation is increased **(1 mark)**

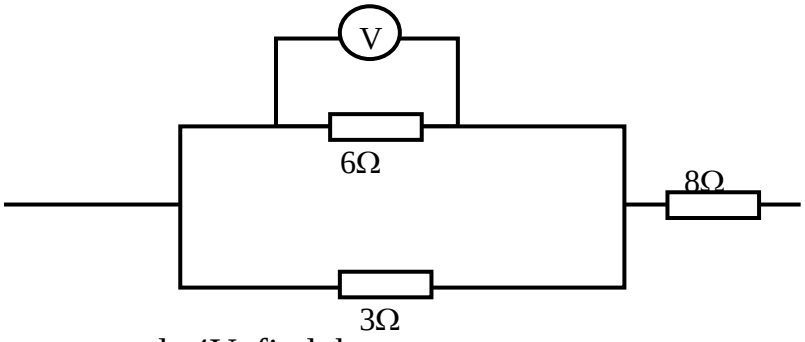
c) Light of wavelength 4.3×10^{-7}m is incident on two different metal surfaces, nickel and potassium. (Take speed of light as 3.0×10^{8} ms^{-1} and planks constant h as $6.63 \times l0^{-34}$Js).

(i) Determine the energy of the incident radiation. **(3 marks)**

(ii) If the work function of nickel is 8.0×10^{-19}J and that of potassium is 3.68×10^{-19}J, state with a reason from which of the two metals the given light will eject electrons. **(2 marks)**

(iii) Determine the velocity of the emitted electrons from the metal surface in b(ii). (Take the mass of an electron as 9.1×10^{-31} kg). **(2 marks)**

17(a) The figure below shows three resistors as shown.



If the voltmeter reads 4V, find the

(i) Effective resistance **(3marks)**

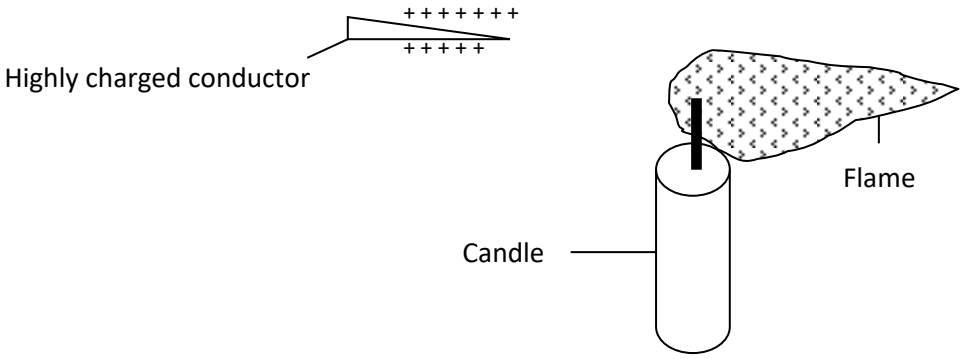
(ii) Current through the 3Ω resistor **(2 marks)**

(iii) Potential difference across the 8Ω resistor if the voltage total voltage in the circuit is 10V **(1 mark)**

(c) (i) What is meant by the term "terminal voltage" as used in current elecricity? **(1 mark)**

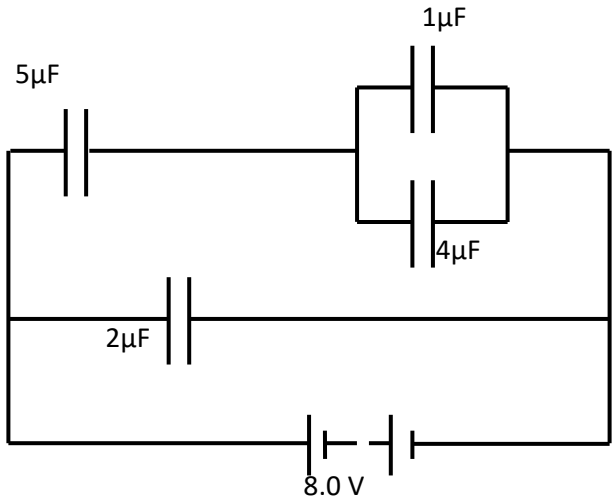
(ii) A cell supplies a current of 2.0A when connected to a 0.6Ω resistor and 1.5A when the same cell is connected to a 0.9Ω resistor.Find the e.m.f and the internal resistance of the cell. **(3marks)**

18((a) Give a reason why a candle flame is blown when a highly charged conductor is brought close to it as shown below. **(1mark)**



b) State two factors that affect capacitance of a capacitor **(2 marks)**

c)The figure below shows 1μF, 2μF, 4μF and 5μF capacitors connected to a battery.



Determine:

i) The total capacitance. **(3marks)**

ii) The total energy stored by the capacitors. **(2marks)**

iii) Voltage across the 4μF capacitor. **(2marks)**

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PHYSICS MOCKS

SERIES 1 TRIAL 4 PAPER 1

Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

SECTION A (25 MARKS)

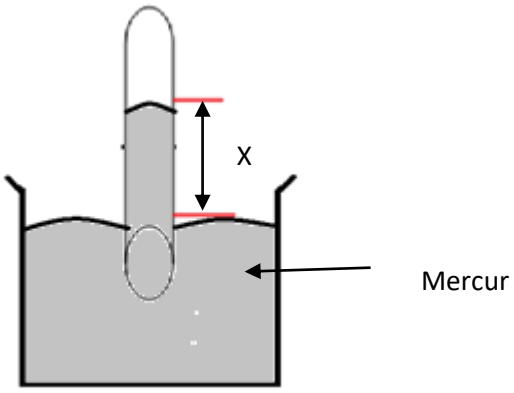
1. With a reason identify in which state isdiffusion faster between gasand liquid.

(2marks)

2. The length of the spring is 20.0cm. It becomes 24.0cm when a weight of 8.0N hangs on it. Calculate the length of the spring when supporting a weight of 200N.

(2marks)

3. The figure below shows the instrument used to measure pressure



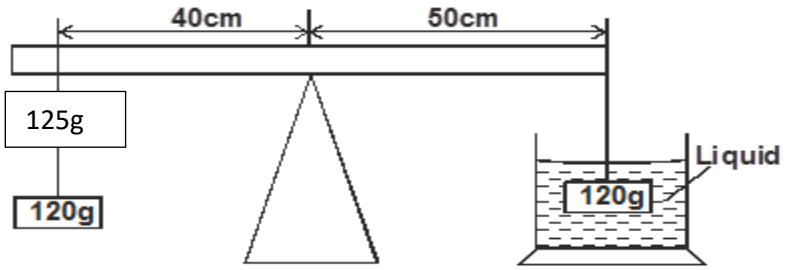
a. Name the instrument **(1mark)**

b. What would be observed if the test tube is tilted assuming the instrument is functioning normally **(1mark)**

4. The rate of heat flow in thermal conductivity increases with increase in cross-section area. Explain this observation **(1mark)**

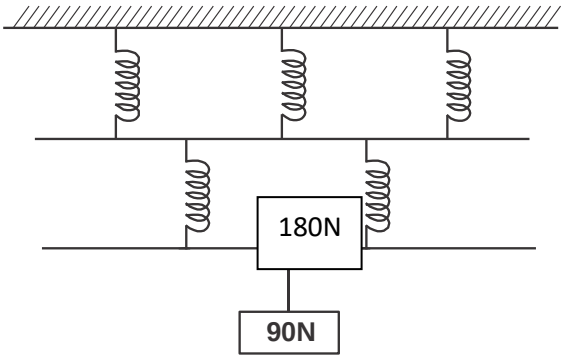
5. Explain why a small car travelling at a very high speed is likely to be dragged into a long track travelling in the opposite direction **(2marks)**

6. A uniform meter rule is balanced by two masses as shown in the figure below.



By displacement method, the immersed object is found to occupy 13.5cm^3. Determine the density of the liquid in SI units. **(3 marks)**

7. The springs shown in the arrangement in figure 4 below are identical.



Given that the 180N weight causes a total extension of 30cm, determine the spring constant of each spring. (The weight of each spring is negligible)

(3 marks)

8. i) Distinguish between elastic collision and inelastic collision. **(1 mark)**

ii) State the energy transformation during inelastic collision. **(2 marks)**

9. State the branch of physics that deal with kinetic energy of matter. **(1 mark)**

10. The water in a burette is 30.6cm^3, 50 drops of water each of volume V are added to the water in the burette. The final reading of the burette was 20.6cm^3. Calculate the radius of the drop of water .

(3 marks)

11. State two factors that affect the stability of an object **(2 marks)**

12. State a reason why a burn from steam at 100^0cis more severe than a burn from boiling water at the same temperature **(1 mark)**

SECTION B: (55 MARKS)

13.a) An astronaut in orbit round the earth may feel weightless even when the earth's gravitational field still acts on him. Explain **(2 marks)**

b) Distinguish between angular velocity and linear velocity **(1 mark)**

c) a stone is whirled with uniform speed in a horizontal circle of radius 15 cm. it takes the stone 10 seconds to describe an arc of length 4cm. calculate

i) Angular velocity **(3 marks)**

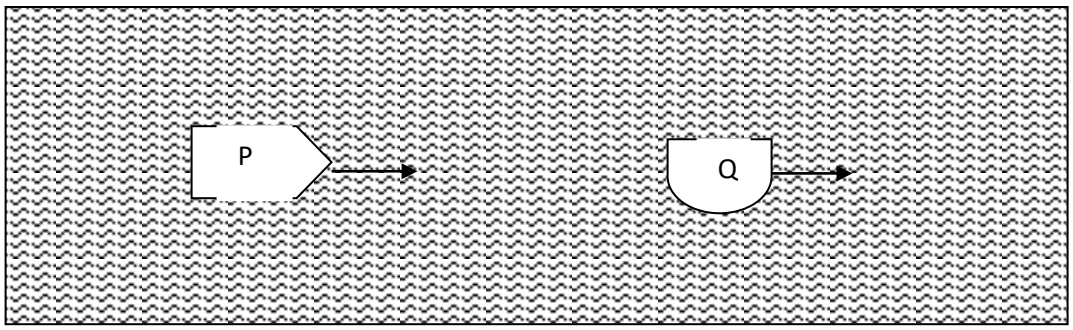
ii) Linear velocity of the stone **(2 marks)**

iii) Periodic time **(2 marks)**

a) State the Bernoulli's principle of fluids **(2 marks)**

b) In derivation of equation of continuity in fluids, state two assumptions to be made. (2marks)

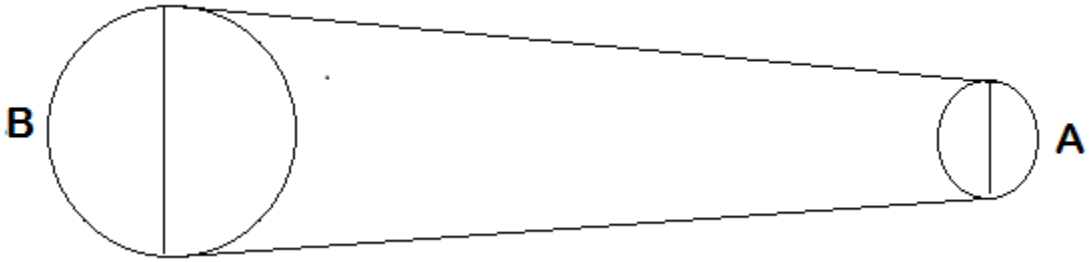
b) The figure below shows cross-section of two submerged bodies P and Q in an ocean. The bodies were then pulled by a ship in the direction shown.



(i) State with a reason, which body is easier to pull if they have equal volume and density **(2 marks)**

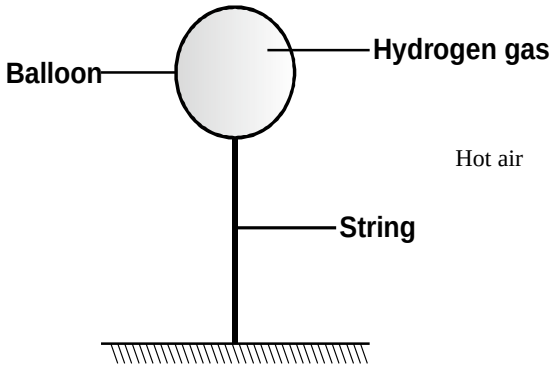
(ii) On the same diagram, show the path followed by each body and their streamlines **(2 marks)**

c) Water flows steadily a pipe as shown in the figure below. The diameter of A and B are 3cm and 5cm. if the volume flux at A is $45cm^3/s$. find the speed of water at B**.(3 marks)**



14. a) State the law of floatation **(1 mark)**

b) The diagram below shows a hot air balloon tethered to the ground on a calm day. The balloon contains 1300cm^3 of hot air of density 0.82 kg/m3. The mass of the material making the balloon without hot air is 420kg. The density of the surrounding air is 1.35 kg/m^3. Determine



i) The total weight of hot air balloon **(3 marks)**

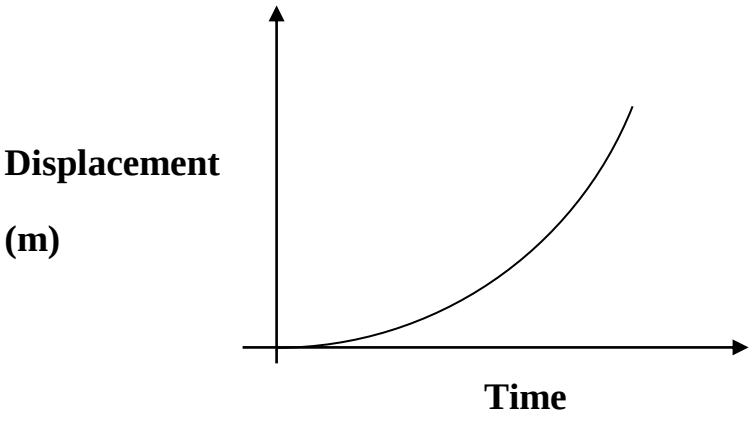
ii) The weight of air displaced by the balloon **(2 marks)**

iii) Upthrust force on the balloon **(1 mark)**

iv) the tension in the rope holding the balloon in the ground. **(2 marks)**

v) the acceleration with which the balloon begins to raise when released**.** **(3marks)**

15. a) the graph below represents a body moving with variable speed

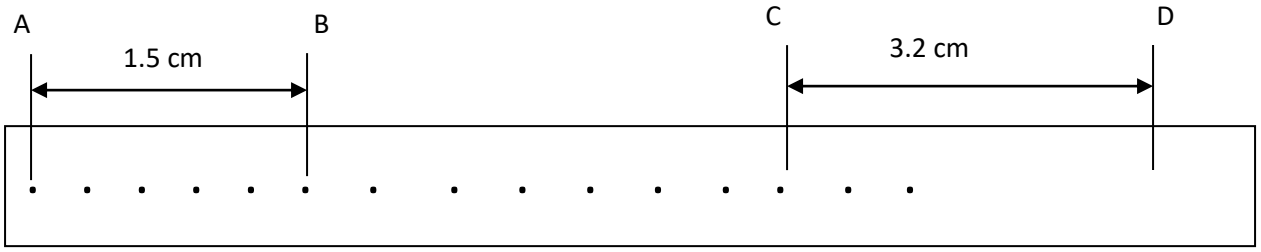


on the same graph sketch the results of the same body moving at a lower velocity.

(1 marks)

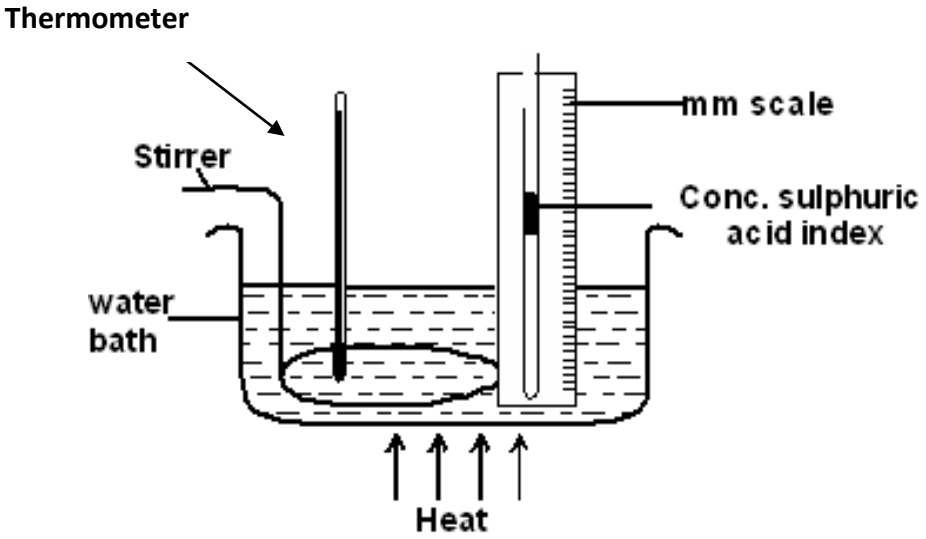
b) A paper tape was attached at a moving trolley and allowed to run throw a ticker timer.

If the frequency of the tape is 100Hz. Determine



i)The period of the ticker timer **(2 marks)**
ii) Velocity AB and CD **(4 marks)**
ii) The average acceleration **(3 marks)**

16. a) Figure 9 shows a set up to investigate one of the gas laws. All equipment are standardized.



i) Name the gas law being investigated. **(1 mark)**
ii) Give two reasons for using the concentrated sulphuric acid index. **(2 marks)**
iii) What is the purpose of the water bath? **(1 mark)**
iv) State two measurements that should be taken in this experiment. **(2 marks)**
v) Explain how the measurements taken in (iv) above may be used to verify the law.**(3 marks)**
b) A gas has a volume of $30cm^3$ at 18^oC and normal atmospheric pressure. Calculate the new volume of the gas if it is heated to 54^oC at the same pressure. **(3 marks)**

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PHYSICS MOCKS

SERIES 1 TRIAL 4 PAPER 2

Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

SECTION A

1 .What property of light is suggested by the formation of shadows? **(1 mks)**

2. You are provided with the following; A cell and holder, a switch, a rheostat, an Ammeter, a voltmeter and connecting wires. Draw a diagram for a circuit that could be used to investigate the variation of the potential difference across the cell with the current drawn from the cell. **(2mks)**

3.An un-magnetized steel rod is clamped facing North-South direction and then hammered repeatedly for some time. When tested, it is found to be magnetized. Explain this observation. **(2mks)**

4. A lady holds a large concave mirror of focal length 1 m, 80 cm from her face, state two characteristics of her image in the mirror. **(2 mks)**

5.A girl brought a positively charged rod close to the cap of a gold leaf electroscope; she observed that the gold leaf diverged further. Explain this observation. **(2mks)**

6. In an experiment using a ripple tank the frequency, f, of the electric pulse generator was reduced to one third of its value. How does the new wavelength compare with the initial wavelength**?** **(3 mks)**

7. Figure 1 shows a ray of light incident on the face of a water prism

FIG.1

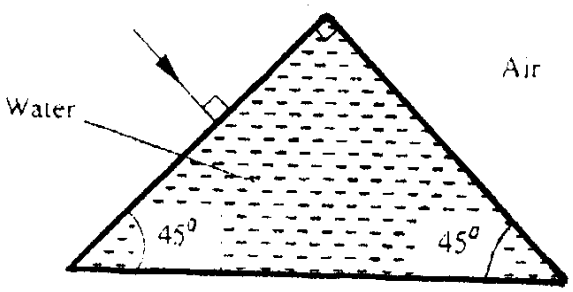
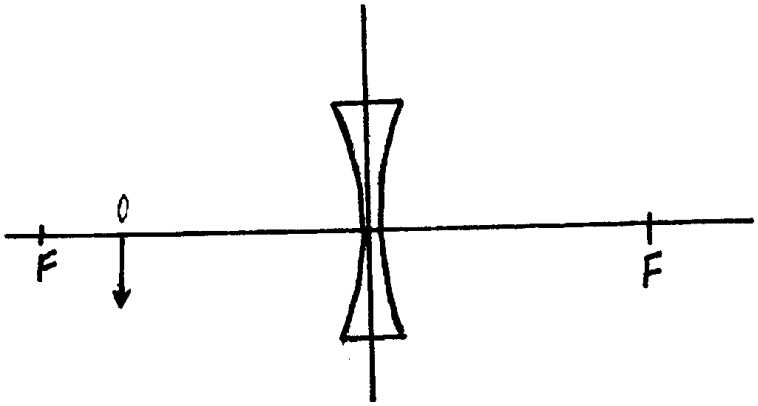


FIG. 1

Sketch the path of the ray as it passes though the prism. Critical angle for water is 49^0 **(1mk)**

8. A heating coil is rated 100W, 240V. At what rate would it dissipate energy if it is connected to a 220V supply? **(3mk)**

9. Figure 2 shows an object 0 placed in front of a concave lens with principal foci F and F Construct a ray diagram to locate the position of the image **(1mk)**

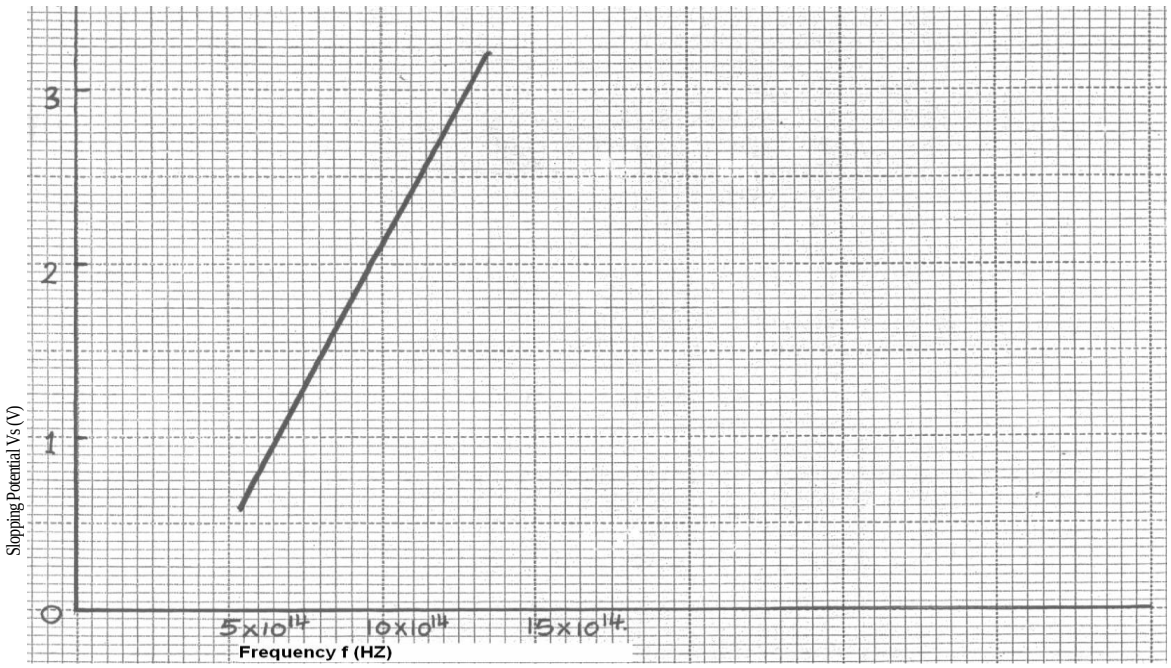


10. State the difference between X-rays and Gamma rays in the way in which they are produced**.** **(1mk)**

11. A 60W bulb is used continuously for 36 hours. Determine the energy consumed. Give your answer in kilowatt hour (kwh). **(2mks)**

12 A narrow beam of electrons in a cathode ray oscilloscope (CR0) strike the screen producing a spot. State what is observed on the screen if a low frequency a.c source is connected across the y- input of the CRO **(1mk)**

In an experiment on photo- electricity using metal X, the graph shown in figure 3 was obtained Use the graph to answer questions 13.



13. Determine the minimum frequency Fo below which no photoelectric emission occurs. **(1mk)**

14 .You are provided with 12V a. c source, four diodes and resistor. Draw a circuit diagram for a full wave rectifier and show the points at which the output is taken. **(2mk)**

15. (a) Given a bar magnet, an iron bar and a string

(i) Describe a simple experiment to distinguish between the magnet and the iron bar

(ii) State with reasons the observation that would be made in the experiment.**(2mks)**

(b) In an experiment to magnetize two substances P and Q using electric current, two curves(graphs) were obtained as shown in figure 4

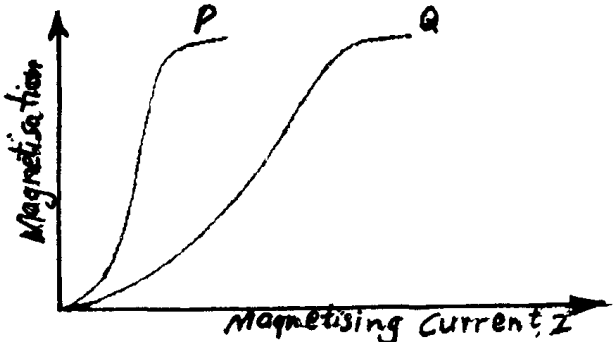


FIG.4

Using the information in fig. 4 explain the differences between substances P and Q with references to the domain theory **(6mks)**

(c) In the set up in figure 5, the suspended metre rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench.

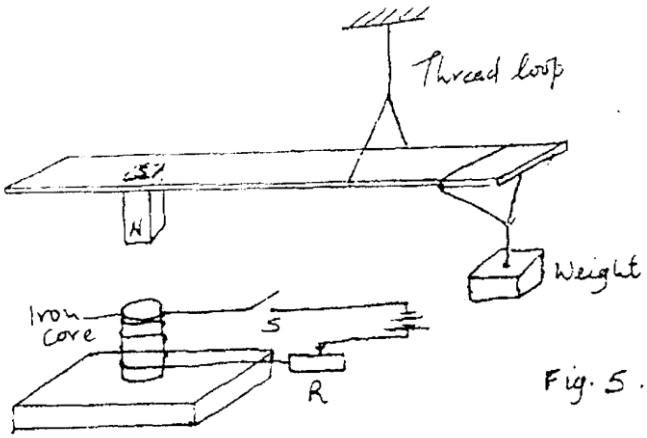


Fig. 5.

(i) State the effect on metre rule when the switch S is closed. **(1mk)**

(ii) What would be the effect of reversing the battery terminals? **(1mk)**

(iii) Suggest how the set up in figure 5 can be adapted to measure the current flowing inthe current circuit. **(3mk)**

16. (a) (i) What is the difference between longitudinal and transverse waves? **(1mk)**

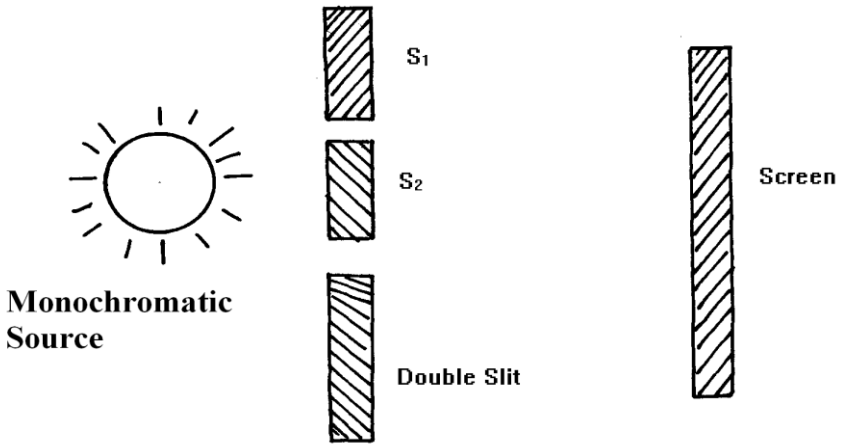
(ii) State two distinctions between the way sound waves and electromagnetic waves are transmitted **(2mk)**

(b) A mineworker stands between two vertical cliffs 400m from the nearest cliff. The cliffs are X distance apart. Every time he strikes the rock once, he hears two echoes, the first one after 2.55 , while the second follows 2s later. From this information; calculation:

(i) The speed of the sound in air **(2mk)**

(ii) The value of X **(3mk)**

(c) In an experiment to observe interference of light waves a double slit is placed close to the source. See figure 5



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

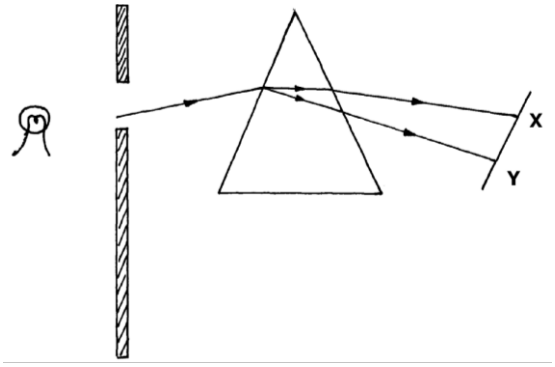
(ii) Describe what is observed on the screen **(2 mks)**

(iii) State what is observed on the screen when

i). The slit separation S1S2 is reduced **(1mk)**

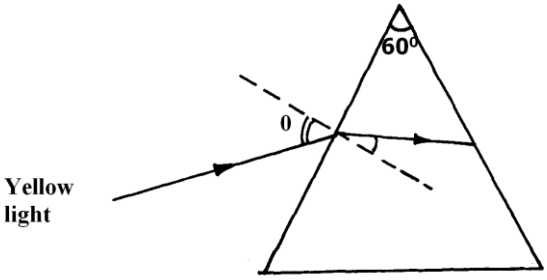
ii) White light source is used in place of monochromatic source **(1mk)**

17.a) The diagram in figure 6 below shows a narrow beam of white light onto a glass Prism.



(i) What is the name of the phenomenon represented in the diagram? **(1mks)**
(ii) Name the colour at x and Y. **(2mk)**
(iii) Give a reason for your answer in part (ii) above. **(1mk)**
(iv) What is the purpose of the slit? **(1mk)**

b)Figure 7 below shows the path of ray of yellow light through a glass prism. The speed of yellow light in the prism is 1.8×10^8 m/s.



i)Determine the refractive index of the prism material (Speed of light in vacuum, C $= 3.0 \times 10^8$ m/s) **(3mks)**
(ii) Show on the same diagram, the critical angle c and hence determine its value. **(3mks)**
(iii) Given that r = 31.2^0, determine the angle 0. **(3mks)**
18.(a)X- rays are used for detecting cracks inside meta' beams (i)State the type of the X-rays used.
(ii) Give a reason for your answer in (i) above.
(b) Figure 1 shows the features of an X- ray tube

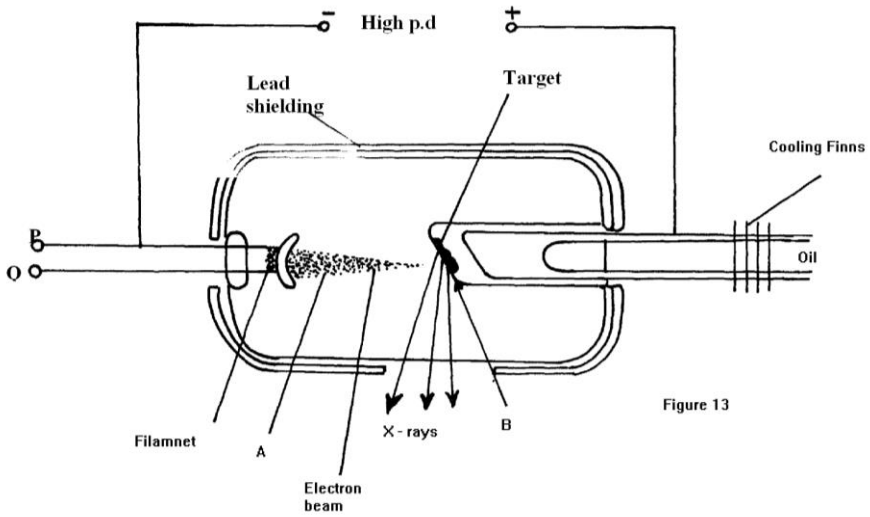


Figure 13

i) Name the parts labelled **A** and **B.** **(2mks)**

(ii) Explain how a change in the potential across P changes the intensity of the X-rays produced in the tube. **(2 mks)**

(iii) During the operation of the tube, the target becomes very hot. Explain how this heat is caused. **(2 mks)**

(iv) What property of lead makes it suitable for use as shielding material? **(1mk)**

(c) In a certain X- ray tube, the electrons are accelerated by a Pd of 12000V. Assuming all the energy goes to produce X- rays, determine the frequency of the X- rays produced. (Plank's constant h= 6.62×10^{-34} is and charge on an electron, e = 1.6×10^{-19}C). **(3mks)**

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PHYSICS MOCKS

SERIES 1 TRIAL 5 PAPER 1

Kenya Certificate of Secondary Exams

TIME:2HRS

Answer all the questions

SECTION A: 25marks

Answer **all** questions in this section in the spaces provided:

1. The diagram **below** shows a micrometer screw gauge used by a student to measure the thickness of a wire. If it has a zero error of -0.06mm, what is the actual thickness of the wire. **(2 marks)**

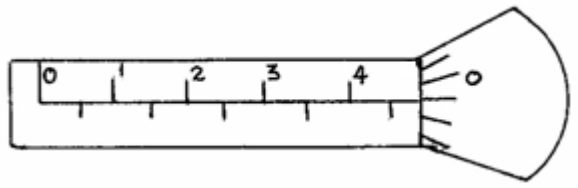


Fig.1

2. A spring extends by 2cm when a mass of 40g is suspended on it. What is the weight required
to extend it by 2.5cm. (2 marks)

3. Use the diagram **below** to answer the question **below**.

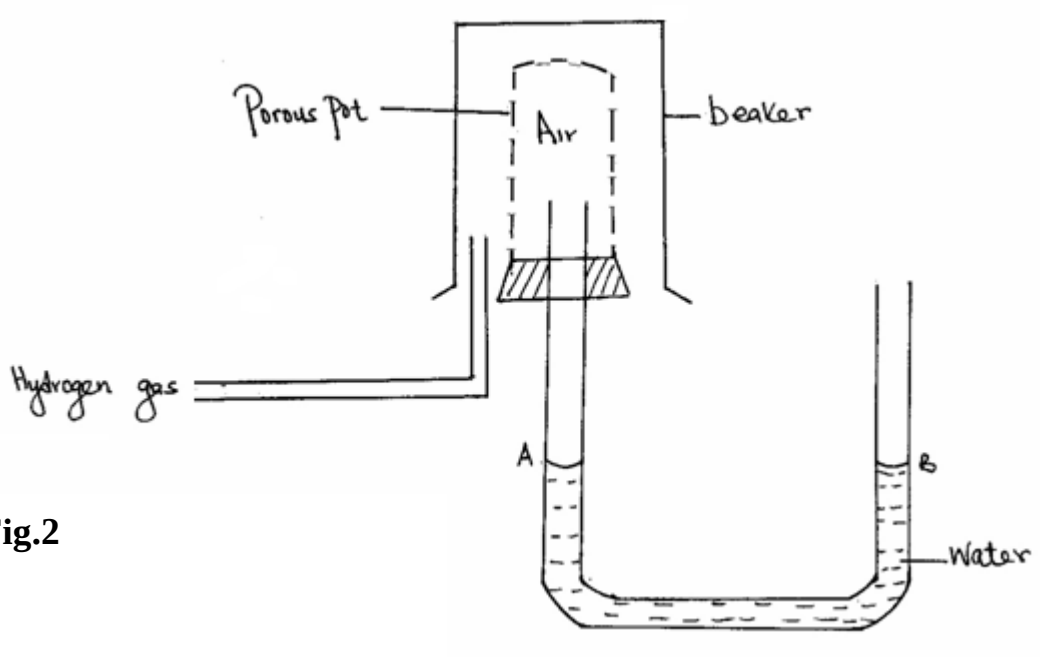


Fig.2

(i) State the aim of this experiment. **(1 mark)**

(ii) At the start of the experiment, the region below the beaker had no hydrogen gas. The hydrogen gas from a gas generator is now introduced for sometime. State the observation made. **(1 mark)**

(iii) Give a reason for your answer. **(1 mark)**

4. Figure **3 below** shows a marble placed on an inverted bowl.

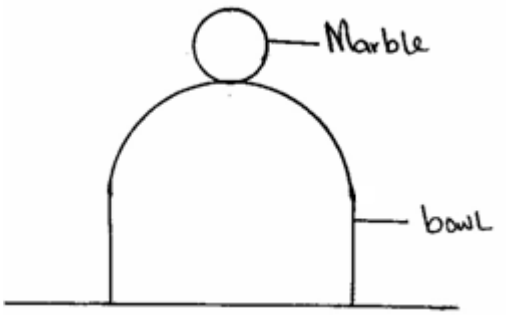


Fig.3

State and explain the type of equilibrium the marble is in. **(2 marks)**

5.(a)Define the moment of a force. **(1 mark)**

A uniform metre rule of mass 100g is balanced by suspending a 10g mass and a 20g mass on its ends as shown **below**.

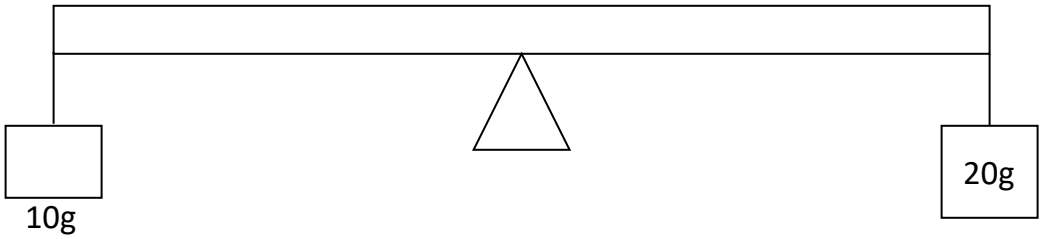


Fig.4

Determine the position of the pivot. **(3 marks)**

6. Figure **5 below** shows a simple bimetallic thermostat used for detecting fire.

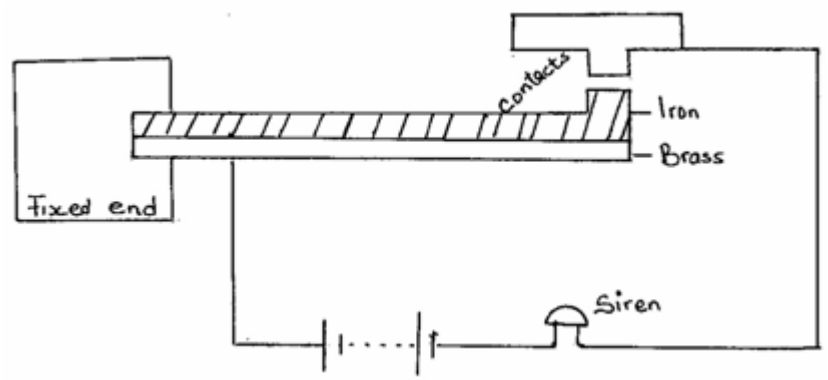


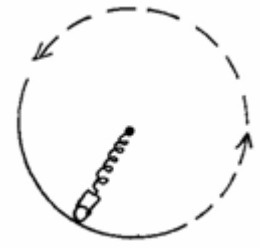
Fig.5

Describe how the fire alarm works. **(1 mark)**

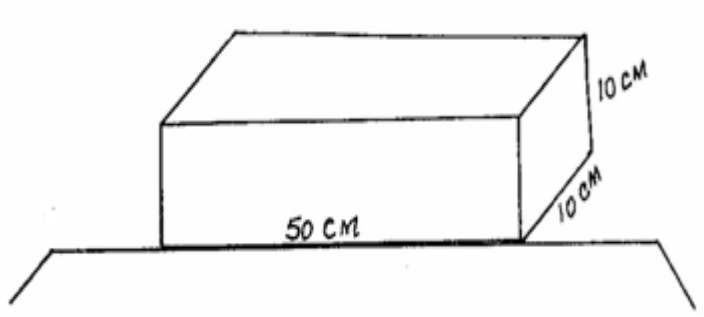
7. **(a)** State **one** assumption made in Bernoulli's fluid flow.

(b) "Air flow over the wings of an aircraft causes a lift. Explain this statement with an aid of a well labelled diagram. **(2 marks)**

8. The following figure represents a spiral spring being rotated in a horizontal circle at uniform speed. The length of the spiral spring including a mass of 50g at its end is 0.2m. The spring constant is 0.5N/cm. Determine the extension produced when the spring rotates at a speed of 4m/s and radius 1m. (3 marks)



9. A concrete block of mass 50kg rests on the surface of the table as shown **below**.



What is the maximum pressure that can be exerted on the bench by the block?

(3 marks)

10. When an inflated balloon is placed in a refrigerator it is noted that its volume reduces. Use the kinetic theory of gases to explain this observation. (2 marks)

SECTION B: (55 MARKS)

Answer question in this section in the spaces provided.

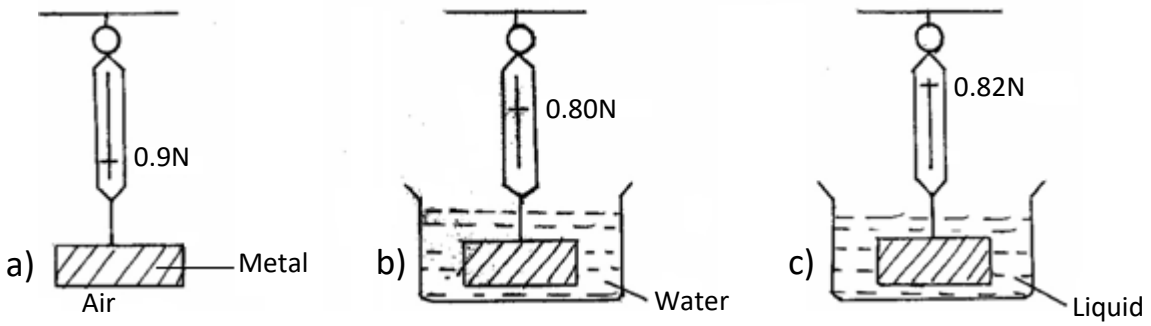
11. **(a)** State the pressure law of an ideal gas. **(1 mark)**

(b) A 30°C the pressure of a gas is 100cm of mercury. At what temperature would the pressure of the gas fall by20cm of mercury. Give the temperature in °C. **(2 marks)**

(c) A hole of area 4.0cm² at the bottom of a tank 5m deep is closed with a cork. Determine the force on the cork when the tank is filled with water. (Take g = $10ms^{-2}$ and density of water = $1000kgm^{-3}$). **(4 marks)**

(d) A measuring cylinder of height 25cm is filled to a height of 15cm with water and the rest is occupied by kerosene. Determine the pressure acting on its base (density of water = $1gcm^{-3}$ density of kerosene = $0.8gcm^{-3}$ and atmospheric pressure = 103,000pa). **(3 marks)**

12. The figure **below** shows the same block weighed in air, water and liquid. Given that the reading of the level of water becomes 150cm³ when the metal is fully immersed.



(**a)**Determine:

(i) Density of the metal. **(3 marks)**

(ii) Water level before the solid was immersed. **(2 marks)**

(iii) Explain why the spring balance gives different reading in figure (b) and (c) with the same metal block. **(2 marks)**

13. **(a)**A boy throws a tennis ball vertically upwards from a truck moving at a constant velocity.Give the reason why the ball lands back exactly the same point where it was projected **(1 mark)**

(b) Define impulse in terms of momentum. **(1 mark)**

(c) A trailer of mass 30 tonnes travelling at a velocity of 72km/hr rams onto a stationary bus of mass 10 tonnes. The impact takes 0.5 seconds before the two vehicles move off together at
a constant velocity for 15 seconds. Determine.

(i) the common velocity. **(3 marks)**

(ii) the distance moved after the impact. **(2 marks)**

(iii) the impulsive force on the trailer on impact. **(3 marks)**

(d) Give the reasons why a safety seat belt used in a vehicle;

(i)should have a wide surface area. **(1 mark)**

(**ii)**should be slightly extensible. **(1 mark)**

(e) Give a reason why, when a passenger jumps from a floating boat, the boat moves backwards. Give a reason for this. **(1 mark)**

(f) A steel ball is dropped into a cylinder containing oil. Sketch on the axis given **below** a graph showing the variation of acceleration with time. **(1 mark)**

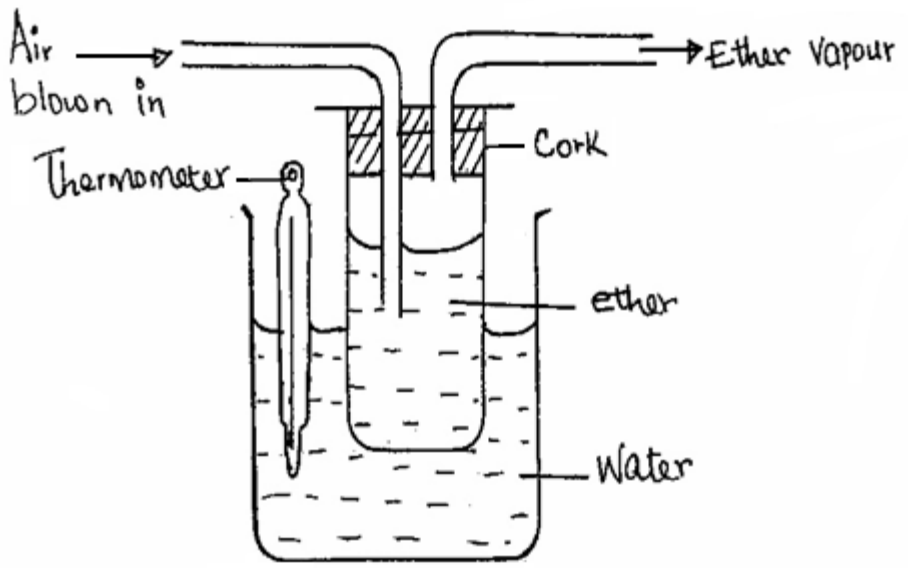
15.(a)State **two** ways through which the rate of evaporation of a liquid may be increased. **(2 marks)**

(b) A metal of mass 10kg is heated to 120°C and then dropped into 2kg of water. The final temperature of the mixture is found to be 50°C. Calculate the initial temperature of the water. (Specific heat capacity of the metal and water is $450JKg^{-1}K^{-1}$ and $4200JKg^{-1}K^{-1}$ respectively**).** **(3 marks)**

(c) Give the property of water which makes it suitable for use as a coolant in machines**.** **(1 mark)**

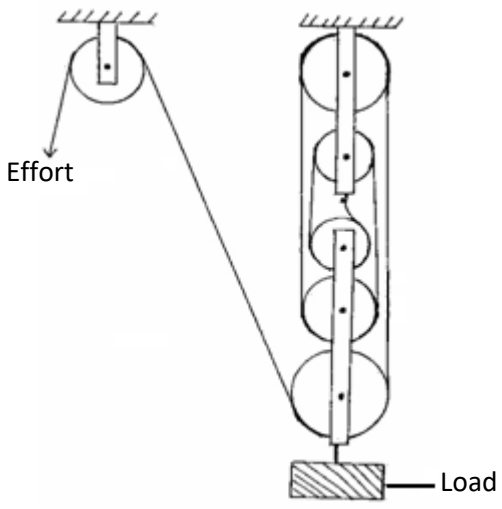
(d) Formation of ice on roads during winter in cold countries is known to hamper vehicles. State **two** ways in which the melting point of ice may be lowered to solve this problem. **(2 marks)**

(f) Some ether is put in a combustion tube and two glass tubes inserted into the tube through a cork as shown in the figure **below**. The combustion tube is then put into a small beaker containing some water and a thermometer dipped in the water. When air is blown into the ether as shown, the reading in the thermometer lowers. Explain this observation. **(2 marks)**



(g) State **two** differences between heat and temperature. **(2 marks)**

15. The figure **below** shows a machine being used to raise a load. Use the information given in the figure to answer questions **below**.



(a) Determine the velocity ratio (V.R) of the machine. **(1 mark)**

(b) If a load of 800N is raised by applying an effort of 272N, determine the efficiency of the machine. **(1 mark)**

(c) A crane lifts a load of 2000kg through a vertical distance of 3.0m in six seconds. Determine

(i) work done. **(2 marks)**

(ii) Power of the crane. **(2 marks)**

(d) Name the transducer that is used to convert the following form of energies.

(i) Electrical to sound. **(1 mark)**

(ii) Electrical to kinetic. **(1 mark)**

NAME……ADM NO……

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DATE……

PHYSICS MOCKS

TRIAL TRIAL 5 PAPER 2

Kenya Certificate of Secondary Exams

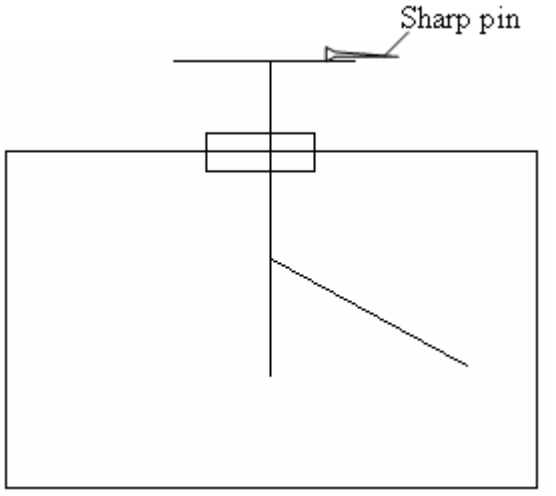
TIME:2HRS

Answer all the questions

SECTION A: 25marks

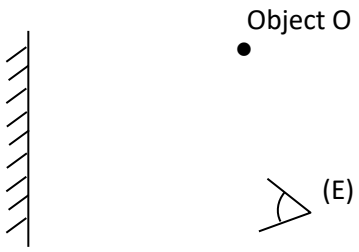
1. State the property of light suggested by the formation of shadows. **(1 mark)**

2. The figure **below** shows a sharp pin fixed on a cap of leaf electroscope. The electroscope is highly charged and then left for sometime.



Explain why the leaf collapses. **(2 marks)**

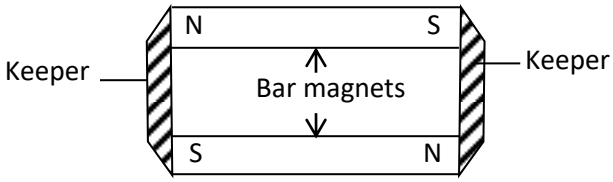
3. The figure **below** shows an object O placed infront of a plane mirror.



On the same diagram, draw rays to locate the position of the image I as seen from the eye E. **(2 marks)**

4. **(a)** State the basic law of magnetism. **(1 mark)**

(b) The figure **below** shows how magnets are stored in pairs with keepers at the ends.



Explain how this method of storing helps in retaining magnetism longer.**(2 marks)**

5.Why is a convex mirror better than plane mirror when used as a driving mirror? **(1 mark)**

6.The chart **below** shows an arrangement of different parts of the electromagnetic spectrum.

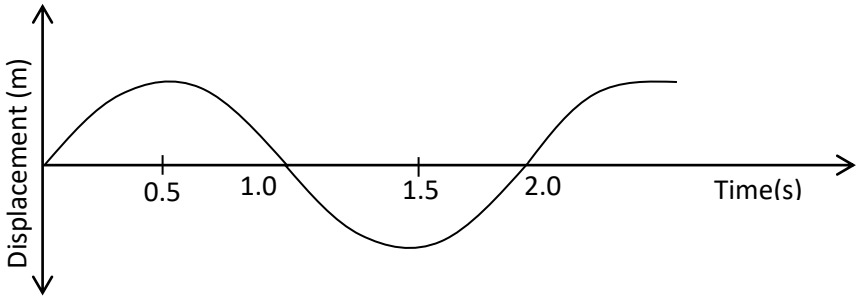
Radio	A	Infrared	Visible	B	X-Rays	Gamma Rays

(i) Name the radiation represented by **B**. **(1 mark)**

(ii) Name a device that can be used to detect radiation **A**. **(1 mark)**

7. **(a)** Distinguish between a transverse and a longitudinal wave. **(1 mark)**

(b) Determine the frequency of the wave shown below. (**2 marks)**



(c) State **one** reason why ultrasound is preferred to audible sound in echo-sounding. (1 mark)

8. An electric heater rated 240V, 3000W is to be connected to a 240V mains supply, through a 10A fuse. Determine whether the fuse is suitable or not. (3 marks)

9. **(a)** What are extrinsic semi-conductors. (2 marks)

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

10. **(a)** State the purpose of cooling fins in the X-ray tube. (1 mark)

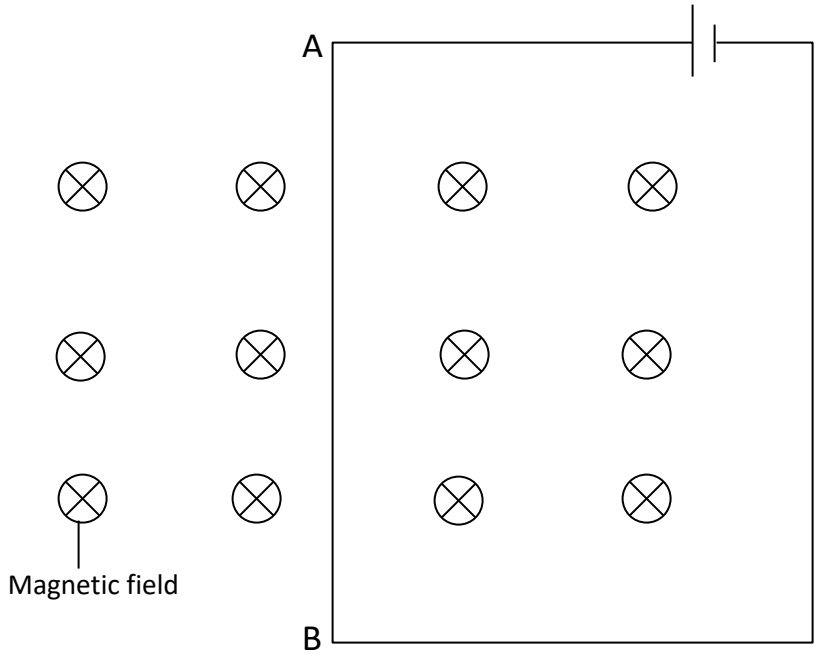
(b) State **two** differences between X-rays and gamma rays. (2 marks)

SECTION B: (55 MARKS)

Answer question in this section in the spaces provided.

11. **(a)** State **two** ways in which one can increase the strength of an electromagnet. **(2 marks)**

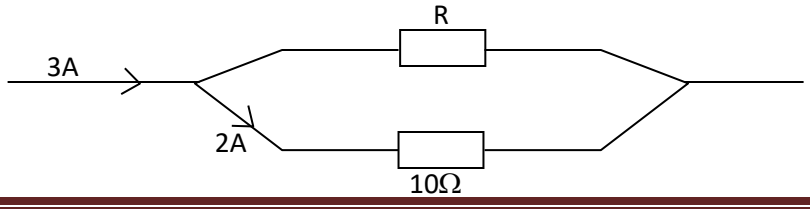
(b) The following figure shows a conductor placed in a magnetic field. Indicate on the diagram the direction of motion of part AB of the conductor**.(1 mark)**



(c)A cell drives a current of 5A through a 1.6Ω resistor. When connected to a 2.8Ω resistor, the current that flows in 3.2A. Find E and r for the cell. **(4 marks)**

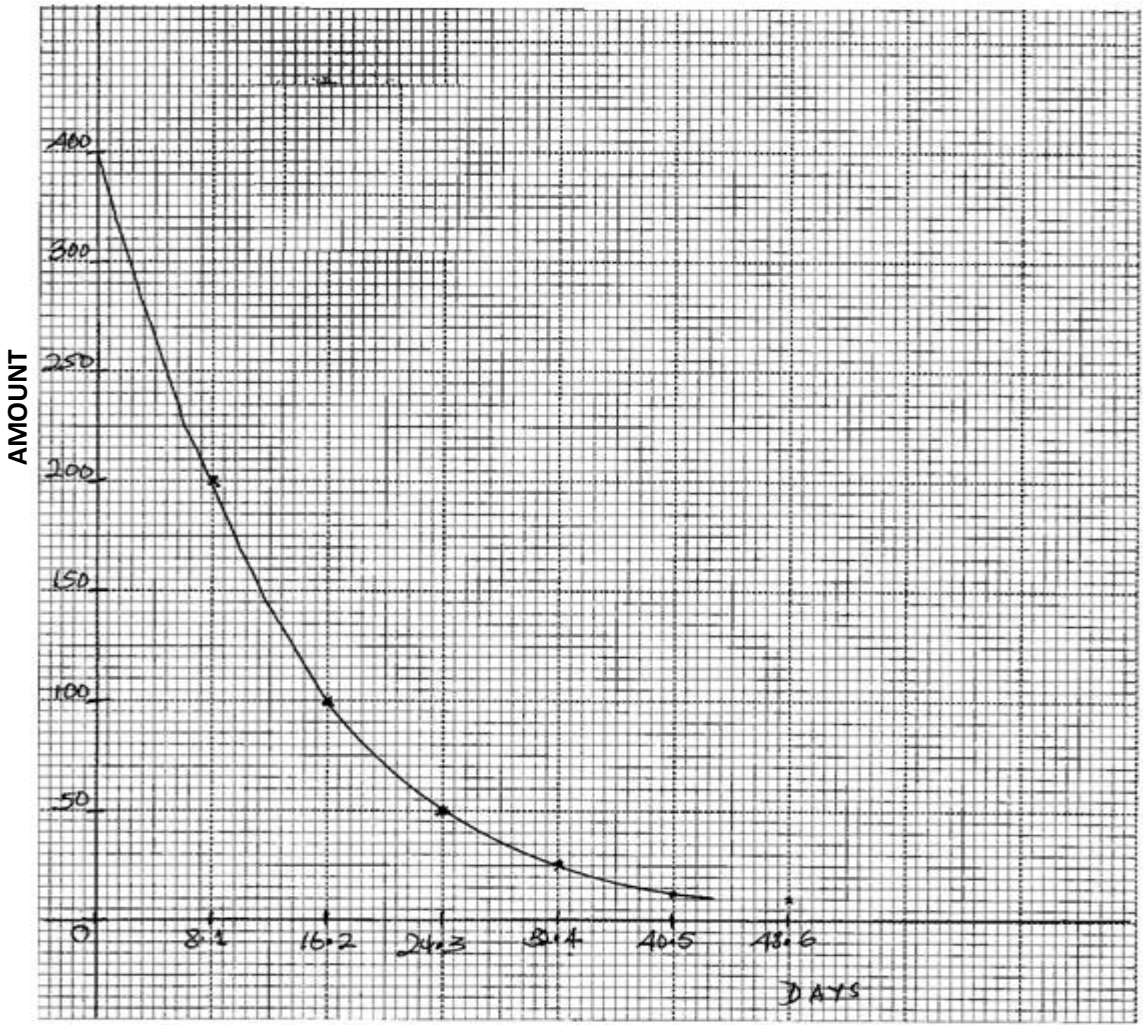
(d) Calculate the length of a nichrome resistance wire of cross-sectional area 7 $\times 10^{-8}m^2$ required to make a resistor of 10 ohms. (Take resistivity of nichrome = $1.10 \times 10^{-6}\Omega m$**).** **(3 marks)**

(e) In figure **below**, calculate the p.d across resistor **R**. **(2 marks)**



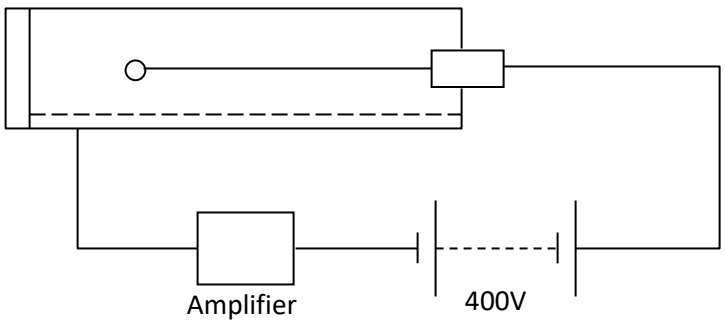
12.(a) The half life of cobalt 60 is 5 years. How long will a sample take for the activity to decrease to $\frac{1}{16}$ of its value. **(2 marks)**

(b) The graph **below** shows radioactive decay of iodine.



Use the graph to determine the half-life of iodine. **(2 marks)**

(c) The figure **below** shows a G.M tube.

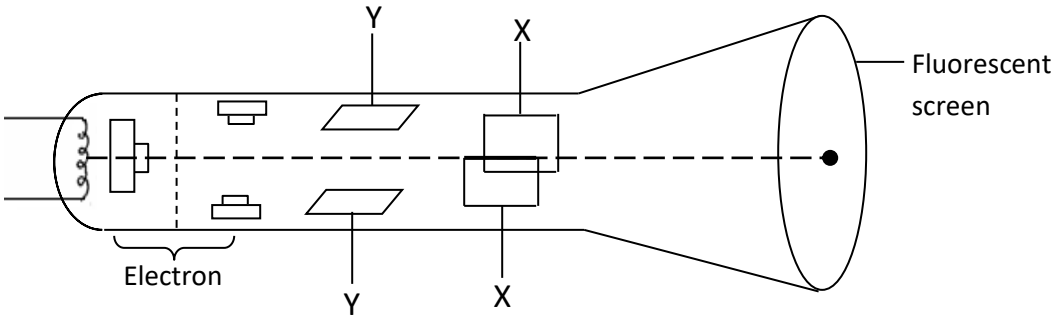


(i) Give the reason why the mica window is made thin. **(1 mark)**

(ii) Explain how the radiation entering the tube through the tube is detected by the tube**.** **(3 marks)**

(iii) What is the purpose of the halogen vapour. **(1 mark)**

II The figure **below** shows a simple cathode ray tube.



(i) Explain how the electrons are produced in the tube. **(2 marks)**

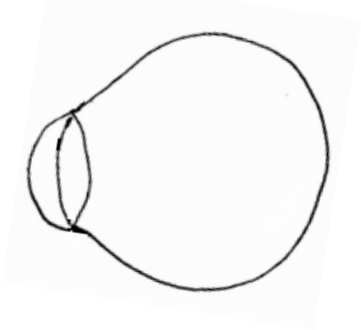
(ii) State **one** function of the anode. **(1 mark)**

(iii) At what part of the cathode ray tube would the time base be connected. **(1 mark)**

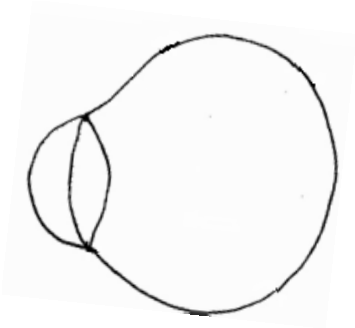
(iv) Why is a vacuum created in the tube? **(1 mark)**

13. (a) The figures **below** shows diagrams of the human eye.

(a)



(b)

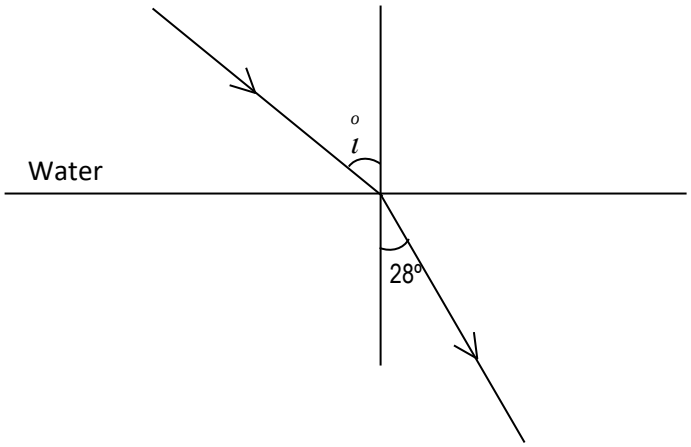


(i) Sketch in figure (a) a ray diagram to show long sightedness. **(1 mark)**

(ii) Sketch in figure (b) a ray diagram to show how a lens can be used to correct the long sightedness. **(2 marks)**

(b) Draw a ray diagram to show how a convex lens can be used as a magnifying glass. **(2 marks)**

(c) The diagram **below** shows a ray of light travelling between water-glass interface.



Calculate the value of i^o given that $a^n g = 1.52$ *and* $a^n w = \frac{4}{3}$. **(3 marks)**

(d) State **one** conditions for total internal reflection to occur. **(1 mark)**

14. (a)A transformer with 2000 turns in the primary circuit and 150 turns in the secondary circuit has its primary circuit connected to a 800Va.c. source. It is found that when a heater is connected to the secondary circuit it produces heat at the rate of 1000W. Assuming 100% efficiency, determine the:

(i) Voltage in the secondary circuit. **(2 marks)**

(ii) Current in the primary circuit. **(2 marks)**

(iii) Current in the secondary circuit. **(1 mark)**

(iv)State the type of transformer represented above. **(1 mark)**

(b)(i) State the reason why long distance power transmission is done at a very high voltage and using thick cables. **(1 mark)**

(ii) Calculate the cost of using the following appliances in one month (30 days) of the company rate is Ksh.9.50 per unit.

I A 2000W water heater for 2 hours per day.

II A 75W bulb for 10 hours per day.

III An 1500W electric iron for 1 hour per day. **(3 marks)**

(iii) Find the total monthly bill for the above household if in addition to the energy consumed, the power company charges each consumer.

I A standing charge of Ksh.200.

II Fuel cost levy at 70 cents per unit. **(2 marks)**

15. (a) Define the term work function. **(1 mark)**

(b) The minimum frequency of light that can cause photoelectric emission to occur from a surface of metal is $6.94 \times 10^{14} H_Z$. If the speed of the emitted electrons is $8.0 \times 10^5 ms^{-1}$. Calculate:- ($h = 6.63 \times 10^{-34} Js$. $me = 9.11 \times 10^{-31} kg$).

(i) the work function of the metal. **(2 marks)**

(ii) the maximum kinetic energy of the photoelectron. **(2mks)**

(iii) the frequency of the source. **(3 marks)**

NAME……ADM NO……

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PHYSICS MOCKS

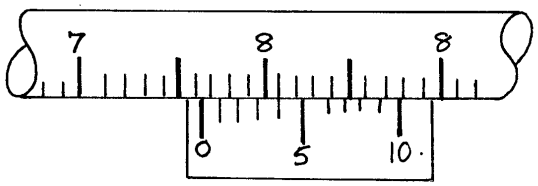
TRIAL TRIAL 6 PAPER 1

Kenya Certificate of Secondary Exams

TIME:2HRS

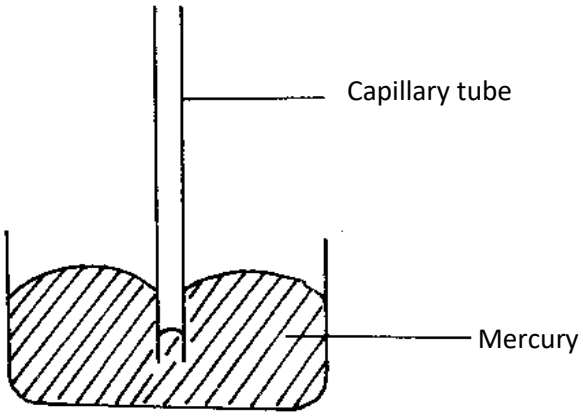
Answer all the questions

1.The figure below shows a vernier calipers scale



State the correct reading of scale if the instrument has a zero-error of -0.02cm **(2 mks)**

2.The diagram below shows the behaviour of mercury in a capillary tube.



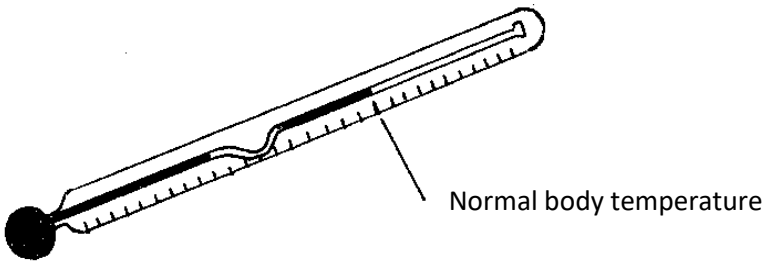
Explain the behaviour **2mks**

3. In an experiment to estimate the size of a molecule of olive oil, a drop of oil of volume $0.12cm^3$ was placed on a clean water surface. The oil spread on a patch of diameter 6.0×10^6 mm^2.

a) Calculate the size of the molecule **(3mks)**

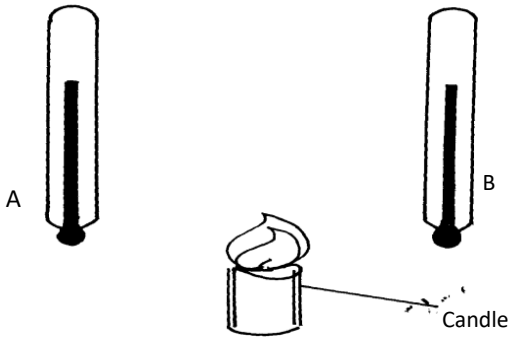
b) State an assumption made in the above calculations. (**1mk)**

4. The figure below shows a clinical thermometer.



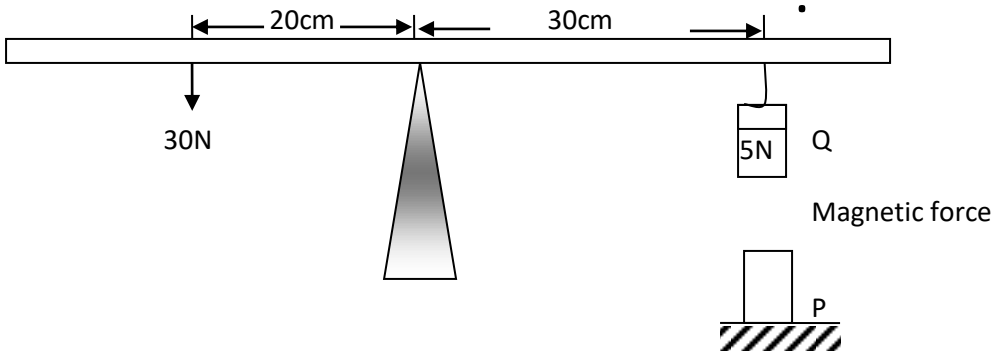
State the function of the constriction. **(1mk)**

5. The figure below shows two identical thermometers. Thermometer **A** has a blackened bulb while thermometer **B** has a silvery bulb. A candle is placed equidistant between the two thermometers



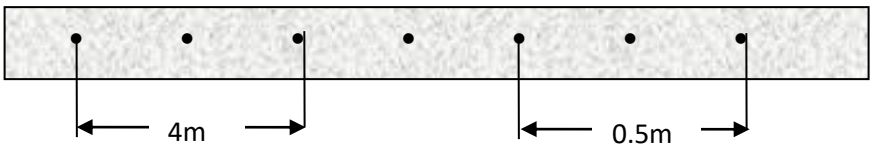
State with a reason the observations made after some time **(2mark)**

6. A uniform metre rule is balanced at its centre. It is balanced by the 30N, 5N and the magnetic force between **P** and **Q**. **P** is fixed and **Q** has a weight of 5N



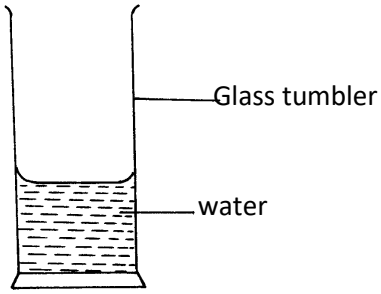
Ignoring the weight of the metre rule, calculate the value of the magnetic force between **Q** and **P** **(2mks)**

7.The pattern below shows oil leakage on a path at the rate of 10drops per second form a lorry.



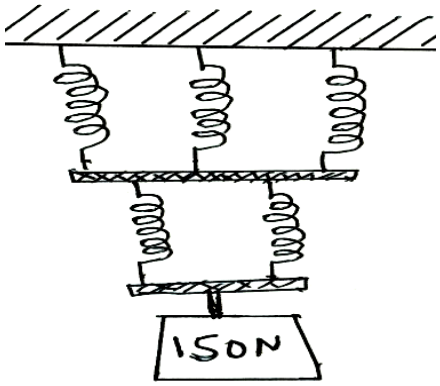
Calculate the acceleration of the lorry **(3mks)**

8.The figure below shows a glass tumbler partly filled with water at room temperature.



Briefly explain what happens to the stability of the tumbler when water is cooled to temperatures below 0^0C. **(1mk)**

9. The spiral springs shows in the figure below are identical. Each spring has a spring constant K = 300N/m .Each rod weighs 0.1N and each spring weighs 0.2N.



(a) Determine the total extension caused by the 150N weight. **(2marks)**

(b) Apart from length of the spring and nature of material, state one other factor affecting the spring constant. **(1mark)**

10.A car is brought to rest from a speed of 30m/s in 2 seconds. If the driver's reaction time is 0.3s, determine the shortest stopping distance. **(3mks)**

11. The figure below shows a Bunsen burner.

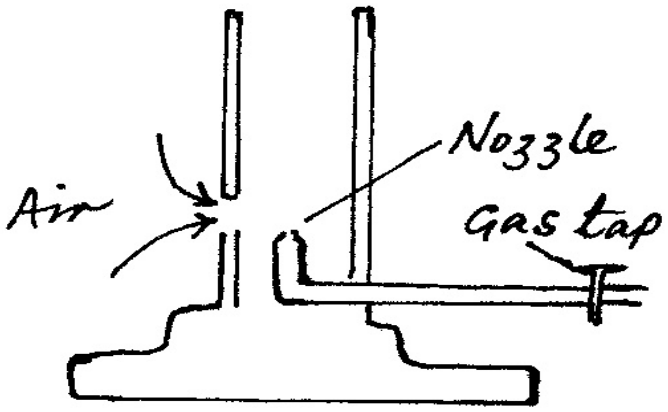


Figure 2

Use the Bernoulli's Principle to explain how air is drawn into the burner when the gas tap opened. **(2mks)**

SECTION II (55 marks)

12. **a) i)** Define Archimedes's Principle. **(1 mark)**

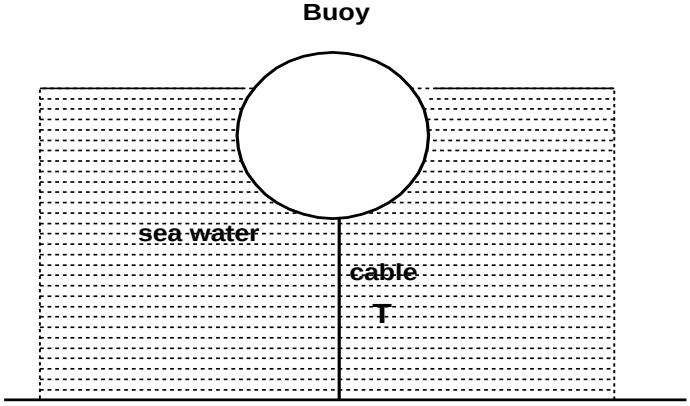
ii) An object weighs 1.04N in air, 0.64N when fully immersed in water and 0.72N when fully immersed in a liquid. If the density of water is 1000 kgm^{-3}, find the density of the liquid. **(3 marks)**

b) i) Define the law of floatation **(1 mark)**

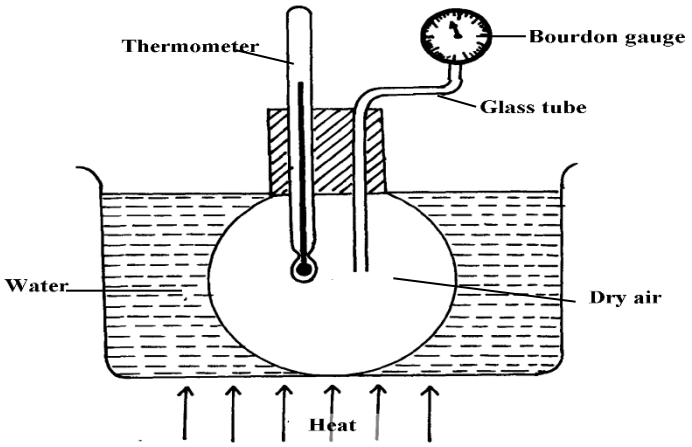
ii) Give a reason why a steel rod sinks in water while a ship made of steel floats on water. **(1 mark)**

iii) Draw a clearly labelled diagram of a common hydrometer which is suitable for measuring the densities of liquids varying between 1.0 and 1.2 g cm^{-3}. **(2 mks)**

iv) The figure below shows a buoy, B, of volume 40 litres and mass 10 kg. It is held in position in sea water of density 1.04 g cm^{-3} by a light cable fixed to the bottom so that $\frac{3}{4}$ of the volume of the buoy is below the surface of the sea water. Determine the tension T in the cable. **(2 marks)**

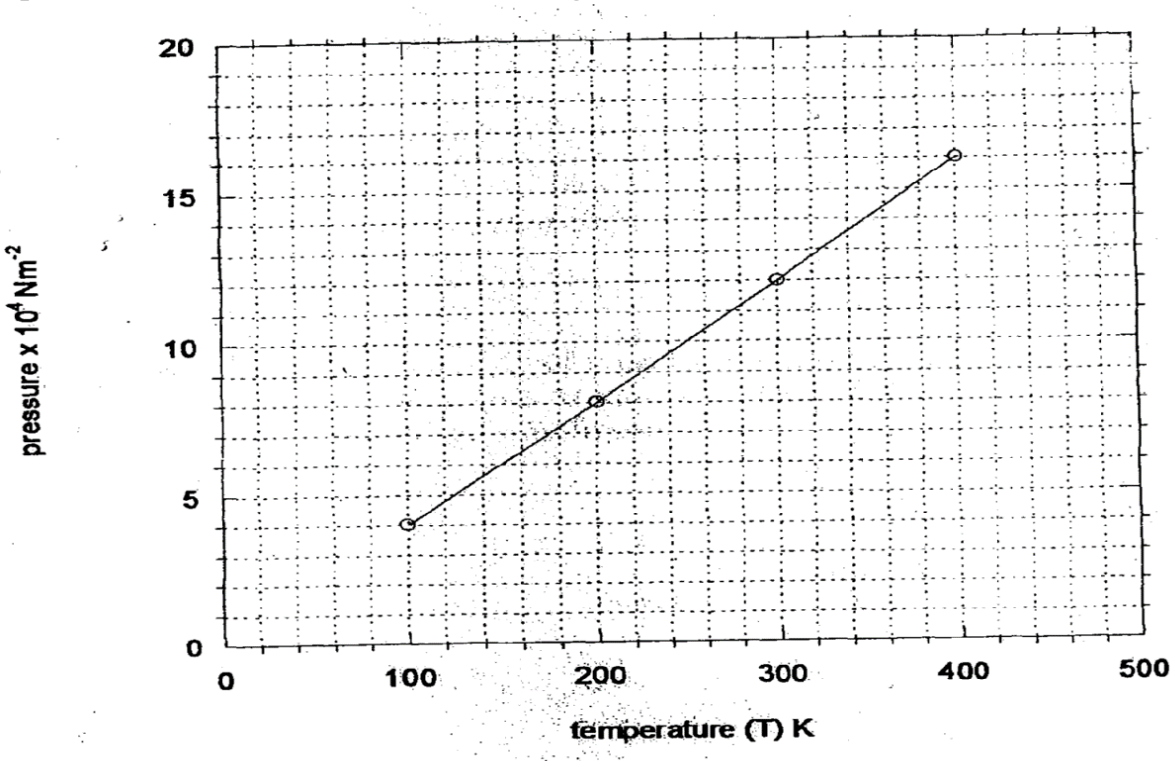


13. The figure below shows a simple set up for pressure law apparatus:-



a) Describe how the apparatus may be used to verify pressure law **(2 marks)**

b) The graph in the figure below shows the relationship between the pressure and temperature for a fixed mass of an ideal gas at constant volume



i) Given that the relationship between pressure, **P** and temperature, **T** in Kelvin is of the form **P = kT + C** Where **k** and **C** are constants, determine from the graph, values of **k** and **C** **(2 marks)**

ii) Why would it be possible for pressure of the gas to be reduced to zero in practice? **(1 mark)**

c) A gas is put into a container of fixed volume at a pressure of 2.1 x 10^5. Nm^{-2} and

temperature 27°C. The gas is then heated to a temperature of 327°C. Determine the new pressure **(2 marks)**

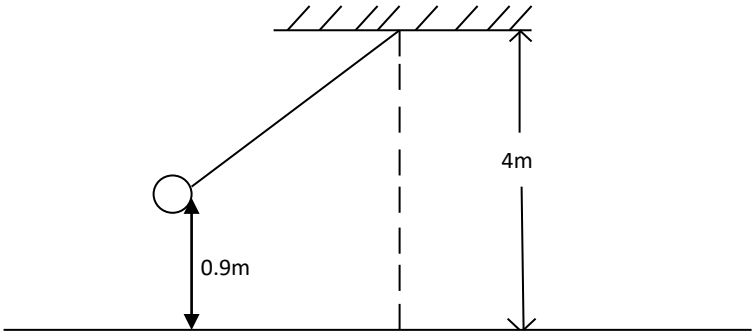
14. (a) An electric crane lifts a load of 2000kg through a vertical distance of 3.0m in 6s. Determine:

i) Work done **(1mk)**

ii) Power developed by the crane **(2mks)**

iii) Efficiency of the crane if it is operated by an electric motor rated 12.5 Kw. **(2mks)**

c) A bob of mass 20kg is suspended using a string of 4m from a support and swings through a vertical height of 0.9m as shown below:



Determine:

i) The potential energy of the body at this position. **(2mks)**

ii) Speed of the body when passing through the lowest point. **(2mks)**

15. (a) The moon goes round the earth at constant speed. Explain why it is true to say that the moon is accelerating. **(1 mark)**

(b) A string of negligible mass has a bucket tied at the end. The string is 60cm long and the buckets has a mass of 45g. The bucket is swung horizontally making 6 revolutions per second. Calculate:

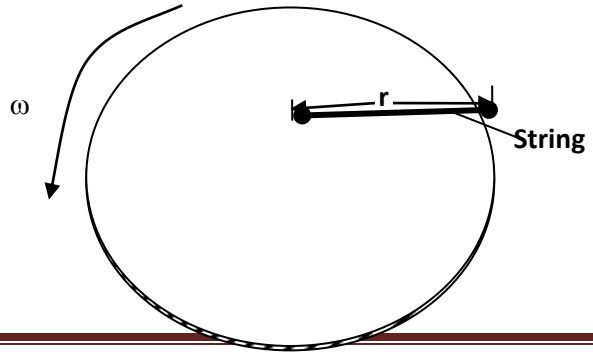
(i) The angular velocity. **(1 mark)**

(ii) The centripetal acceleration. **(2 marks)**

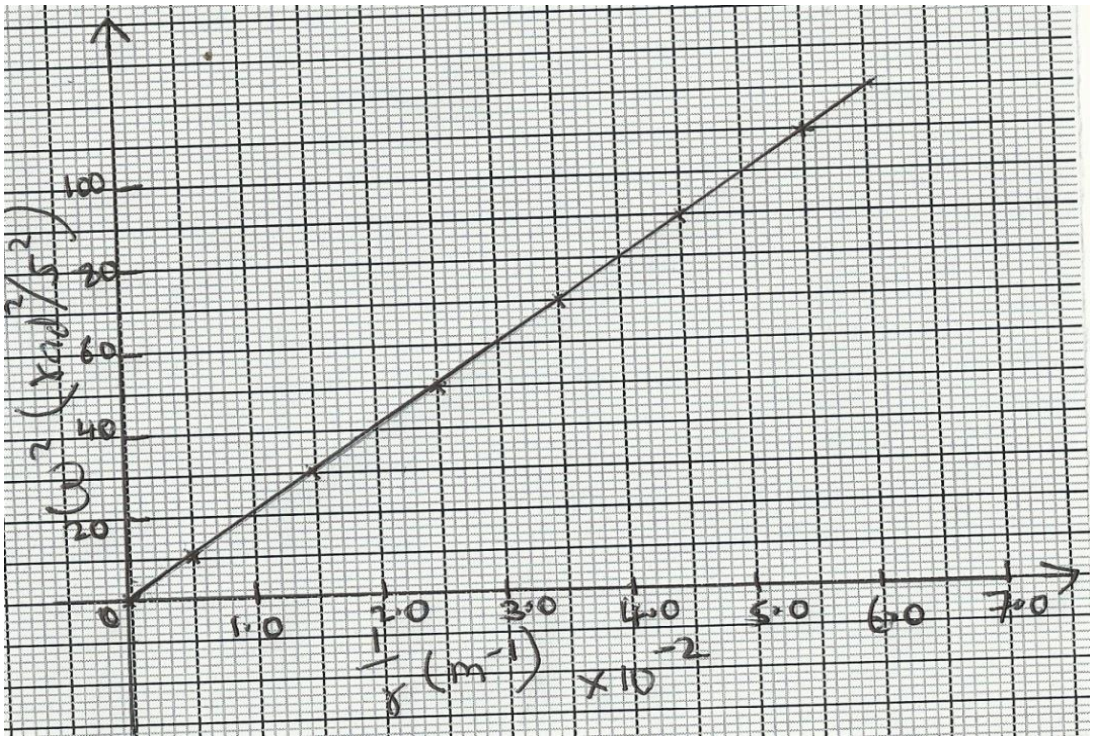
(iii) The tension on the string. **(2 marks)**

(iv) The linear velocity. **(1 mark)**

(c) The figure below shows a body of mass; $m = 200g$ attached to the centre of a rotating table with a string. The radius of the string was varied and different values of angular velocity recorded. The mass of the body remained constant throughout the experiment.



The results obtained for angular velocity and radius were used to plot the following graph;



From the above graph;

(i) Calculate the value of the slope. **(2marks)**

(ii) If ω^2 and $\frac{1}{r}$ are related by the equation; $\omega^2 = \frac{p}{r} \times \frac{1}{m}$, find the value of **P.(2marks)**

(iii) State the significance of **P.** **(1mark)**

16. (a) Define the term specific heat capacity. **(1 mark)**

A block of metal of mass 150g at 100°C is dropped into a lagged calorimeter of heat capacity 40Jk^{-1} containing 100g of water at 25°C. The temperature of the resulting mixture is 34°C. (Specific heat capacity of water = 4200Jkg^{-1}). Determine;

(i) Heat gained by calorimeter. **(2 marks)**

(ii) Heat gained by water. **(2 marks)**

(iii) Heat lost by the metal block. **(1 mark)**

(iv) Specific heat capacity of the metal block. **(2 marks)**

(b) State two differences between boiling and evaporation. **(2mark)**

17. (a) (i) State Newton's second law of motion. **(1 mark)**

(ii) A striker kicks a ball of mass 250g initially at rest with a force of 75N. if the foot was in contact with the ball for 0.10sec. Calculate the take-off velocity of the ball. **(2 marks)**

(b) A bullet of mass 20g moving at 400 m/s strikes a block of wood of mass 3.5kg initially at rest. The bullet sticks into the block and the two move off together on a horizontal surface, where a frictional retarding force of 4N is acting between the block and surface.

(i) Determine the initial common velocity of bullet and wooden block. **(2marks)**

(ii) What distance does the block move before coming to rest? **(2marks)**

NAME……ADM NO……

SCHOOL……..CLASS……

DATE……

PHYSICS MOCKS

SERIES 1 TRIAL 6 PAPER 2

Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided

1. The figure 1 shows a wire in a magnetic field. A current is switched on to flow through the wire in the direction shown. State the direction of motion of the wire. **(1mk)**

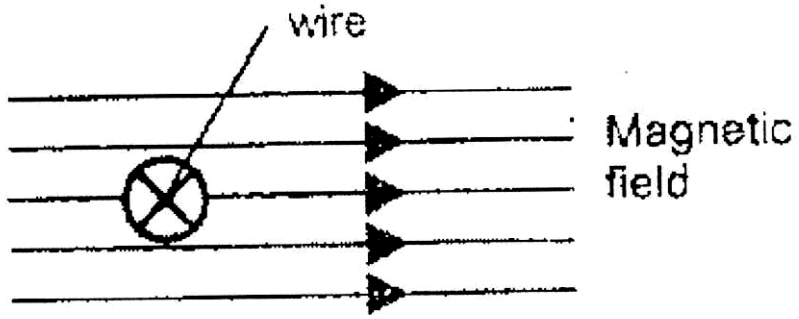


Figure 1.

2. In a textile industry, the machines experience electrostatics forces at certain points. Suggest **one** method of reducing these forces. **(1mk)**

3. When the device X is connected in the circuit below, the voltage across it is 0.14V.

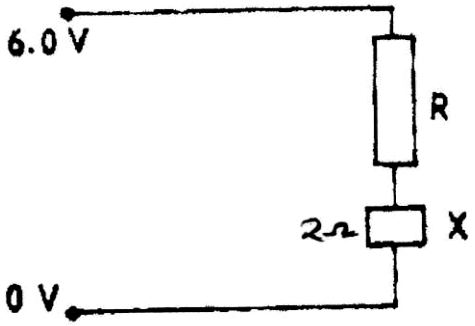
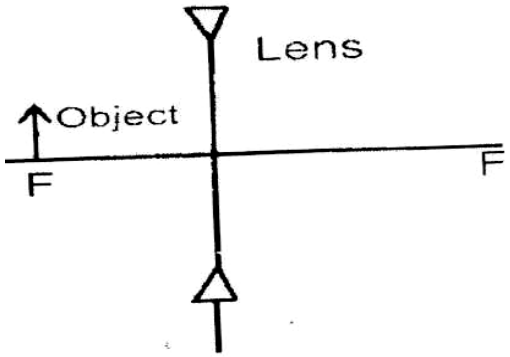


Fig. 2

Calculate the value of the resistance R. **(2mks)**

4. Four bars of metal W, X, Y and Z are tested for magnetism. X attracts both W and Y but not Z. Z does not attract W, X or Y. W and Y sometime attract one another and sometimes repel one another. What conclusion can you draw about? **(2mks)**
   (a) Bar W
   (b) Bar X
5. **(a)** An observer watching a fireworks displays sees the light from an explosion and hears the sound 4 seconds later. How far was the explosion from the observer? (Speed of sound in air 330m/s). **(3mks)**
   (b) A vertical object is placed at the focal point F of a diverging lens as shown in figure 3.

Fig. 3



Sketch a ray diagram to show the image of the object. **(2mks)**

6. If the focal length of the lens above is 10cm. Calculate its power. **(2mks)**
7. At what part of the cathode ray tube would the time base be connected? **(1mk)**
8. A heater of resistance R_1 is rated P watts, V volts while another of resistance R_2 is rated 2P WATTS, $^{V}/_{2}$ volts. Determine $^{R1}/_{R2.}$ (2mks)
9. The figure below shows an experimental arrangement. S1 and S2 are narrow slits.

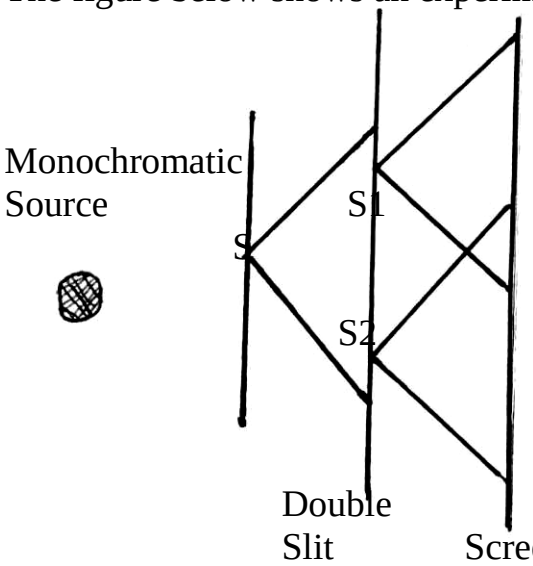


Fig. 4

State what is observed on the screen when the source is: **(3mks)**
(i) Monochromatic

(ii) White light

Use the diagram below to answer question 10.

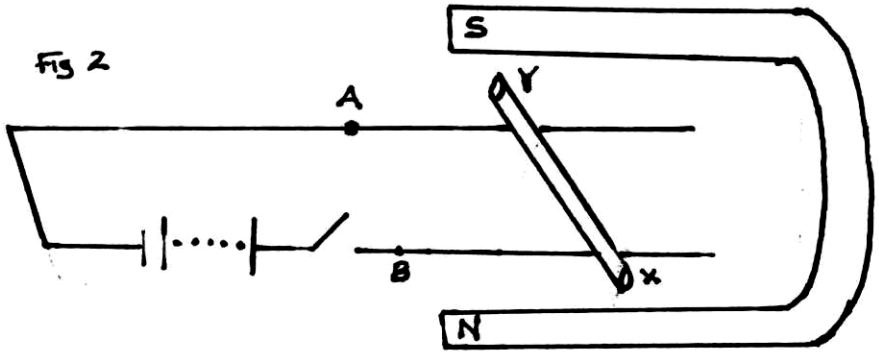


Fig. 5

10. An un-insulated copper wire XY lies over the fixed wire A and B connected to a battery. When the key in the circuit is closed, the rod XY moves. In which direction does the wire XY experience the force? (Indicate using an arrow) **(1mk)**

11. When is the force on the wire XY greatest? **(1mk)**

12. State and explain the effect of reducing the EHT in an X-ray tube on the X-rays produced**.** **(1mk)**

13. The graph below shows the variation of capacitance of a capacitor with voltage supplied across it.

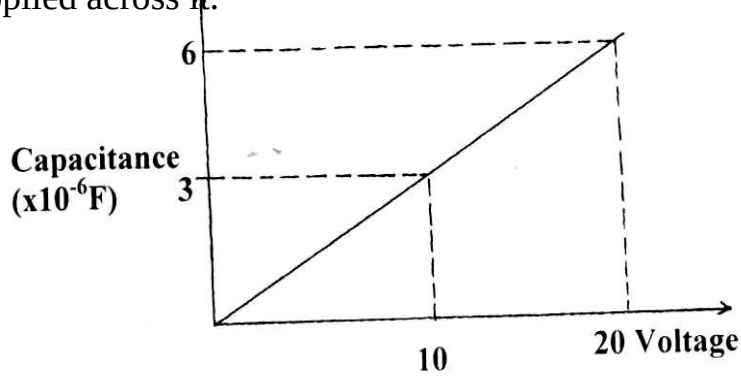


Fig. 6

Use the graph to determine the quantity of charge stored in the capacitor. **(3mks)**

SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided

14.(a) (i) State the meaning of the statement diode characteristic. **(1mk)**

- Sketch a circuit diagram that can be used to investigate p-n junction diode characteristics.
  (2mks)

(b) Define the term acceptor atom as applied in semiconductor. (1mk)

(c) Study figure 7 below and use it to answer questions that follow.

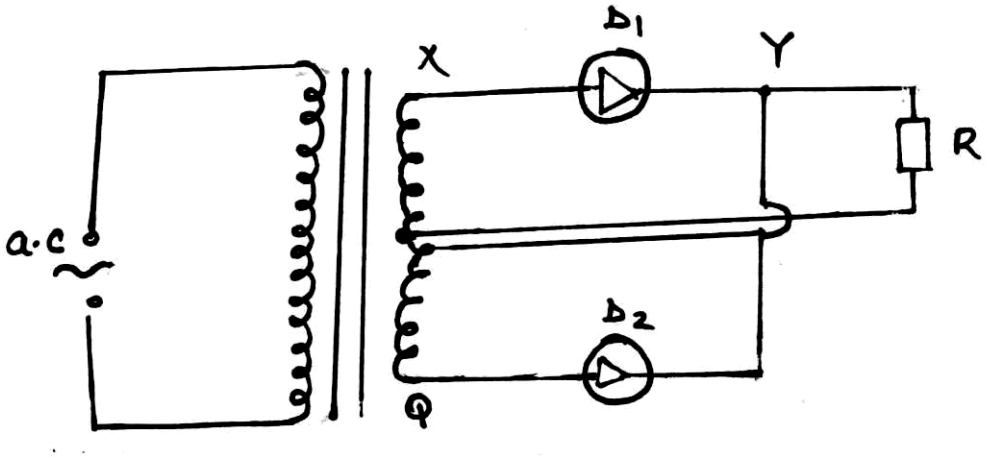


Fig. 7

(i) Briefly explain how the circuit works to produce a rectified alternating current. **(3mks)**

(ii) Draw on the diagram to show the position of the capacitor. **(1mk)**

(iii) State the functions of the capacitor in the circuit. **(1mk)**

(iv) Sketch the graph of the output as seen on a CRO screen. **(1mk)**

15. Figure 8 below shows an experimental set up in a vacuum for investigating the effect of a magnetic field on the radiation emitted by a radio-active source.

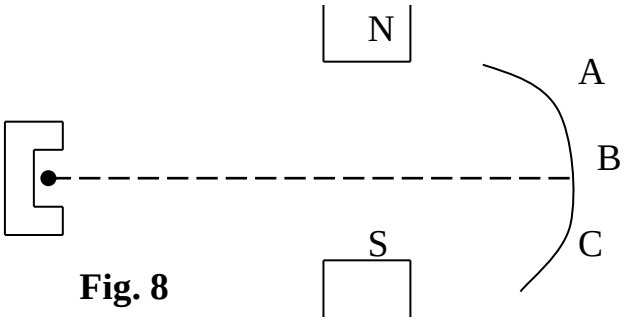


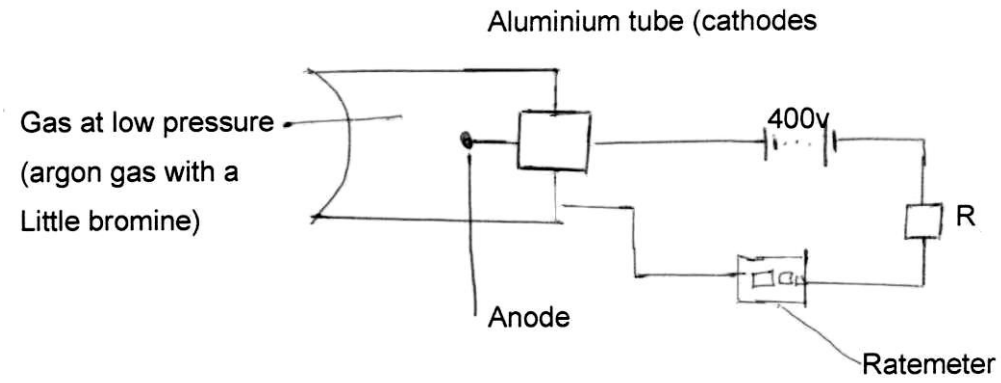
Fig. 8

The background radiation at the place is 5 counts per minute. The detectors are placed a positions A, B and C respectively. Results obtained are shown in the table below.

Positions	A	B	C
Counts / min	480	5	400

Use the table to explain which of the three types of radiations are emitted from the source. **(2mks)**

(b) **Figure 9** below shows the features of a Geiger-Muller (G.M) Tube used for detecting radiation.



(i) State the use of Argon gas and Bromine. **(1mk)**

Argon gas

Bromine

(ii) Explain how radiation from the source is detected by the tube. **(4mks)**

(iii) State **one** use of radio activity in medicine. **(1mk)**

(c) The box contains names of seven parts of electromagnetic spedrium.

Radio waves	Microwaves	Infra-red	Visible light	Ultra violet	X-rays	Gamma rays

(i) State the order in which they have been written. **(1mk)**

(ii) The parts are all transverse waves. State **one** other property which they all have in common. **(1mk)**

16. A photocell has a cathode made of caesium metal when a monochromatic radiation is shone on the cathode photoelectrons are emitted. A graph of kinetic energy against frequency is drawn as shown in figure 10.

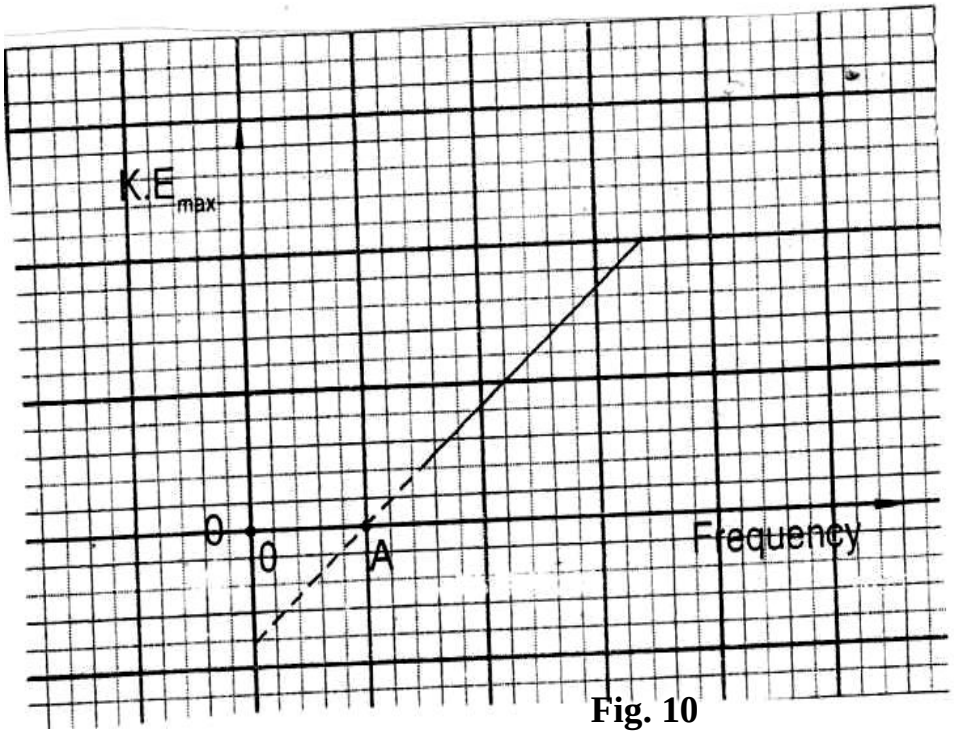


Fig. 10

(a) Use the graph to answer the questions below.

i. What is the unit of the slope? **(1mk)**

ii. What physical quantity is represented by point A? **(1mk)**

iii. Lithium metal has a higher work function than caesium. On the same axes, sketch the graph of lithium. **(1mk)**

iv. What does the term Monochromatic mean? **(1mk)**

(b) The maximum Kinetic energy of the electrons emitted from a metallic surface is 1.6×10^{-19}J when the incident radiation is 7.5×10^{14}Hz. Calculate the minimum frequency of radiation for which electrons will be emitted.
(A planck's constant = 6.6×10^{-34}Js) **(3mks)**

17. **(a)** Refraction is the bending of light as it travels from one media to another. State the cause of the bending. **(1mk)**

(b) The figure 11 below shows two adjacent solids of materials Diamond and Ruby.

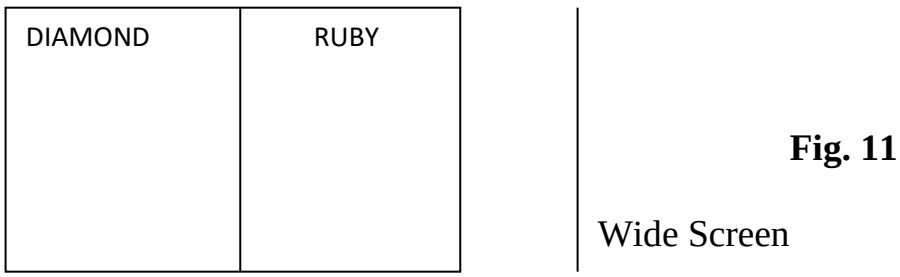


Fig. 11

The refractive index of Diamond is 2.4 and that of Ruby is 1.75.

(i) Find the refractive index of Ruby with respect to diamond. **(3mks)**

(ii) Draw an accurate ray from diamond such that no light is incident on the screen. **(3mks)**

(c) The figure 12 below shows white light incident on a rain drop.

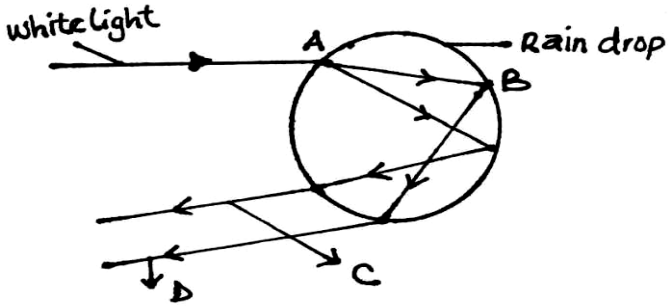


Fig. 12

(i) State what happens at A and B. **(1mk)**

(ii) State the colour of rays C and D. **(2mks)**

18.(a) The figure 13 shows shadow formation using an extended source of light.

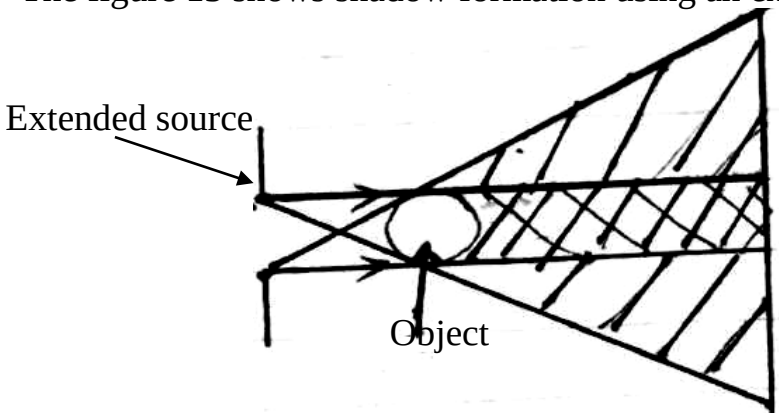


Fig. 13

State the effect on the umbra as the object is moved away from the screen when:

(i) Diameter of the hole is the same as the diameter of the object. **(1mk)**

(ii) The diameter of the object is smaller than the diameter of the hole. **(1mk)**

(iii) The diameter of the object is greater than the diameter of the hole. **(1mk)**

(b) The figure 14 shows an object infront of a plane mirror. Complete the diagram to show the location of the image,

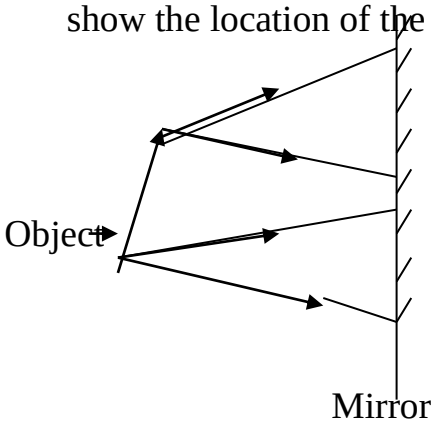
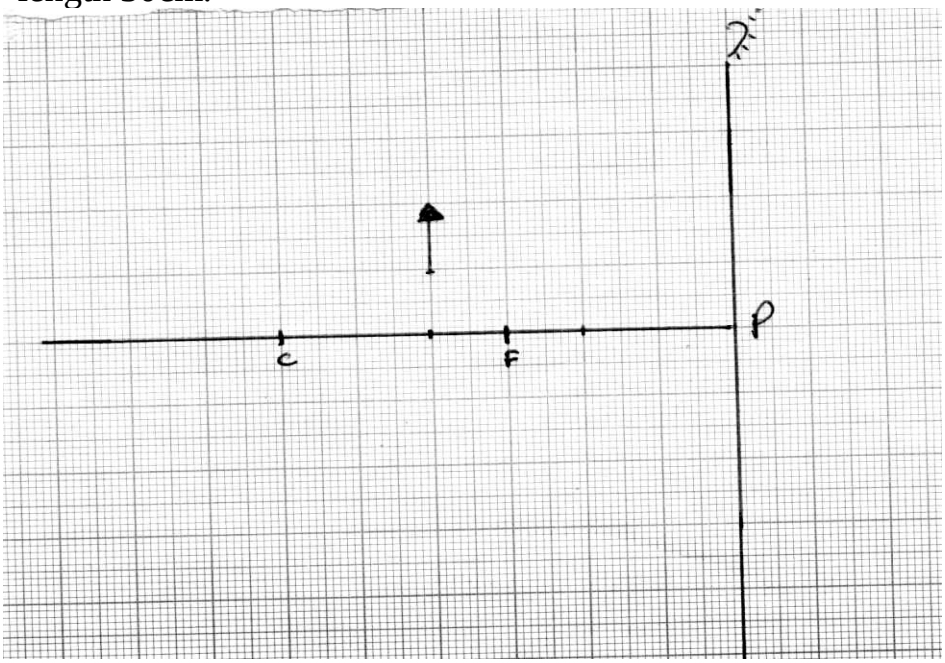


Fig. 14

(c) The graph below shows an object O placed in front of a concave mirror of focal length 30cm.



Construct ray diagrams to show the position of the object. **(3mks)**

(d) Give **<u>one</u>** feature that makes Parabolic Mirrors suitable for use as car head lights. **(1mk)**

19.(a) Appliances which draw current from a ring's main circuit have a third cable connected to the earth. Give a reason why? **(1mk)**

(b) In a lighting circuit the wires used are relatively thinner than those of a cooker circuit. Give an explanation for this. **(1mk)**

(c) A transformer with 6000 turns in the primary circuit and 300 turns in the secondary circuit has its primary circuit connected to a 400V a.c. source. A heater connected to the secondary circuit produces heat at the rate of 600W. Assuming that the transformer is 100% efficient determine:-

i. The voltage in the secondary circuit. **(3mks)**

ii. The current in the primary circuit. **(2mks)**

iii. The current in the secondary circuit. **(2mks)**

NAME……ADM NO……

SCHOOL……..CLASS……

DATE……

PHYSICS MOCKS

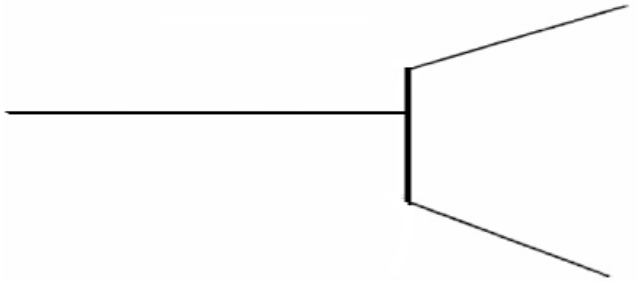
SERIES 1 TRIAL 7 PAPER 1

Kenya Certificate of Secondary Exams

TIME:2HRS

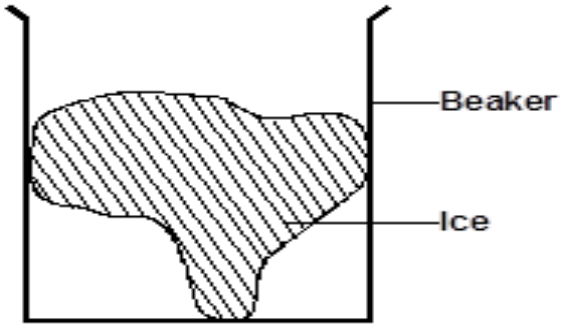
SECTION A: 25marks

1.The figure below shows part of micrometer screw gauge with 50 divisions on the thimble scale. Complete the diagram to show a reading of 5.73mm**.** **(2 marks)**



2. A bottle containing a smelling gas is opened at the front bench of a classroom. State the reason why the gas is detected throughout the room. **(1 mark)**

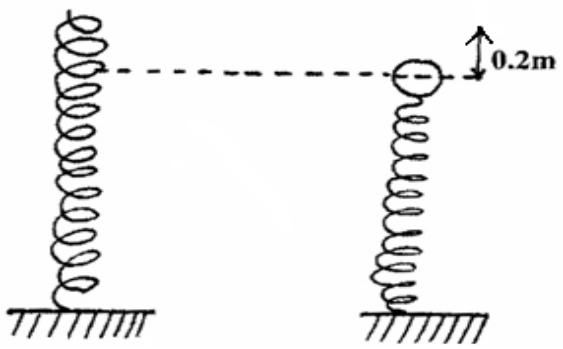
3.The figure below shows beaker containing a block of ice.



State and explain the change in stability when the ice melts**.** **(2marks)**

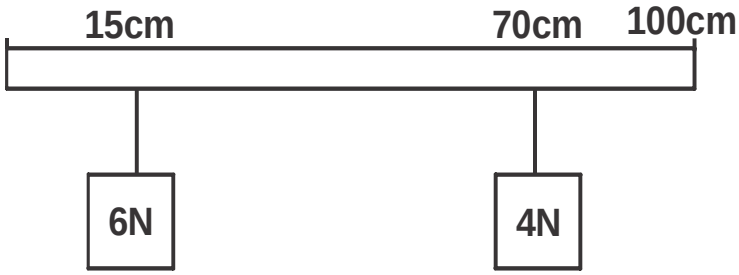
4. An aero plane is moving horizontally through still air at a uniform speed. It is observed that when the speed of the plane is increased, its height above the ground increases. State the reason for this observation. **(2 marks)**

5. A steel ball of mass 0.05kg was placed on top of a spring on a level ground. The spring was then compressed through a distance of 0.2m.



If the spring constant is 15N/m. Calculate the maximum height reached when the spring is released**.** **(3marks)**

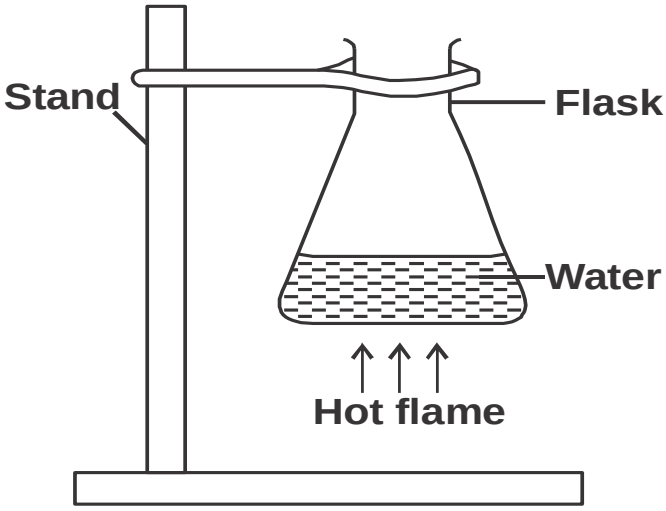
6. The figure below shows a uniform metre rule of weight 3N supporting two weights. The metre rule is pivoted somewhere such that it is horizontally balanced. (Pivot not shown)



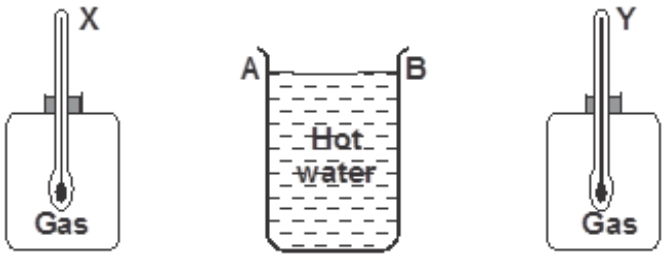
The 6N weight is at 15cm mark while the 4N weight is at 70cm mark. Determine the position of the pivot from zero cm mark**.** **(3 marks)**

7. State one environmental hazard that may occur when oil spills over a large surface area of the sea. **(1 mark)**

8. The figure shows a flat bottomed flask containing some water. It is heated directly with a very hot flame. Explain why the flask is likely to crack. **(2marks)**



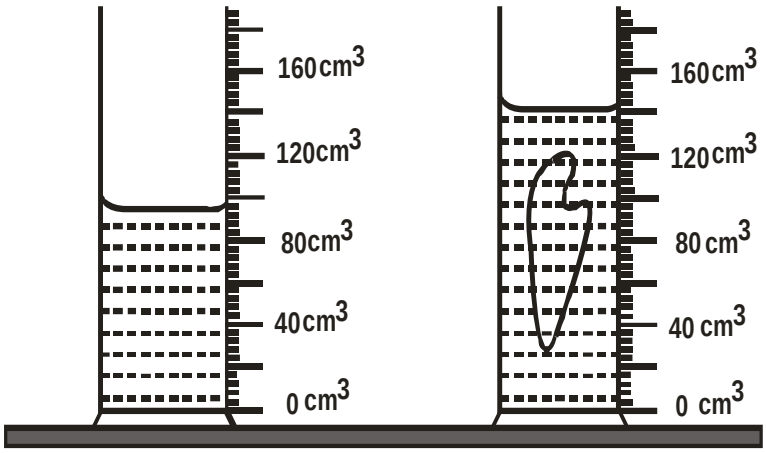
9. The figure below shows a cylindrical container having hot water at 95°C. End A is shiny while end B is dull black. At equal distances from the container is placed two identical gas jars fitted with thermometers X and Y.



Compare the readings of the two thermometers after two minutes **(1 mark)**

10. Give a reason for your answer in **question 9** above **(1 mark)**

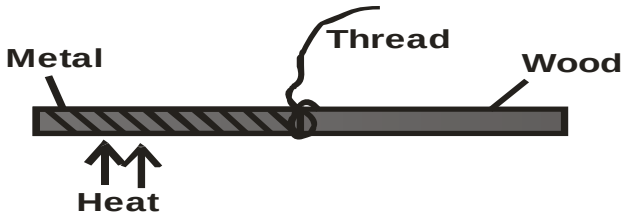
11. The figure below shows the change in volume of water in a measuring cylinder when an irregular solid is immersed in it.



Given that the mass of the solid is 268g, determine the density of the solid in SI units.

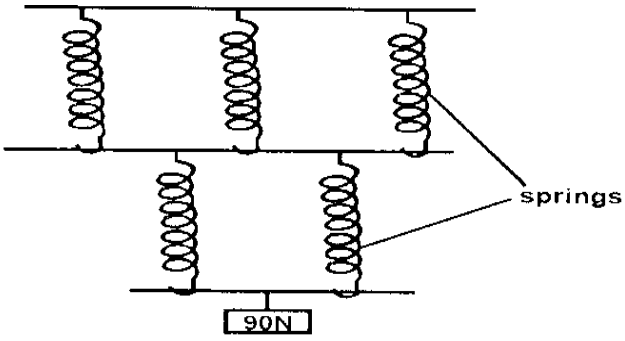
(3 marks)

12. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt **(2 marks)**

13. The spiral springs shown in the figure below are identical. Each spring has a spring constant, *k = 300N/m*

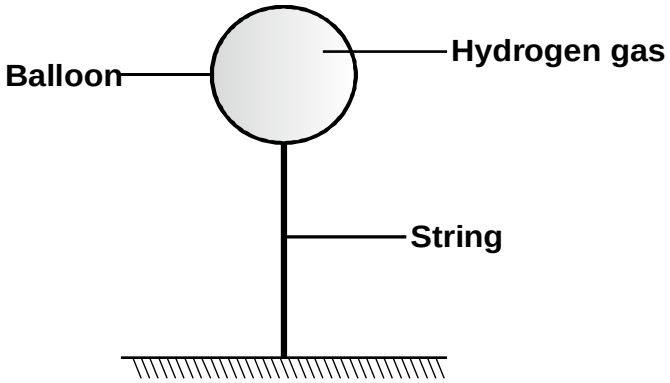


Determine the total extension of the system. (Take the weight of the cross bars to be negligible) **(2 marks)**

SECTION B: 55marks

14. (a) State the Archimedes principle. **(1 mark)**

b) A rubber envelope of a hydrogen filled balloon having volume of $2m^3$ is held in position by a vertical string as shown below.



The mass of the balloon is 1.3kg. Given that density of hydrogen is $0.1kg/m^3$ density of air is $1.3kg/m^3$. Calculate

(i) the total weight of the balloon including the hydrogen gas. **(2 marks)**

(ii) the up thrust. **(2 marks)**

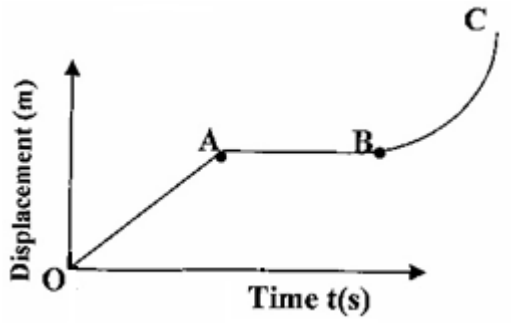
(iii) the tension in the string. **(2 marks)**

(c) A solid weighs 50N in air and 44N when complete immersed in water. Calculate

i) Relative density of the solid. **(2 marks)**

(ii) Density of the solid. **(2 marks)**

15.a) The figure below shows a displacement-time graph of the motion of a particle.



Describe the motion of the particle in the region. **(3marks)**

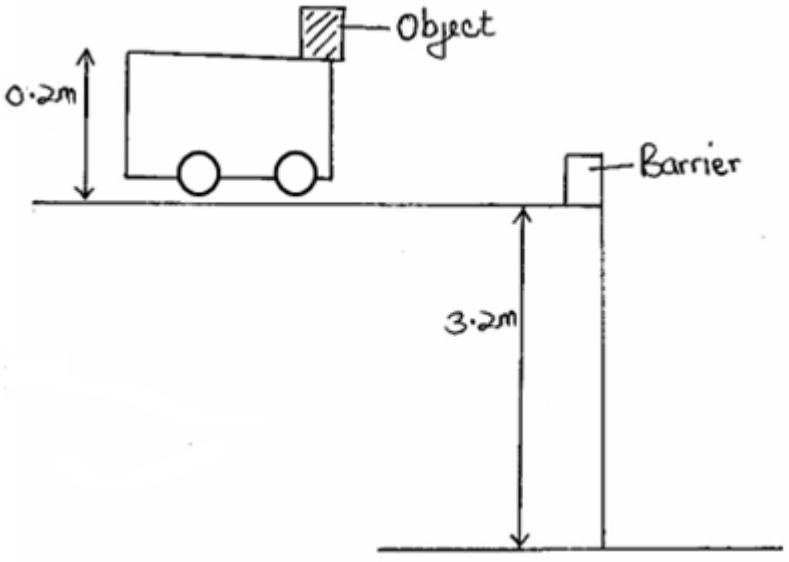
OA-

AB-

BC-

(b) State the Newton's first law of motion. **(1 mark)**

c) The figure below shows a trolley moving towards a barrier at a constant velocity of 20m/s. Use this information to answer the questions that follows.



i) Sketch the path followed by the object after the impact **(1mark)**

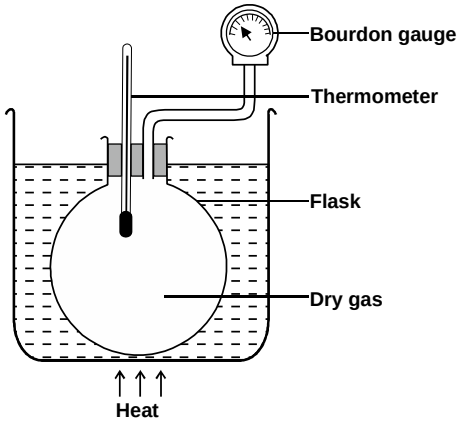
ii) Give a reason why the object on the trolley flies off on impact. **(1 mark)**

iii) Determine the time taken by the object to reach the ground. **(2 marks)**

iv) Determine the horizontal distance covered by the object from the point of impact to the point where it reached the ground**.** **(2 marks)**

16. a) What is meant by absolute zero temperature**?** **(1 mark)**

b) The set up below was used by a group of form three students to verify pressure law.

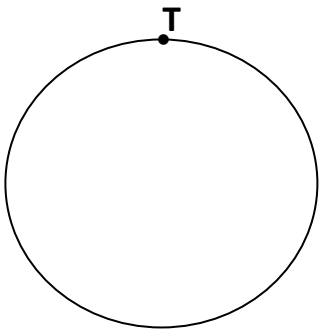


Describe briefly how the set-up can be used to verify pressure law. **(4 marks)**

c) A 4.5cm³ bubble released at the bottom of a dam measured 18cm³ at the surface of the dam. Work out the depth of the dam taking atmospheric pressure to be 10^5 Pa and the density of water as 1g/cm³. **(3marks)**

17(a) One of the factors that affect the centripetal force is the mass of the body. State another factor. **(1mark)**

(b) A mass of 400g is rotated by a string at a constant speed V in a vertical circle of radius 100cm. The tension in the string is 9.2N which is experienced at point T.

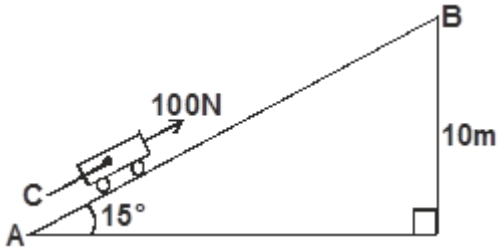


i) Determine the velocity V of the mass at point T. **(3marks)**

ii) Determine the tension in the string at the bottom of the circle. **(2marks)**

c) State two applications of circular motion **(2marks)**

18. The figure below shows an inclined plane, a trolley of mass 30kg is pulled up a slope by a force of 100N parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.



a) What is the work done on the trolley against the gravitational force in moving from A to B? **(2marks)**

b) Determine the work done by the force in moving the trolley from A to B **(2 marks)**

c) Determine the efficiency of the system**.** **(3 marks)**

d) Determine the mechanical advantage of the system. **(3 marks)**

19. a) Explain why it is advisable to use a pressure cooker for cooking at high altitudes.

(1 mark)

b) A block of metal of mass 150g at 100°C is dropped into a lagged calorimeter of heat capacity 40J/K containing 100g of water at 25°C. The temperature of the mixture is 34°C. (specific heat capacity of water = 4200J/kg/K).
Determine:

(i) Heat gained by the calorimeter. **(2marks)**

(ii) Heat gained by water. **(2marks)**

(iii) Specific heat capacity of the metal block. **(3marks)**

NAME……ADM NO……

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PHYSICS MOCKS

SERIES 1 TRIAL 7 PAPER 2

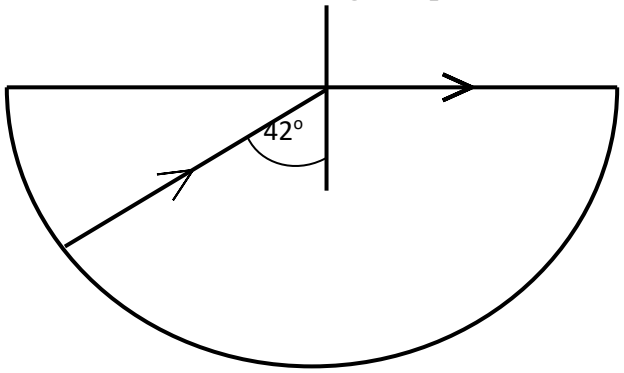
Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A

Answer ALL questions this section in the spaces provided.

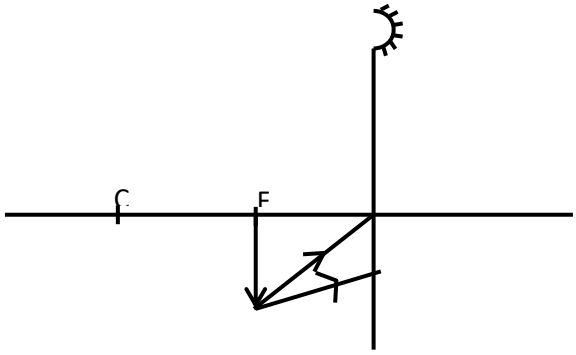
1. What property of light is suggested by the formation of shadows? **(1mark)**
2. Why are audio recording hall walls covered with soft materials. **(1mark)**
3. A highly negatively charged rod is gradually brought close to the cap of a positively charged electroscope. It is observed that the leaf collapses initially and then diverges. Explain this observation. **(3marks)**
4. The figure **below** shows a ray of light incident on a face of semicircular prism. Determine the refractive index of the glass prism. **(3marks)**



5. Explain why repulsion is the only sure test for polarity of a magnet. **(1mark)**
6. State the use of manganese (IV) oxide in a dry cell. **(1mark)**
7. A lamp of height 6cm stands infront of pin-hole camera at a distance of 24cm from the pin-hole. The camera screen is 8cm from the pinhole. Calculate the height of the image formed on the screen. **(3marks)**

8. A car accumulator is rated 40Al and is expected to supply a constant current for 120 minutes. Calculate the amount of current delivered. **(2marks)**

9. The figure **below** shows two incident rays on a concave mirror from the top of an object.
Complete the ray diagram showing the reflected rays. **(2marks)**



10. An electric bulb rated 40W is operated on240V mains. Determine the resistance of its filament. **(3marks)**

11. The force on a straight conductor carrying current in a magnetic field can be varied by changing, among others, the magnitude of the current and the magnetic field strength. Name the other factors that can be changed to vary the force. **(2marks)**

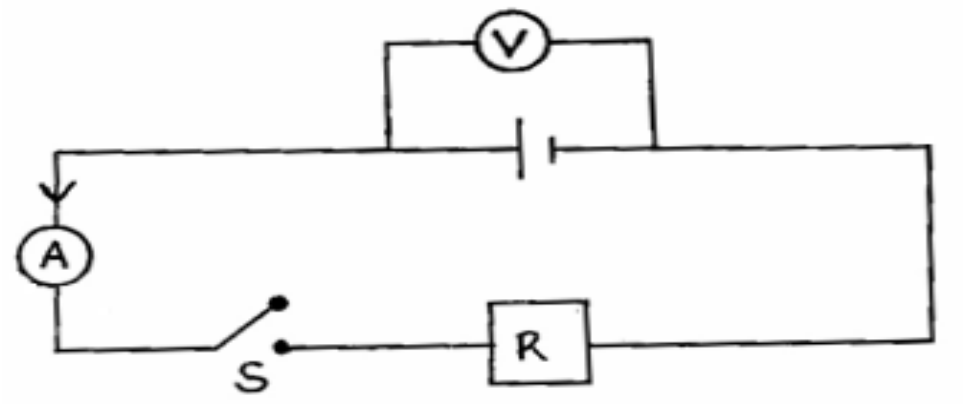
12.(i) Distinguish between transverse and longitudinal waves. **(1mark)**

(ii) Give **one** example of a transverse wave and one example of a longitudinal wave. **(2marks)**

SECTION B: (55 MARKS)

Answer ALL questions this section in the spaces provided.

13.(a) In an experiment to determine the internal resistance of a cell, the following circuit was used.



It was noted that when S is open, the voltmeter reads 1.5V and when S is closed the voltmeter reads 1.3V and ammeter reads 0.2A.

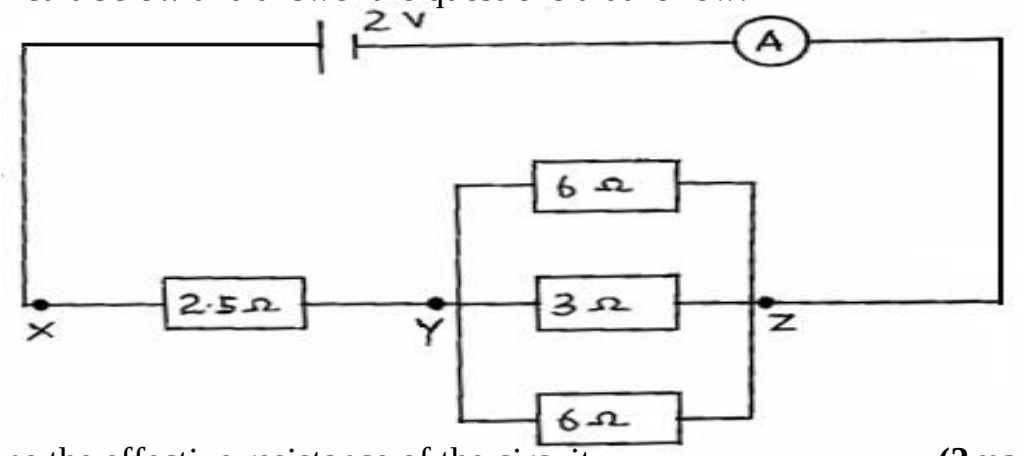
(i) What is the e.m.f of the cell. **(1mark)**

(ii) Determine the lost voltage. **(1mark)**

(iii) Find the value of **R**. **(2marks)**

(iv) Find the internal resistance of the cell. **(2marks)**

(b) Study the circuit **below** and answer the questions that follow.



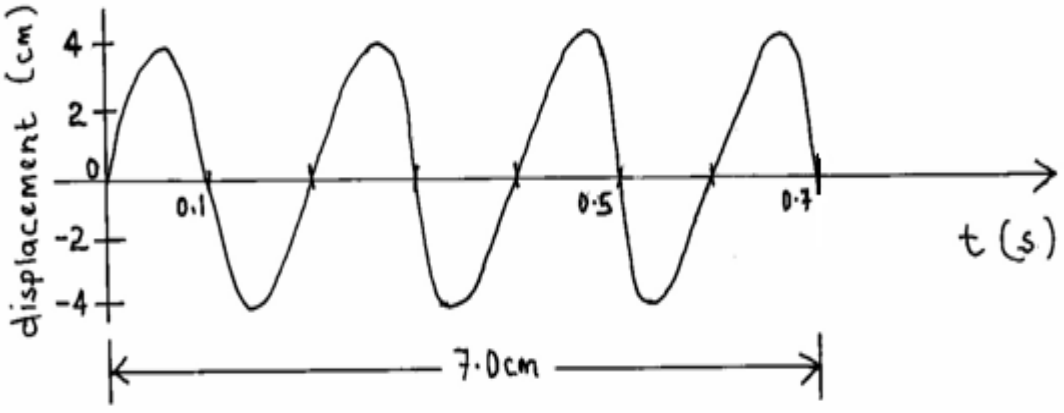
(i) Determine the effective resistance of the circuit. **(2marks)**

(ii) Find the ammeter reading. **(2marks)**

(iii) Find the p.d between X and Y. **(2marks)**

(iv) State the factors that affect the resistance of a conductor. **(3marks)**

16. The diagram **below** represents a wave motion



(i) What is the amplitude of the wave in metres. **(1mark)**

(ii) How many cycles are made. **(1mark)**

(iii) Calculate the wavelength, λ, of the wave. **(2marks)**

(iv) Calculate the frequency of the wave. **(2marks)**

(v) Calculate the velocity of the wave. **(2marks)**

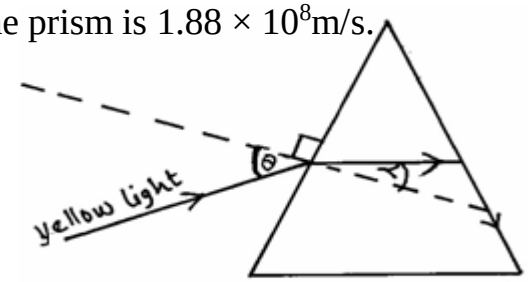
(b) **(i)** The echo sounder of a ship receives the reflected wave from a sea-bed after 0.2 seconds. What is the depth of the sea bed if the velocity of sound in water is 1450m/s. **(3marks)**

(ii) State **<u>two</u>** factors that affect the speed of sound in air. **(2marks)**

15.(a) State **<u>two</u>** conditions necessary for total internal reflection to occur. **(2marks)**

(b) Define the term critical angle as used in refraction of light. **(1mark)**

(c) The figure **below** shows the path of a ray of light through a glass prism. The speed of yellow light in the prism is 1.88×10^8m/s.



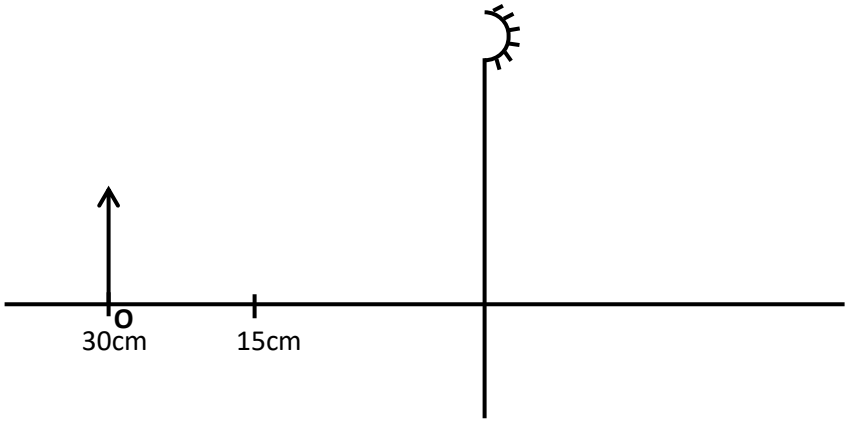
(i) Determine the refractive index of the prism material for the light (speed of light in vacuum, $c = 3.0 \times 10^8$m/s. **(3marks)**

(ii) Show on the figure, the critical angle, c, and determine its value. **(4marks)**

(iii) Given that $r = 21.2^o$, determine the angle θ. **(3marks)**

16.(a) State the advantages of using a convex mirror as a driving mirror. **(2marks)**

(b) The figure **below** shows an object **O** placed infront of a converging mirror of local length 15cm.

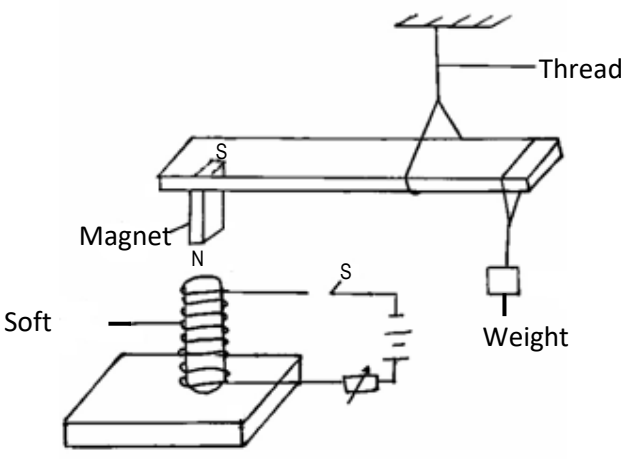


Draw on the figure a ray diagram to locate the image formed. **(3marks)**

(c) State why parabolic reflection is used in car headlights.

17.(a) State **three** factors that affect the strength of an electromagnet. **(3marks)**

(b) In the set up **below**, the suspended metre rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench:



(i) State and explain the effect on the metre rule when the switch S, is closed**.(2marks)**

(ii) What would be the effect of reversing the battery terminals? **(1mark)**

(c) The figure **below** shows two parallel current carrying conductors **A** and **B** placed close to each other. The direction of the current is into the plane of the paper.

On the same figure.

(i) Sketch the magnetic field pattern. **(1mark)**

(ii) Indicate the force F due to the current on each conductor. **(1mark)**

NAME……ADM NO……

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DATE……

PHYSICS MOCKS

SERIES 1 TRIAL 8 PAPER 1

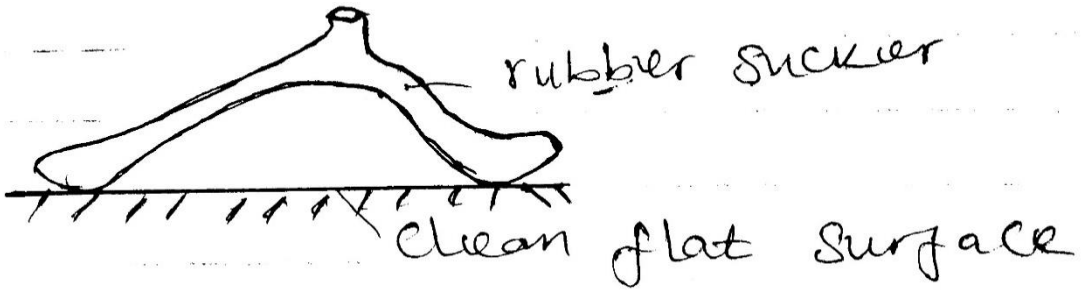
Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A (35 Marks)

(Answer all questions in this section)

1. A micrometer screw gauge has a zero error of -0.03mm. It is used to measure the diameter of a wire. If the actual diameter of the wire is 0.30mm, draw the micrometer screw gauge showing the measured diameter of the wire. **(3 marks)**
2. The figure (1) below shows a rubber sucker, explain why the sucker sticks on a clean flat Surface. **(1 mark)**



3. You are provided with a test – tube, thread and a meter ruler. Outline the steps you would use to measure the circumference and hence the diameter of the test – tube. **(4marks)**

4. A car weighs 12 000N.

i. What is the force acting on one tyre if the weight is evenly distributed amongst thetyres? **(1 mark)**

ii. If the area of contact of tyre is $80cm^2$.Calculate the pressure of the air in the tyre. **(3 marks)**

5. Why are gases easily compressible while liquids and solids are almost incompressible**?** **(1 mark)**

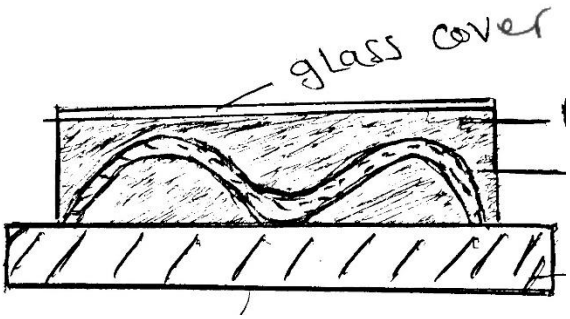
6. Name three properties of a clinical thermometer that make it suitable for measuring body temperature **(3 marks)**

7. How does the volume of a given mass of water change as;

i) The water is cooled from 10^0 C to 0^0C**?** **(1 mark)**

ii) The water is frozen to ice at 0^0C**?** **(1mark)**

8. The figure (2) below shows a section of a solar heater



Explain;

i) Why the pipeline is fixed to a dark coloured collector plate **(1 mark)**

ii) Why is pipe coloured several times **(1 mark)**

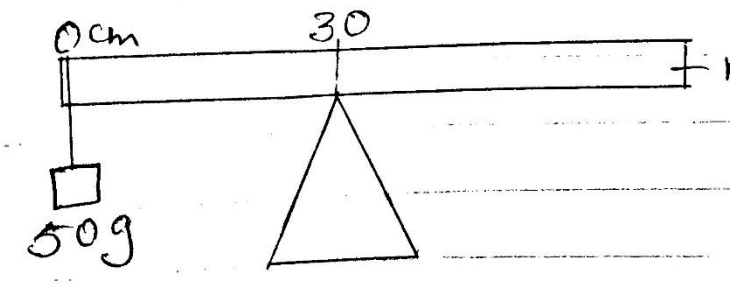
iii) Why is pipe made of copper **(1 mark)**

iv) Why is the collector plate fixed to an insulator? **(1 mark)**

v) Why the panel front covered with glass **(1 mark)**

9. **(a)** Define moments of a force **(1 mark)**

(b) The figure (3) below shows a uniform meter rule balanced at the 20 cm mark when a mass of 50g is hanging from its zero cm mark



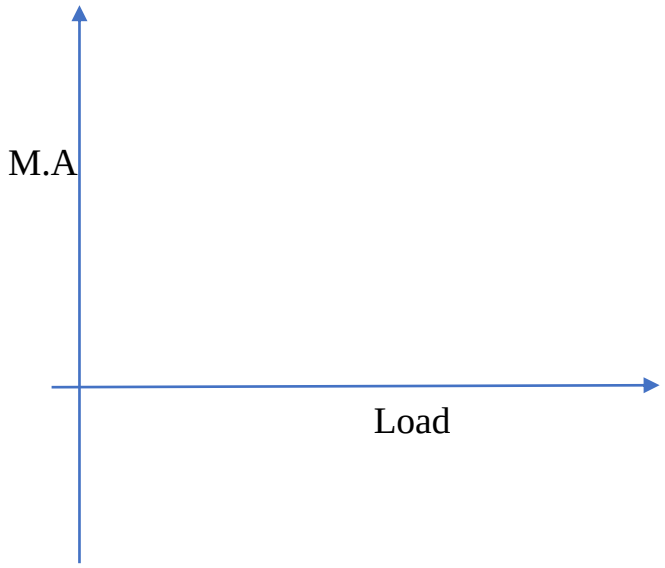
Calculate the weight of the rule **(3 marks)**

10. State two practical applications of stability **(2 marks)**

11. Explain how loose clothing may affect safety in the laboratory **(2 marks)**

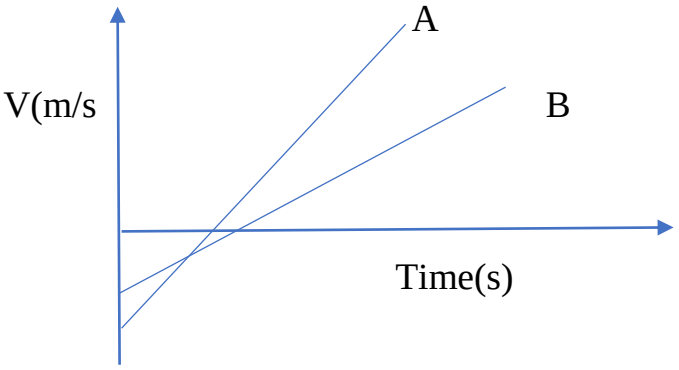
12. Water flows steadily along a horizontal pipe at a volume rate of $8.0\times10^{-3}m^3/s$. If the cross-section area of the pipe is $20cm^2$. Calculate the velocity of the fluid. **(3 marks)**

13. On the axis provided sketch a graph of mechanical advantage (MA) against load for a pulley system **(1 mk)**



SECTION B :(45 marks)
(Answer all the questions in this section)

14. The figure below shows velocity-time graphs of two objects A and B drawn on same axes



The two objects are of equal masses. The same size of force is applied against each object. State with a reason which of the two objects stops in a shorter distance. **(2 marks)**

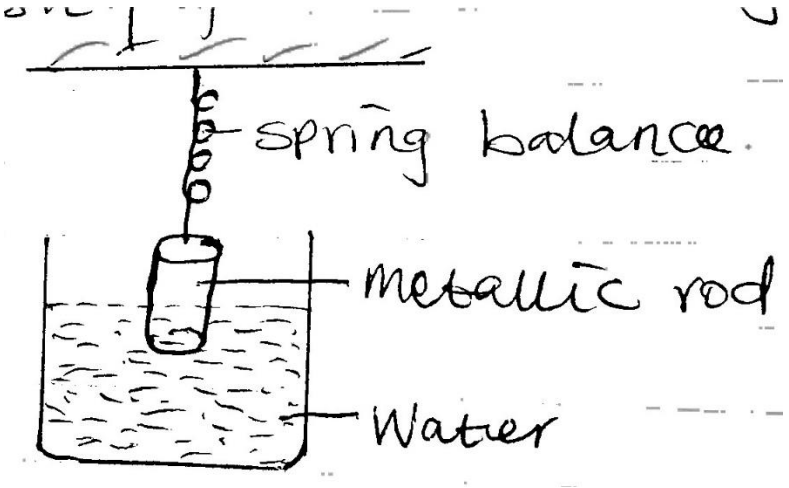
(b) An object moving at 30 m/s starts to accelerate at $5m/s^2$ so that its velocity becomes 50 m/s.

i) Find the distance moved during this acceleration **(3 marks)**

ii) The object is now braked so that it comes to rest in a time of 5 seconds. Find the braking force if its mass was 2700g. **(3 marks)**

15. (a) State the law of floatation **(1 mark)**

(b) The figure (5) below shows a metallic rod of length 10cm and uniform cross-sectional area 4cm^2 suspended from spring balance with 7.5 cm of its length immersed in water. The density of the material is 1.5g/cm^3.The density of water is 1 g/cm$^{3.}$



Determine:

i) The mass of the rod **(3 mks)**

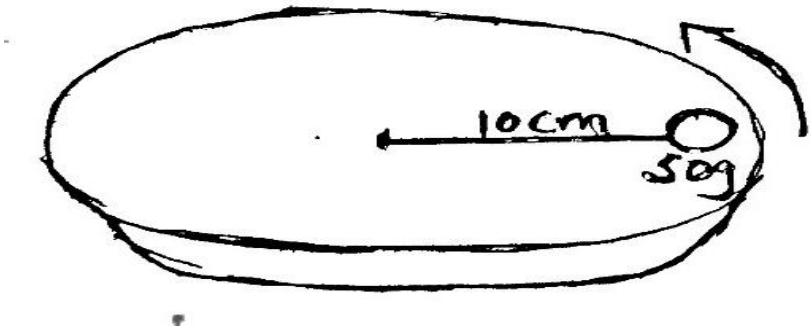
ii) The upthrust acting on the rod **(3 mks)**

iii) The reading 0f the spring balance **(2 mks)**

iv) The reading of the spring balance when the rod is wholly immersed in water **(3marks)**

16.(a) State what provides centripetal force for an electron moving round the nucleus **(1mark)**

(b) The figure (6) below shows a turntableon which a mass of 50g is placed 10cm from the centre



Frictional force between the 50g mass and the turntable is 0.4 N.When the turntable is made to rotate with angular velocity of W rad/sec, the mass starts to slide off.

i) Determine the:

I. Angular velocity W **(3 mks)**

II. Time taken to make one complete revolution **(3 mks)**

ii) On the figure, draw a path that would be taken by the 50g mass if the turntable suddenly came to stop **(3 mks)**

17.(a) An object of the mass 150kg moving at 20m/s collides with a stationary object of mass 90kg.They couple after collision .Determine the :

(i) Total momentum before collision **(2 marks)**

(ii) Total momentum after collision **(1 mark)**

(iii) Their common velocity after collision **(2 marks)**

(b) A piece of wire of length 12m is stretched through 2.5cm by a mass of 5 kg. assuming that the wire obeys the Hookes law, what force will stretch it through 4.0 cm**.** **(2marks)**

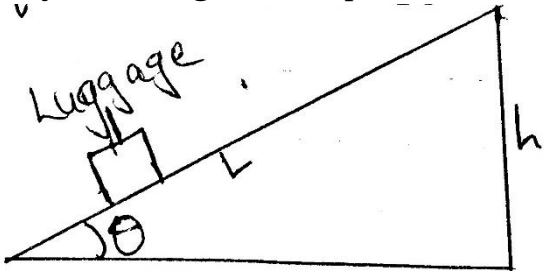
18. (a) Explain why an air bubble increase in volume as it rises from the bottom of a lake to the surface **(2 marks)**

(b) An immersion heater rated 2.5Kw is immersed into a plastic jug containing 21kg of water and switched on for four minutes .Determine:

i) The quantity of heat gained by water **(2 marks)**

ii) The temperature change for water.(specific heat capacity of water=4.2×10^{3}Jkg^{-1}k^{-1} **(3 marks)**

(c) The figure (7) below shows an inclined plane used to load heavy luggage's onto a lorry. The length of the plane is L metres and the height is h metres



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NAME……ADM NO……

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DATE……

PHYSICS MOCKS

SERIES 1 TRIAL 8 PAPER 2

Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A (25 MARKS)

ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED

1. Figure 1 below shows two plane mirrors inclined at an angle x from each other. A viewer counts a total of seven images by looking directly from the object O. Determine value of angel x. **(2mks)**

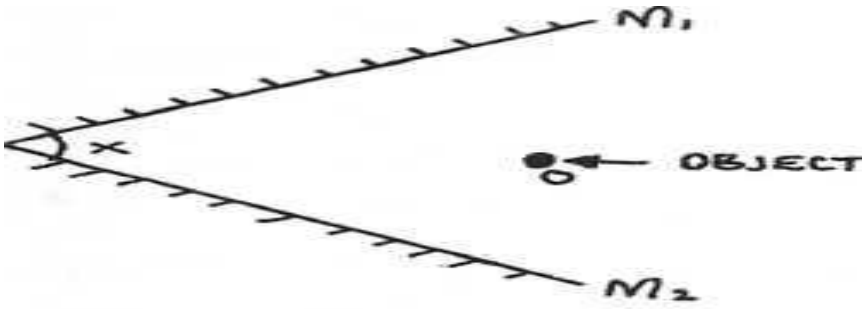
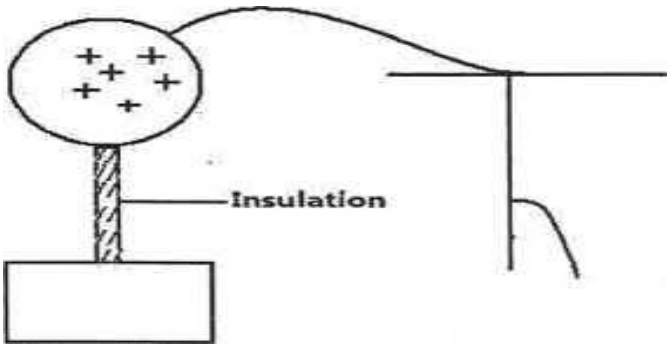
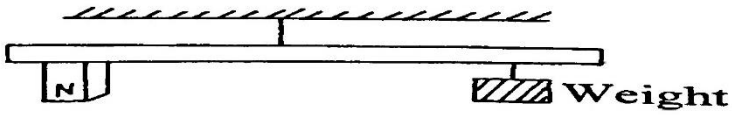


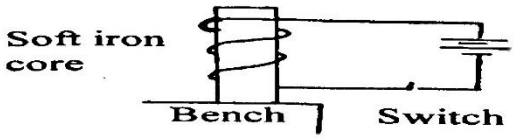
Figure 1

2. A charged metal sphere is connected to an uncharged electroscope as shown in the figure 2 below. State and explain the observations made. **(2mks)**



3. A metre rule is suspended by a thread such that it in equilibrium balanced by a permanent magnet attached to the metre rule and some weight as shown in figure 3 below.





If the soft iron is fixed to the bench, state and explain the effect on the metre rule when the switch is close. **(2mks)**

4. **a)** Explain why convex mirrors are preferred to plane mirrors as vehicle side mirrors. **(1mk)**

b) A part from images being formed behind the mirror, state any other two similarities of images formed by a plane mirror and a convex mirror. **(2mks)**

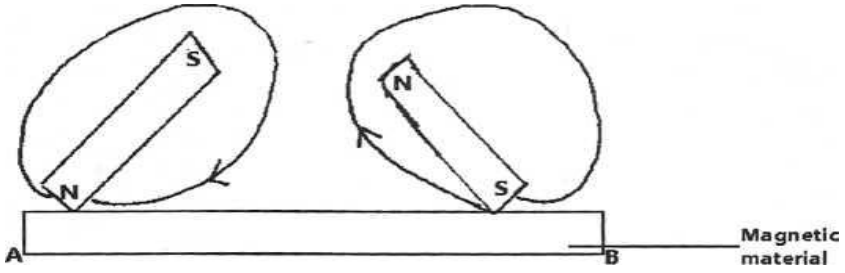
5. **i)** Differentiate between polarization and local action in a simple cell **(2mks)**

ii) State the use of manganese IV oxide in a dry cell **(1mk)**

6. Other than progressive waves travelling in opposite direction at the same speed, state any other two conditions necessary for the formation of stationary **(2mks)**

7. A gun is fired and an echo heard at the same place 0.6s later. How far is the barrier, which reflected the sound from the gun? (Speed of sound in air=330ms^{-1} **(3mks)**

8. In an attempt to make a magnet, a student used the double stroke method as figure 4 shown below. **(2mks)**



State the polarities at the ends A and B

A -

B-

9. a) The figure 5 below shows an electromagnetic relay.

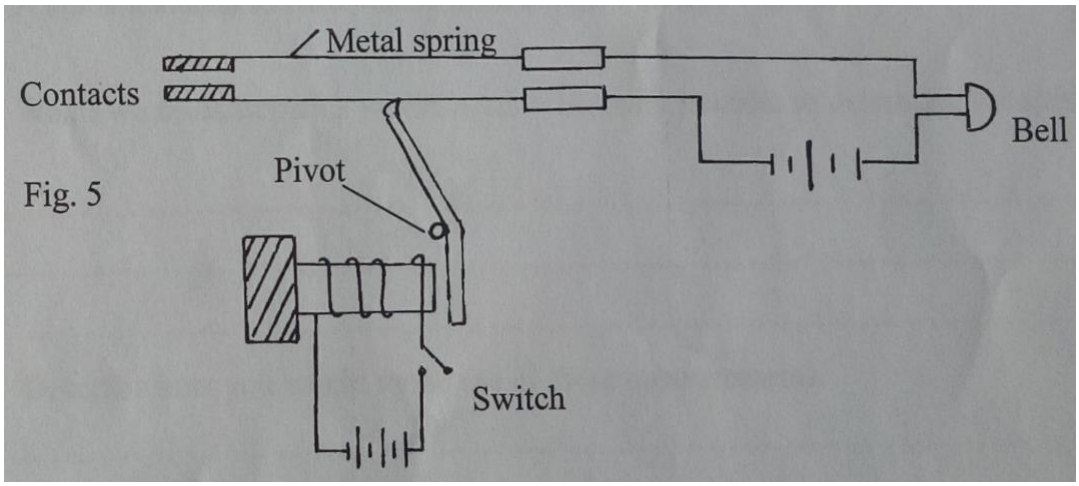


Fig. 5

Explain what happens when the switch is closed. (2mks)

10. A current of 12A flows through a circuit for 2.5 minutes. How much charge passes through the circuit. (2mks)

11. a) Define term light (1mk)

b) Other than the image being real, state any other characteristics of the images formed by pin-hole camera (1mk)

SECTION B(55MARKS)

ANSWER ALL THE QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED

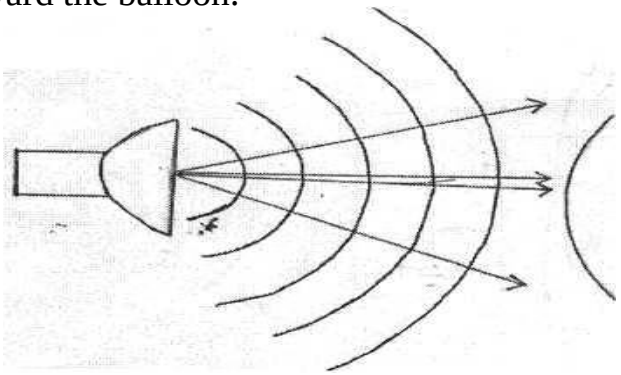
12. a) A student stands some distance from a high wall and claps his hands

i) What two measurements would need to be made in order to determine the speed of sound? (2mks)

ii) Describe how you would make use of these measurements (2mks)

iii) The speed of sound in air is 330m/s. How far from the wall would you stand? Choose an answer from the following distances 10m, 200m,500m. Give reasons why you did not choose each of the other two distances. (2mks)

b) The balloon filled with carbon dioxide can act like a lens and focus sound from a loud speaker. On to the microphone, Figure 6 show waves produced by loud speaker moving toward the balloon.



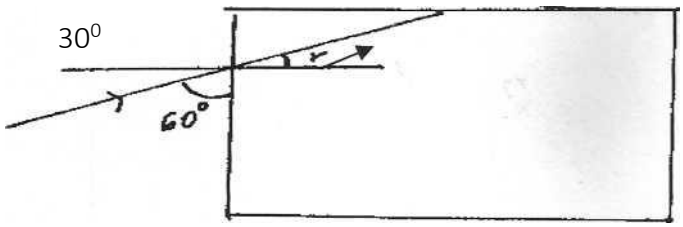
i) Complete the diagram to show what happens to the sound waves when they have passed through the balloon and moves towards the microphone**.** **(2mks)**

ii) The loud speaker is now moved toward the balloon. This results in less sound at the microphone. Explain why there is less sound at the microphone **(1mk)**

iii) The frequency of the sound emitted by the loud speaker is 1020Hz. Calculate the wavelength of the sound wave in air where its velocity is 340m/s **(2mks)**

13.a) Define critical angel **(1mk)**

b) Figure 7 below shows a ray of light incident on the face of a cube made of glass reflactive index 1.50



Calculate

i) The angle r: **(2mks)**

ii) The critical angle for the glass air interface **(2mks)**

c) The figure 8 below shows a ray of light incident on a glass prism. Given that the critical angle for the grass is 39º, sketch on the diagram the path of the ray through the prism**.** **(2mks)**

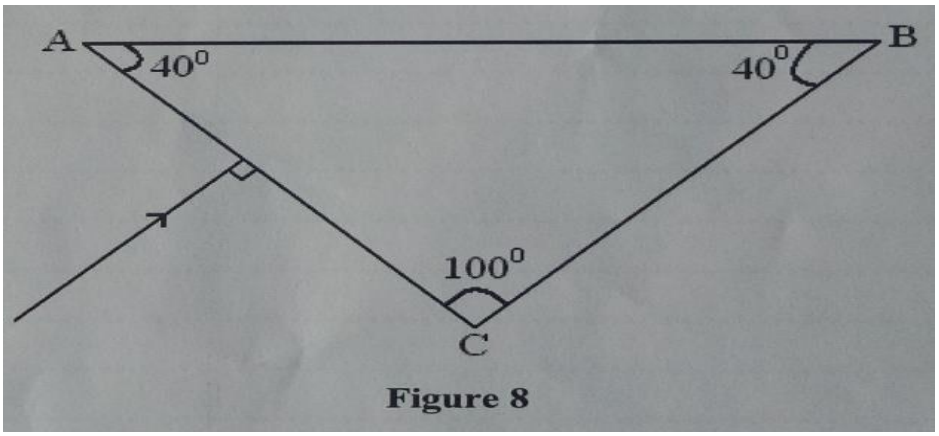


Figure 8

14.a)i) Definecapacitance of a capacitor and state its S.I unit **(2mks)**

ii) State any two factors that affect the capacitance of a capacitor

iii) The figure 9 below shows three capacitors connected between two points A and B. **(3mks)**

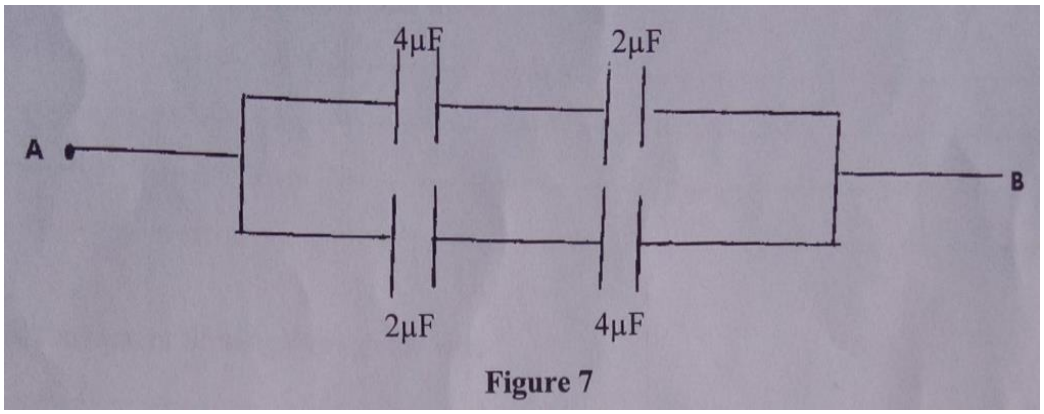


Figure 7

iv) Sketch a simple diagram that contains a capacitor, a two way switch, and a load resistor that can be used for charging and discharging a capacitor. **(3mks)**

15.a) State Ohm's law **(1mk)**

b) A wire was connected to a battery and was found that the energy converted to heat was 30J when 20C of charge flowed through the wire in 5 seconds. Calculate;

i) The p.d between the ends of the wire **(2mks)**

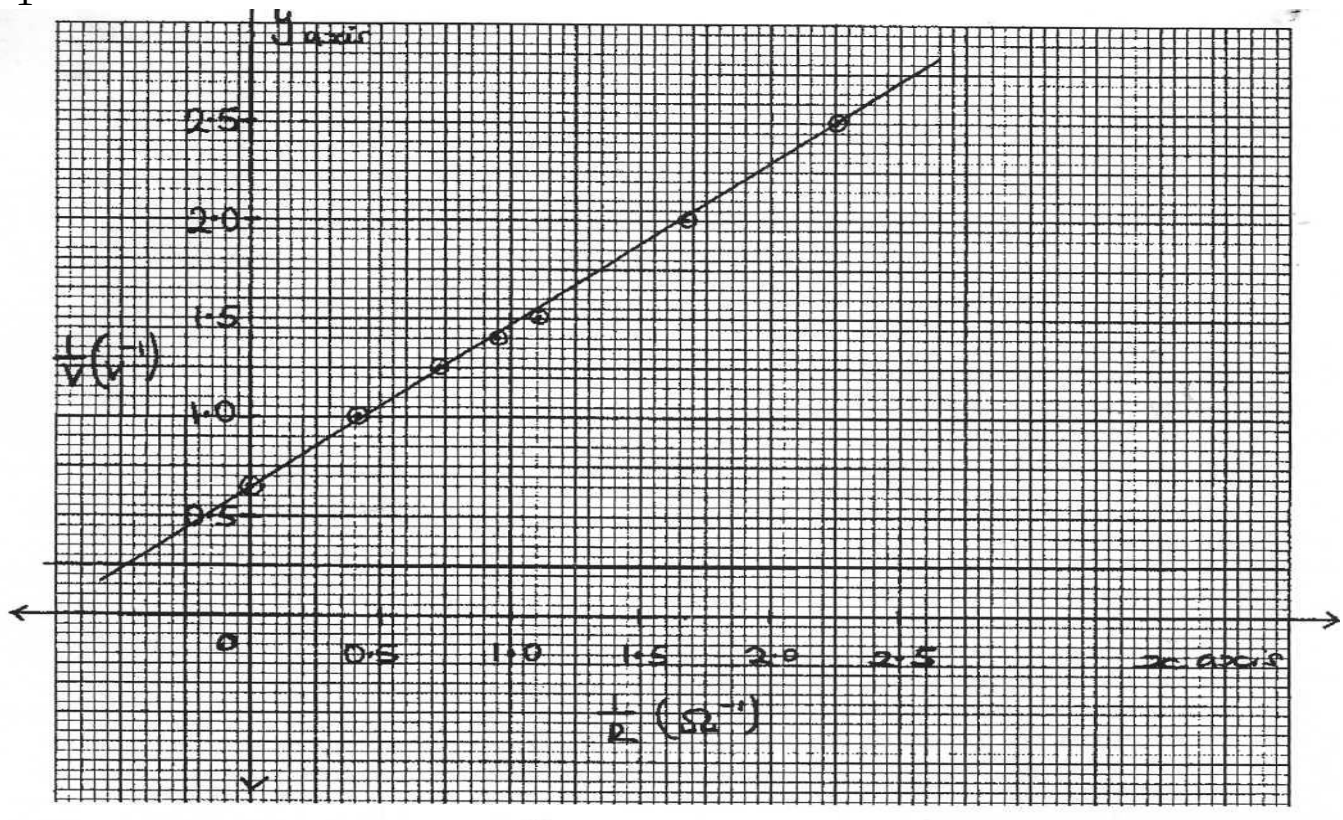
ii) The current flowing through the wire **(1mk)**

iii) The resistance of the wire **(2mks)**

iv) The average power development in the wire **(2mks)**

c) The graph below shows results obtained in an experiment the emf (E) and the internal resistance, r, of a cell. Given that the equation of the graph is $E = r + 1$

1



Use the graph to determine the values of:-

Given that the equation of the graph is $\frac{E}{V} = \frac{r}{R} + 1$

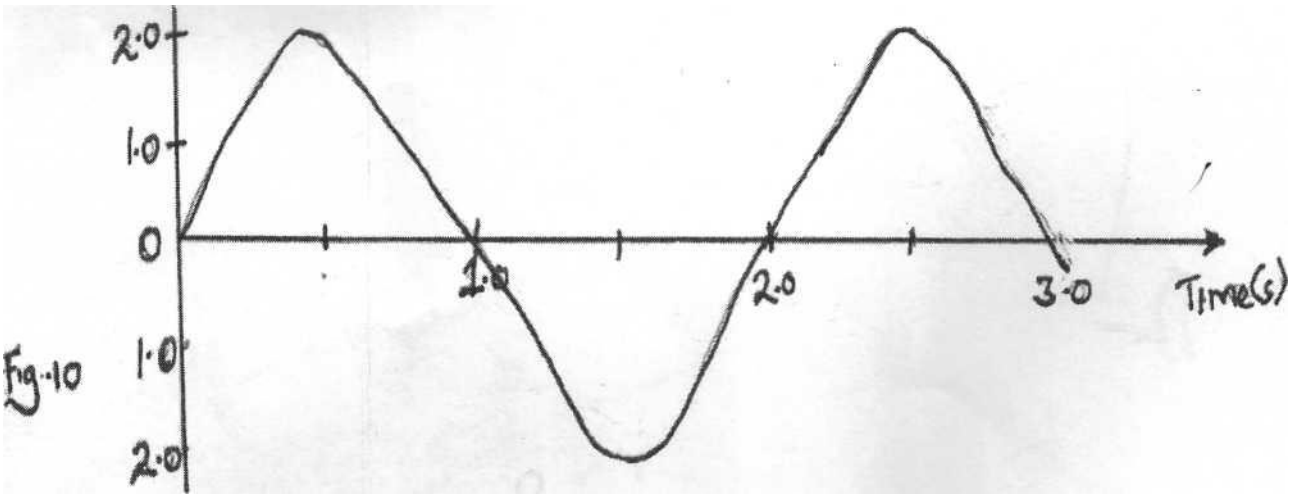
Use the graph to determine the values of:=

(i) E (2mks)

(ii)R

16.a) Distinguish between stationery waves and progressive waves. In terms of their propagation (2mks)

b)The figure 10 represents an oscillation taking place at a particular point while a wave in a gas passes the point. The vertical axis is labeled displacement.



Fig·10

i) Explain what is meant by displacement in this context. **(1mk)**

ii) From the figure determine

I) The period **(1mk)**

II) The frequency **(1mk)**

c) Calculate the wavelength of the sound wave in the figure. Take the velocity of sound in the gas to be 340m/s **(3mks)**

d) State two factors that can increase the speed of sound in solids **(2mks)**

NAME……ADM NO……

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PHYSICS MOCKS

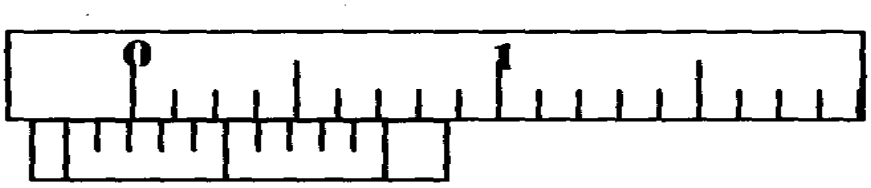
SERIES 1 TRIAL 9 PAPER 1

Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A 25 MARKS
ANSWER ALL QUESTIONS IN THIS SECTION

1. The figure below shows part of a vernier callipers when the jaws are closed without an object in between the jaws.

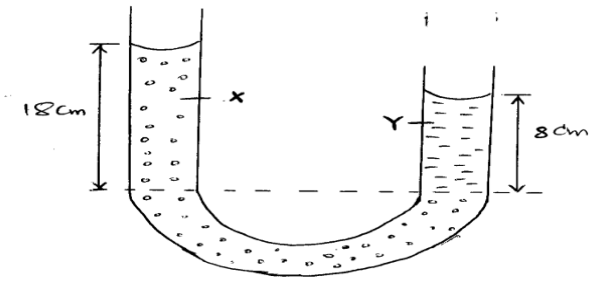


a. State the zero error of the vernier callipers. **(1mk)**

b. A student used the same vernier calipers to measure the diameter of a test tube of actual diameter 2.15cm. What was the reading shown by the vernier calipers **(2mks)**

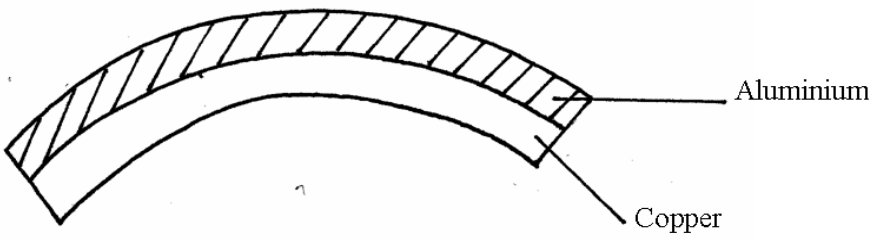
2. State two differences between boiling and evaporation. **(2mks)**

3. The figure below shows a u-tube containing the liquids X and Y. Given that the density of liquid X is 1.8g/cm^3, calculate the density of liquid Y in g/cm^3**.(3mks)**



4. When the temperature of a gas in a closed container is raised, the pressure of the gas increases. Explain how the molecules of the gas cause the increase in pressure. **(2mks)**
5. State one factor that affects the turning effect of a force on a body**.** **(1mk)**
6. Draw a diagram showing the bimetallic strip after it is cooled below room temperature. **(2mks)**

Figure 3



7. In a vacuum flask, the walls enclosing the vacuum are silvered on the inside. State the reason for this. **(1mrk)**
8. A fixed mass of gas occupying 4 litres at 27^0c is compressed at constant temperature until the pressure is doubled. It is then cooled at constant pressure until the volume is 1litre.What is the final temperature of the gas? **(3mks)**
9. Figure 4 below represents a part of a tape pulled through a ticker-timer of frequency 50Hz, calculate the acceleration of the trolley **(3mks)**

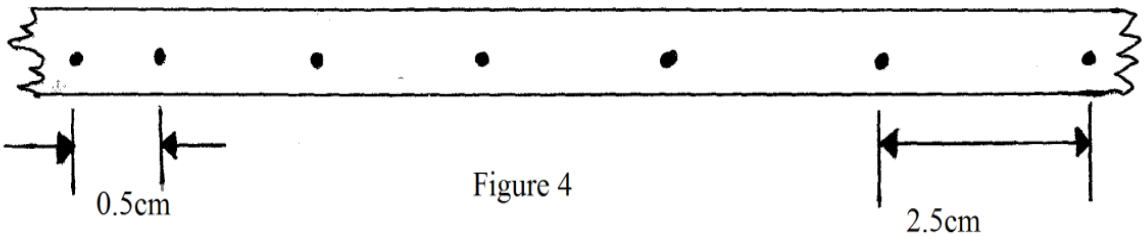


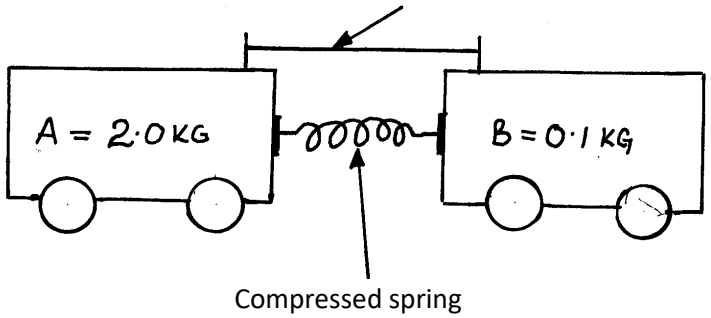
Figure 4

10. Jupiter's gravitational field strength is 26N/kg what would be the weight of an object that weighs 30N on earth on Jupiter. (Take g=10N/Kg on earth) **(3mks)**
11. Distinguish between speed and velocity. **(1mk)**
12. When mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain**.** **(1mk)**

SECTION B (55MARKS)
ANSWER ALL QUESTIONS IN THIS SECTION

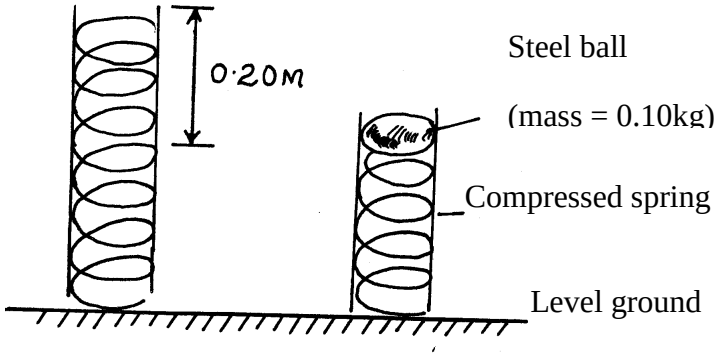
13.a) State the law of conservation of linear momentum**.** **(1mrk)**

b) The diagram below shows two stationary trolleys A and B separated by a compressed spring and held together by inextensible thread. The mass of trolley A is 2.0kg and the mass of trolley B is 0.1kg. When the thread is cut, the trolleys move rapidly apart.



If trolley A moves off with a speed of $0.25ms^{-1}$. Calculate the speed with which trolley B moves off. **(4mks)**

c) A steel ball of mass 0.10kg was placed on top of a level ground. The spring was then compressed by 0.20m with an average force of 10N.



Calculate the maximum height the ball attains (Take $g=10Nkg^{-1}$) **(4mks)**

14.a) State the Archimedes principle. **(1mk)**

b) A block of wood measuring 0.8m by 0.5m by 2m floats in water. 1.2m of the block is submerged.

i. Determine the weight of the water displaced**.** **(2mks)**

ii Find the force required to just make the block fully submerged. **(3mks)**

c) A block of glass of mass 250g floats in mercury. What volume of the glass lies under the surface of mercury? **(3mks)**

d) A piece of sealing wax, weighs 3N in air and 0.22N when immersed in water, calculate the density of the wax**.** **(3mks)**

e) A balloon weighs 10N and has a gas capacity of $2m^3$. The gas in the balloon has a density of $0.1kg/m^3$. If density of air is $1.3kgm^{-3}$, calculate the resultant force of the balloon when it is floating in air**.** **(3mks)**

15.a) Explain why water is a good coolant liquid in a car's engine cooling system. **(2mks)**

(b) Water of mass 5kg initially at 18^0C is heated in an electric kettle rated 2.5kw. The water is heated until it boils at 98^0C. Taking specific heat capacity of water to be 4200Jkg^{-1} K^{-1}, heat capacity of kettle = 438J/kg, specific latent heat of vaporization of water = 2.28MJ/kg .Calculate;

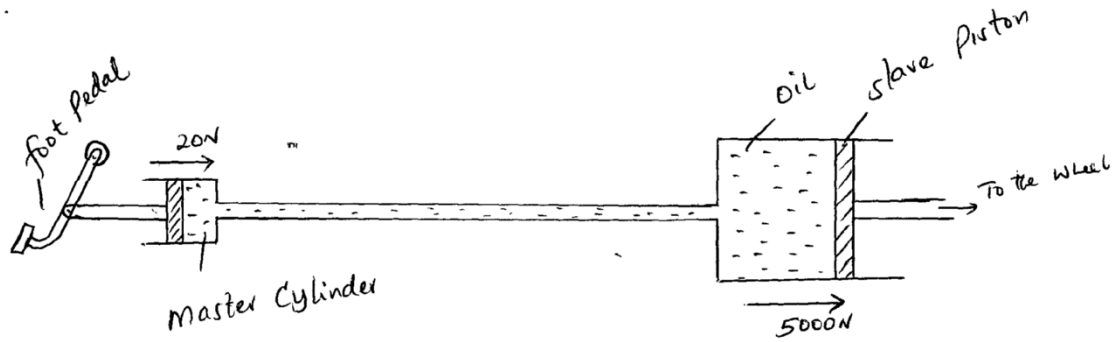
(i) The heat absorbed by the water. **(2mks)**

(**ii)**Heat absorbed by the electric kettle. **(2mks)**

(iii) The time taken for the water to boil. **(2mks)**

(iv) How much longer it will take to boil away all the water into vapour. **(2mks)**

16. The figure below shows a hydraulic brake system.



A force of 20 N is applied on the foot pedal connected to a piston of area 0.05m^2. This causes a stopping force of 5000N on one wheel. Calculate.

a) Pressure in the master cylinder **(3mks)**

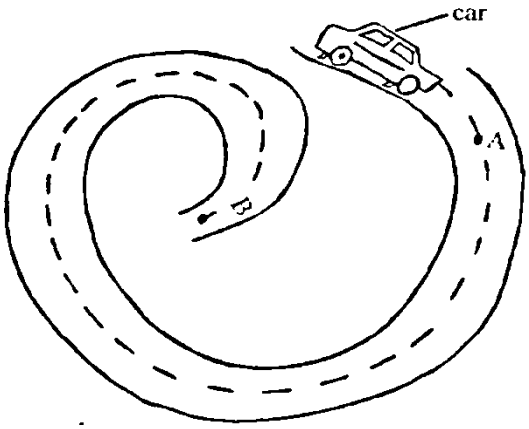
b) Area of the slave piston. **(3mks)**

c) Velocity ratio of the system. **(3mks)**

d) Give two reasons why oil is used in the hydraulic brake system. **(2mks)**

17. a) Define the term radian. **(1mk)**

b) The figure below shows a car of mass (m) moving along a curved part of the road with a constant acceleration.



i. Explain why the car is more likely to skid at B than at A. **(1mk)**

ii. If the radius of the path at B is 250m and the car has a mass of 6000kg, determine the maximum speed the car can be driven while at B without skidding. The coefficient of friction between the roadand the tyre is 0.3. **(3mks)**

c) A string of length 70cm is used to whirl a stone of mass 0.5kg in a circle of vertical plane at 5 rev/s. Determine:

i. The period. **(2mks)**

ii. The angular velocity **(3mks)**

NAME……ADM NO……

SCHOOL……..CLASS……

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PHYSICS MOCKS

SERIES 1 TRIAL 9 PAPER 2

Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A: (25 MARKS)
ANSWER ALL QUESTIONS IN THIS PAPER.

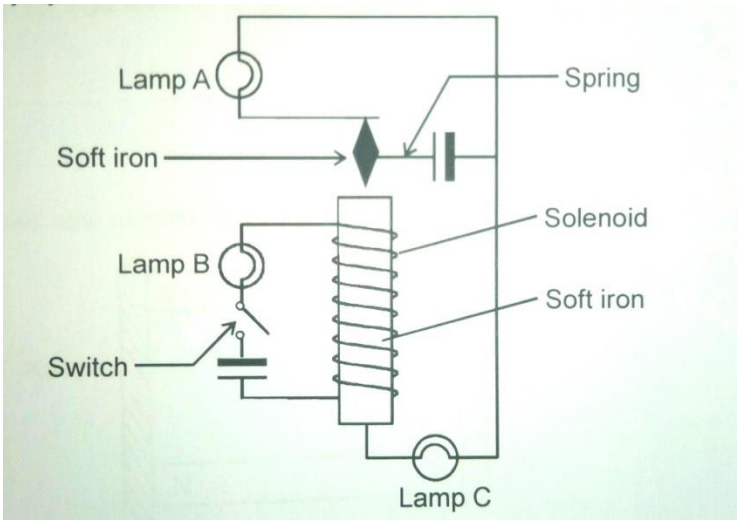
1. State what happens to the depletion layer when:
- **(a)** A diode is forward biased. **(1 mk)**
- **(b)** A diode is reverse biased. **(1 mk)**

2. Explain why a plain sheet of paper and a plane mirror both reflect light yet only the plane mirror forms images while a paper cannot form images. **(2 mks)**

3. Explain how x-rays are produced. **(1 mk)**

4. State one similarity and one difference between cathode rays and x-rays**.(2 mks)**

5. The figure below shows an arrangement for lighting three lamps; A, B and C only one which is controlled directly by the switch.



- **(a)** Which of the lamps is directly controlled by the switch? **(1 mk)**

(b) What is the name given to this use of an electromagnet? **(1 mk)**

(c) Which lamps can be on at once? **(1 mk)**

(d) Explain how lamp C comes in. **(1 mk)**

6. Figure 2 below shows an object P placed inside a soft iron ring and a strong bar magnet. Use the information to answer questions 6 and 7.

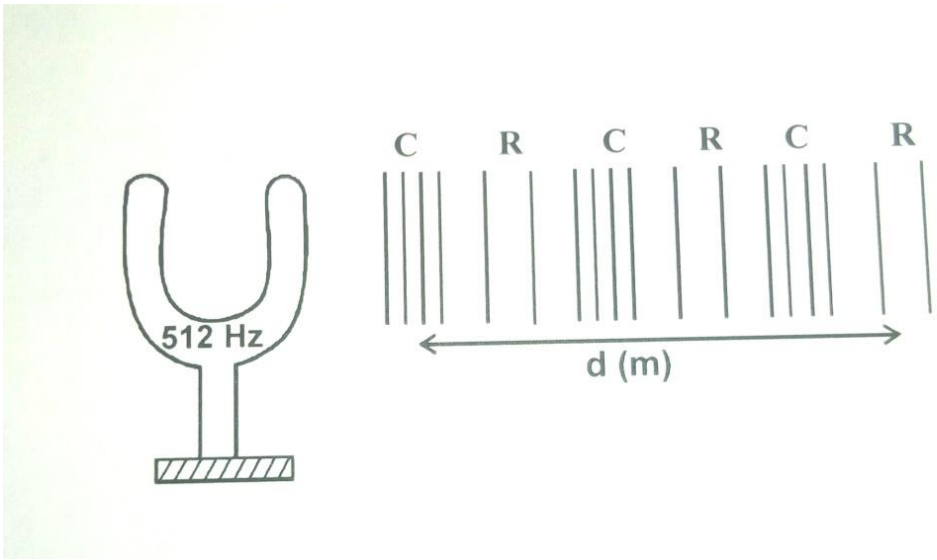
Name the process shown in the diagram. **(1 mk)**

7. Indicate on the diagram, the magnetic field pattern. **(1 mk)**

8. A concave mirror produces a real image 2cm tall of an object 5.0mm tall placed 10cm from the mirror. Find the focal length of the mirror. **(2 mks)**

9. The velocity of light in glass is 2.0×10^8m/s. Calculate the angle of refraction in the glass for a ray of light passing from air to glass at an angle of incidence of 40^o**.(3 mks)**

10. The figure below shows a tuning fork producing waves. The wave fronts are as in the diagram.



If the speed of sound in air is 330m/s, determine the value of d. **(3 mks)**

11. A convex lens forms an image four times the size of the object on a screen. If the distance between the object and the screen is 10cm, determine;

(i) The image distance. **(2 mks)**

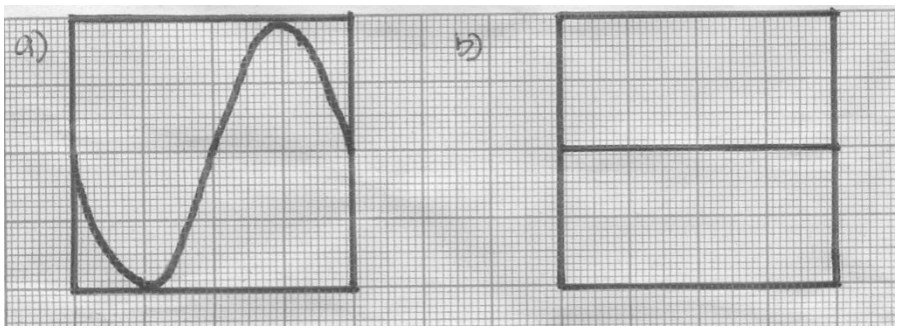
(ii) Focal length of the lens. **(2 mks)**

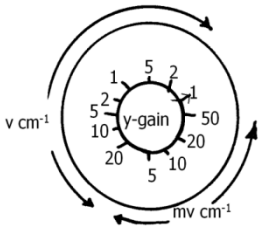
SECTION B: (55 MARKS)
ANSWER ALL THE QUESTIONS FROM THIS SECTION.

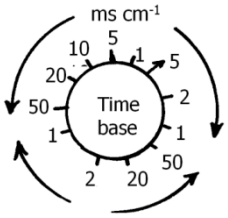
12. (a) A TV tube uses a voltage of 4550V to accelerate electrons released from its cathode by thermionic emission.

(i) What is meant by thermionic emission? **(1 mk)**

(ii) Figure (a) and (b) shows the screen, Y-gain and time base controls from a typical oscilloscope displaying a wave form.







(i) From the display waveform, state the period the trace. **(1 mk)**

(ii) Calculate the frequency of the waveform. **(2 mks)**

(c) Ultraviolet radiation incident on a zinc plate releases electrons from the zinc surface. The energy of each incident proton is 5.4eV. Zinc has a work function of 4.3eV.

(i) State the name given to this effect. **(1 mk)**

(ii) What is meant by work function of the metal? **(1 mk)**

(d) An electron is emitted from the surface of zinc.

(i) Calculate the maximum kinetic energy of the electron in Joules. **(2 mks)**

(ii) Calculate the maximum speed of the electron. ($M_e = 9.11 \times 10^{-31}$ kg) **(2 mks)**

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

(b) The primary coil of a transformer has 1200 turns and the secondary coil has 60 turns. The transformer is connected to a 240V a.c source.

Determine:

(i) The output voltage. **(2 mks)**

(ii) The output current when the primary coil has a current of 0.5A (Assume there is no energy losses). **(3 mks)**

(iii) One of the primary ways in which power is lost in transformers is through eddy currents. State how eddy currents can be minimized. **(1 mk)**

(c) Consider the table below for electromagnetic waves.

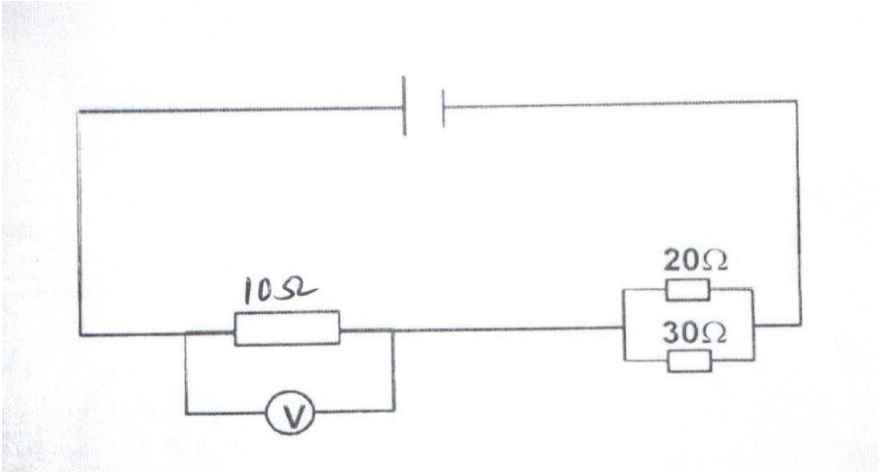
Radiation	Production	Detection	Application
Radiowaves	A	Aerials	B
D	Thermal vibration of atoms of hot bodies.	C	Imaging/medical diagnosis

(i) Fill in the spaces labeled. **(4 mks)**

A -
B -
C -
D -

(ii) State one similarity between ultraviolet rays and gamma rays in terms of their dangers. **(1 mk)**

14. (a) The cell in the figure below has an e.m.f of 2.1V and negligible internal resistance.



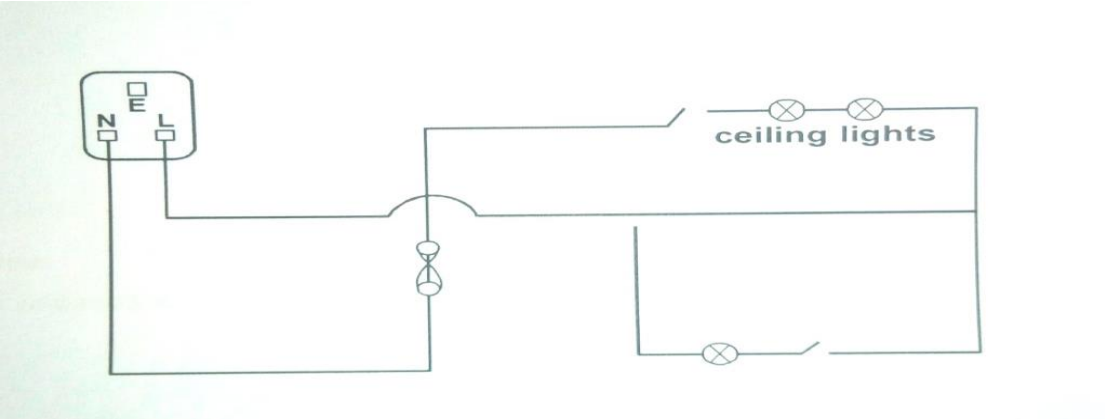
Determine:

(i) The total resistance in the circuit. **(2 mks)**

(ii) Current in the circuit. **(1 mk)**

(iii) The reading of the voltmeter. **(2 mks)**

(b) (i) The circuit below shows a lighting circuit for a house.



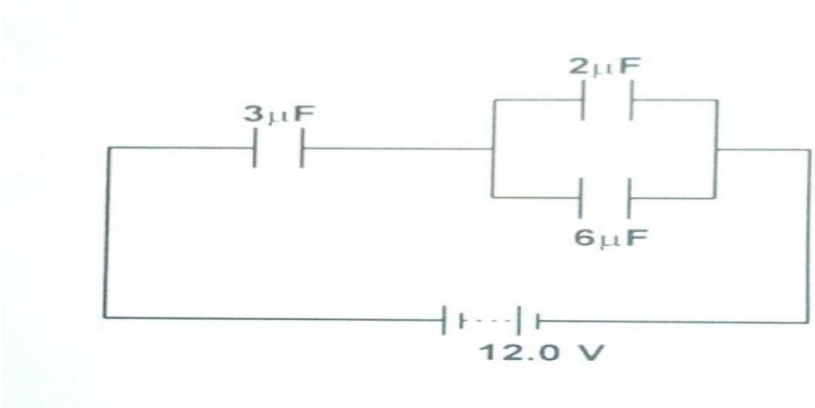
Mention any two mistakes in the wiring circuit. **(2 mks)**

(c) A house has four lamps rated (60W, 240V), a cooker rated (5Kw, 240V and an iron box rated (1Kw, 240V). All are used for 3.5 hours a day. Calculate the monthly cost for electricity for the owner at the rate of 13.5 cents/KWhr. **(3 mks)**

(d) An electric heater is rated 1KW, 240V. If the element is connected to 240V mains supply for 10 minutes, determine the amount of heat dissipated.(2 mks)

15. (a) Describe the steps followed to charge an uncharged gold leaf electroscope positively given a negatively charged polythene rod. **(3 mks**

(b) The figure below shows three capacitors of capacitance $3\mu F, 2\mu F, and\ 6\mu F$ connected to a 12.0V supply.



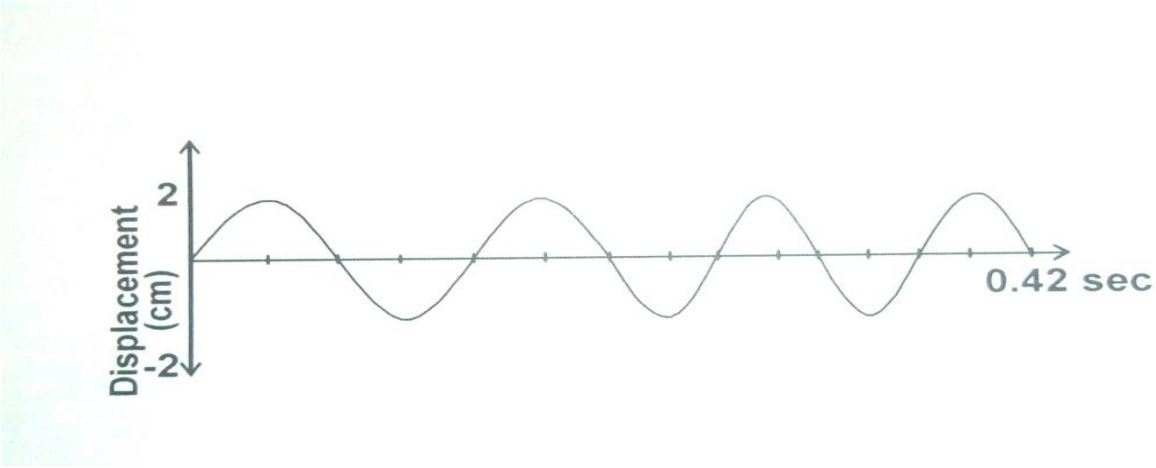
Calculate:

(i) The total capacitance of the circuit. **(2 mks)**

(ii) The charge through the $2.0\mu F\ capacitor.$ **(3 mks)**

(c) Give two factors that increase the capacitance of a parallel plate capacitor. **(2 mks)**

16. (a) The figure below shows a transverse wave.



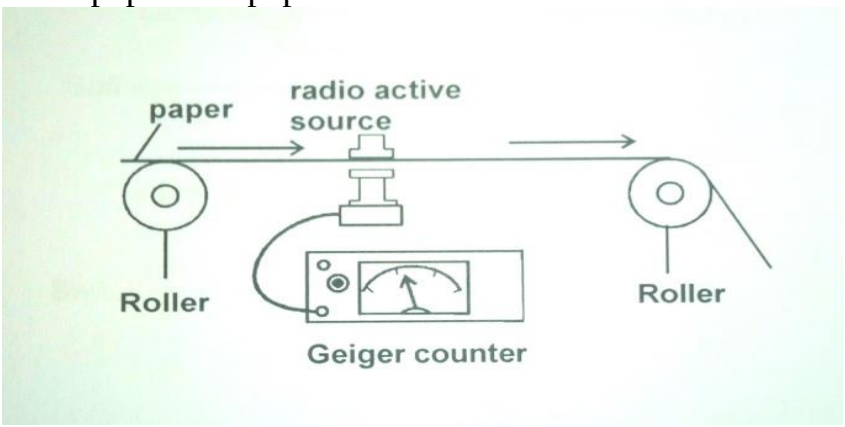
Calculate the frequency of the wave. **(2 mks)**

(b) A boy standing in front of a cliff blows a whistle and hears the echo after 0.5seconds. He then moves 17 metres further away from the cliff and blows the whistle again. He now hears the echo after 0.6 seconds. Determine the speed of sound in air. **(3 mks)**

(c) The element Thorium $^{234}_{90}Th$ is radioactive. It decays by emitting Beta particles.

Determine the number of the protons and neutrons in the nucleus formed when a Thorium atom emit a beta particle. **(2 mks)**

(d) The figure below shows a source of beta particles and a detector being used to check the thickness of paper in a paper mill.



(i) Explain how the device works. **(2 mks)**

(iii) Explain why beta particles are used instead of alpha particles or gamma rays. **(2 mks)**

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PHYSICS MOCKS

SERIES 1 TRIAL 10 PAPER 1

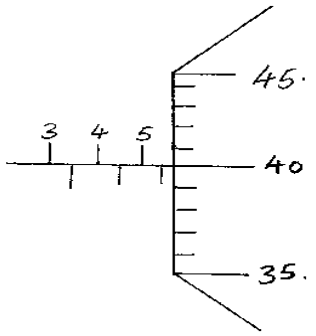
Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A (25 Marks)

Answer ALL questions in this section in the spaces provided.

1. Figure 1 shows a micrometer with a negative error of 0.02 mm, used to measure the diameter of a ball bearing.



Record the diameter of the ball **(2mks)**

2. Explain the washing effects of detergents of soap and why detergents in warm water washes greasy clothes even better **(2mks)**

3. State the reasons why concrete beam reinforced with steel does not crack when subjected to changes in temperature **(1mk)**

The diagram below shows two bulbs P and Q painted white and black

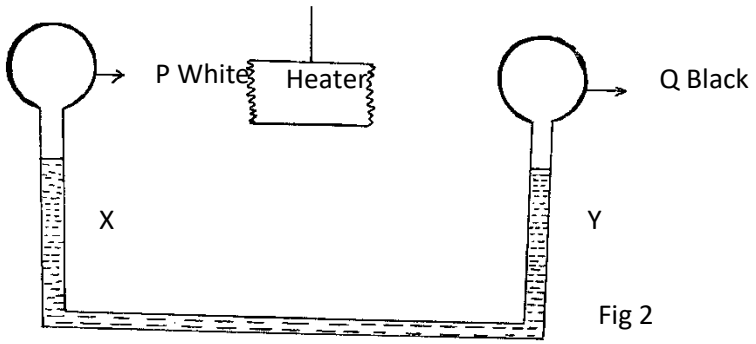


Fig 2

Explain what happens when the heater is turned on? **(2mks)**

4. The figure below shows the path taken by a fluid flowing from region A to C

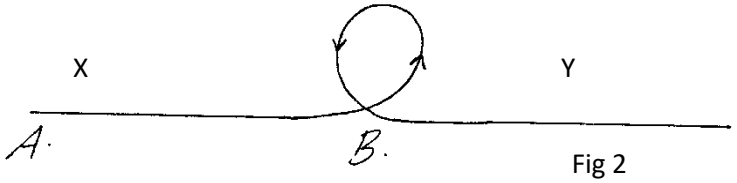


Fig 2

Explain the looping at B **(1mk)**

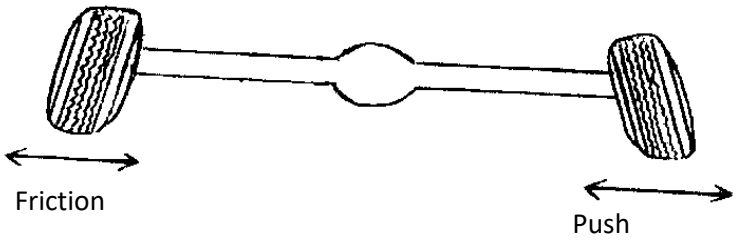
5. A car of mass 1000kg traveling at 36km/h is brought to rest over a distance of 20m. Find

(i) The acceleration **(2mks)**

(ii) The breaking force in Newton's **(1mk)**

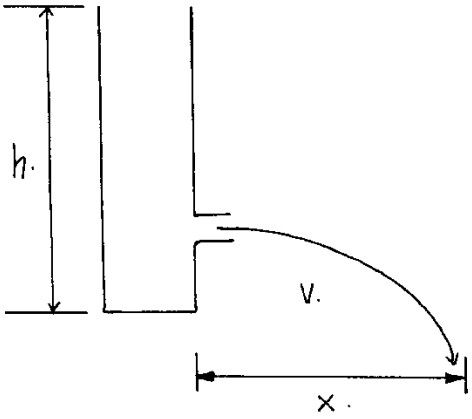
6. A carbon dioxide cylinder contains $300cm^3$ of gas at a pressure of 2.40×10^7 pa. Atmosphere pressure is 1.01×10^5 pa. Calculate the volume of the gas at atmospheric pressure **(2mks)**

7. The figure below shows a cambered wheels



What is the advantage of these**?** **(1mk)**

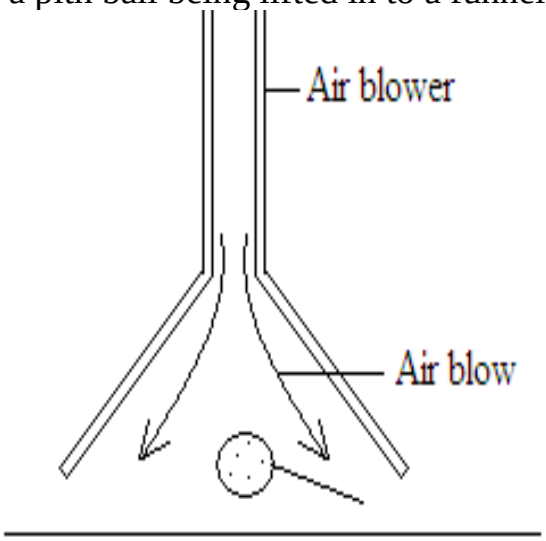
8. The diagram below shows a water tank of height h?



What is the relationship between the velocity V of the water jet and the height h **(1mk)**

9. A cylindrical container has a base area of $150cm^2$ and is filled with water to a depth of 25cm. Find the pressure due to the column of thewater on the base. **(2mks)**

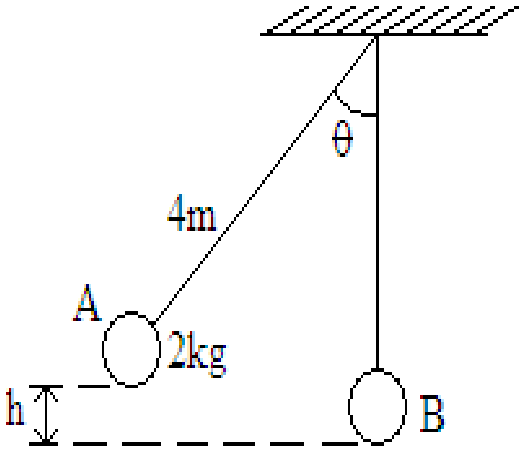
10. The figure below shows a pith ball being lifted in to a funnel end of a blower.



Explain this observation **(2 mks)**

11. A resultant force F acts on a body of 'M' causing an acceleration of A_1 on the body. When the same force acts on a body of mass 2m, it causes an acceleration of A_2.
Express A_2 in terms of A_1**.** **(3 mks)**

12. A metal ball suspended vertically with a wire is displaced through an angle θ as shown in the diagram below. The body is released from A and swings back to 'B'.



Given that the maximum velocity at the lowest point B is 2.5 m/s. Find the height h from which the ball is released $(g = 10m/s^2)$ **(3 mks)**

SECTION B (55 Marks)

Answer ALL questions in this section in the spaces provided.

13.

a. Use simple sketches to show the three states of equilibrium.
Name the states. **(3 mks)**

i.

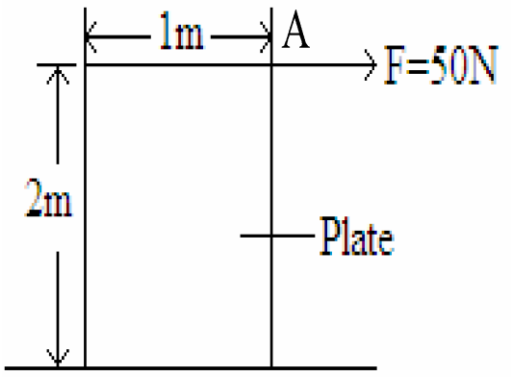
ii.

iii.

b. Define center of gravity of a body. **(1 mk)**

c. State two factors affecting stability of body **(2 mks)**

d. The figure below shows a metal plate 2 m long, 1m wide and negligible thickness. A horizontal force of 50 N applied at point 'A' Just makes the plate tilt.



Calculate the weight of the plate. **(3 mks)**

15. (a) State what is meant by the term 'specific latent heat of vaporization' **(1mk)**

b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100^0C was passed into water contained in a well-lagged copper calorimeter. The following measurements were made;

Mass of calorimeter 50g

Initial mass of water 70g

Final mass of calorimeter + water + condensed steam = 23g

Final temperature of mixture = 30g

(Specific heat capacity of water = 4,200 Jkg^{-1} K^{-1} specific heat capacity for copper = 390 Jkg^{-1} K^{-1})

(i) Determine the:

I Mass of condensed steam **(2mks)**

II Heat gained by the calorimeter and water **(3mks)**

(ii) Given that L is the specific latent heat of vaporization of steam,

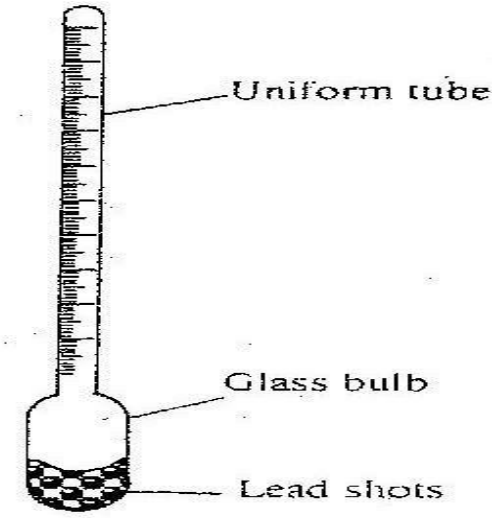
I) write an expression for the heat given out steam. **(1mk)**

II) Determine the value of L. **(3mks)**

16. a) State the Archimedes principle (1mk)

b) State the law of floating (1 mark)

(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 hydrometer is calibrated to measure relative density **(2mks)**

(d) Figure 14 shows a cork floating on water and held to the bottom of the beaker by a thin thread.

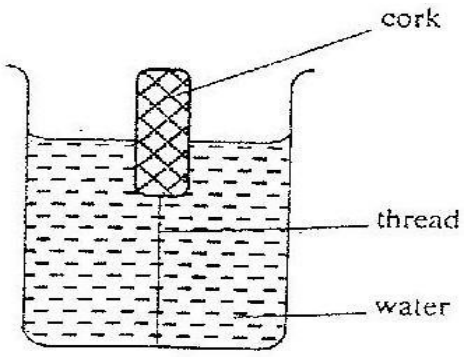


Figure 14

(i) Name all the forces acting on the cork **(3marks)**

(ii) Describe how each of the forces mentioned in (i) above changes when water is added into the beaker until it fills up. **(3 marks)**

17. (a) State what is meant by centripetal acceleration **(1mk)**

(b) The figure below shows masses, A, B and C placed at different points on a rotating table. The angular velocity, ω, of the table can be varied.

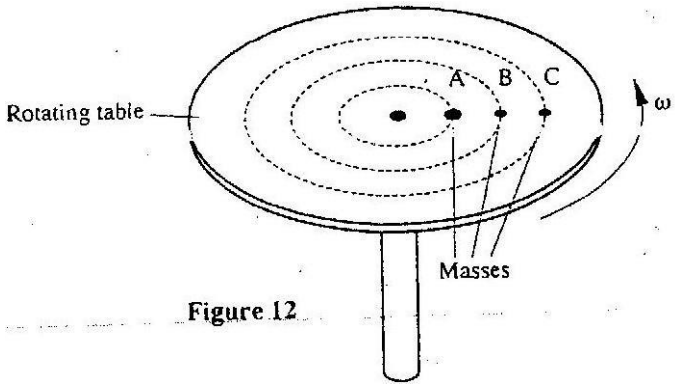


Figure 12

(i) State two factors that determine whether a particular mass slides off the table or not **(2 marks)**

(ii) It is found that the masses slide off at angular velocities ω_A, ω_B, and ω_C respectively. Arrange the values of ω_A, ω_B, ω_C in decreasing order. **(1mk)**

(c) A block of mass 200g is placed on a frictionless rotating table while fixed to the centre of the table by a thin thread. The distance from the centre of the table to the block is 15 cm. If the maximum tension the thread can withstand is 5.6N. Determine the maximum angular velocity the table can attain before the thread cuts. **(4 mks)**

d) A turntable of radius 8cm is rotating at 33 revolutions per second. Determine the linear speed of a point on the circumference of the turntable. **(4 marks)**

e) Define angular velocity. **(1 Mark)**

NAME……ADM NO……

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DATE……

PHYSICS MOCKS

SERIES 1 TRIAL 10 PAPER 2

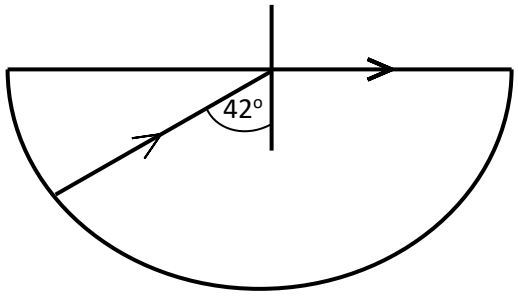
Kenya Certificate of Secondary Exams

TIME:2HRS

SECTION A (25 Marks)

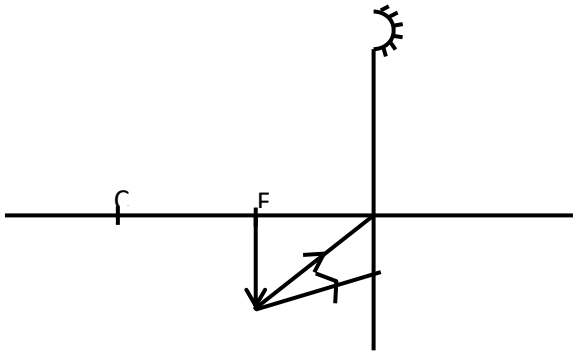
Answer ALL questions this section in the spaces provided.

1. What property of light is suggested by the formation of shadows? **(1mark)**
2. Why are audio recording hall walls covered with soft materials. **(1mark)**
3. A highly negatively charged rod is gradually brought close to the cap of a positively charged electroscope. It is observed that the leaf collapses initially and then diverges. Explain this observation. **(3marks)**
4. The figure **below** shows a ray of light incident on a face of semicircular prism. Determine the refractive index of the glass prism. **(3marks)**



5. Explain why repulsion is the only sure test for polarity of a magnet. **(1mark)**
6. State the use of manganese (IV) oxide in a dry cell. **(1mark)**
7. A lamp of height 6cm stands infront of pin-hole camera at a distance of 24cm from the pin-hole. The camera screen is 8cm from the pinhole. Calculate the height of the image formed on the screen. **(3marks)**
8. A car accumulator is rated 40Al and is expected to supply a constant current for 120 minutes. Calculate the amount of current delivered. **(2marks)**

9. The figure **below** shows two incident rays on a concave mirror from the top of an object. Complete the ray diagram showing the reflected rays. **(2marks)**



10. An electric bulb rated 40W is operated on240V mains. Determine the resistance of its filament. **(3marks)**

11. The force on a straight conductor carrying current in a magnetic field can be varied by changing, among others, the magnitude of the current and the magnetic field strength. Name the other factors that can be changed to vary the force. **(2marks)**

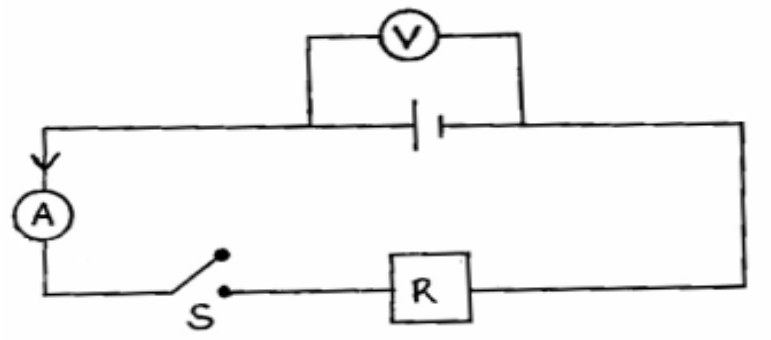
12.(i) Distinguish between transverse and longitudinal waves. **(1mark)**

(ii) Give **one** example of a transverse wave and one example of a longitudinal wave. **(2marks)**

SECTION B: (55 MARKS)

Answer ALL questions this section in the spaces provided.

13.(a) In an experiment to determine the internal resistance of a cell, the following circuit was used.



It was noted that when S is open, the voltmeter reads 1.5V and when S is closed the voltmeter reads 1.3V and ammeter reads 0.2A.

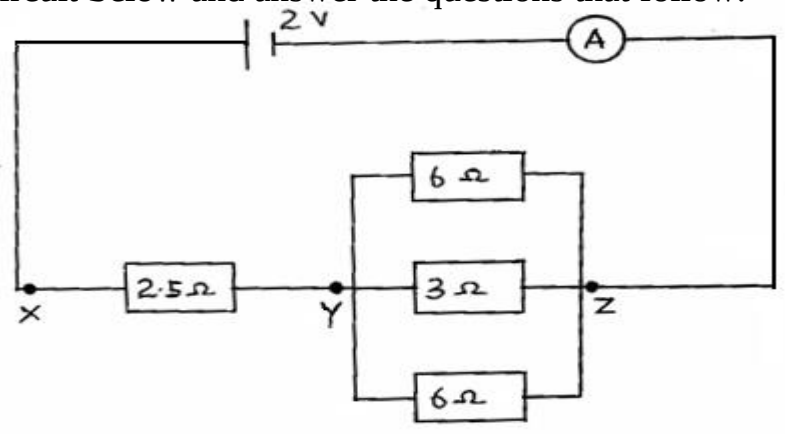
(i) What is the e.m.f of the cell. **(1mark)**

(ii) Determine the lost voltage. **(1mark)**

(iii) Find the value of R. **(2marks)**

(iv) Find the internal resistance of the cell. (2marks)

(c) Study the circuit **below** and answer the questions that follow.



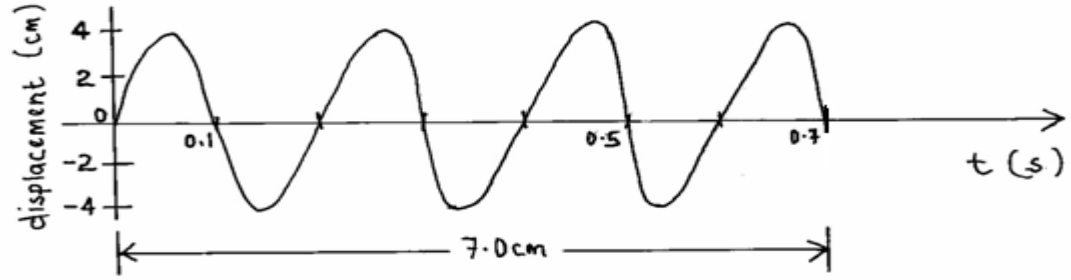
(i) Determine the effective resistance of the circuit. **(2marks)**

(ii) Find the ammeter reading. **(2marks)**

(iii) Find the p.d between X and Y. **(2marks)**

(iv) State the factors that affect the resistance of a conductor. **(3marks)**

14. The diagram **below** represents a wave motion.



(i) What is the amplitude of the wave in metres. **(1mark)**

(ii) How many cycles are made. **(1mark)**

(iii) Calculate the wavelength, λ, of the wave. **(2marks)**

(iv) Calculate the frequency of the wave. **(2marks)**

(v) Calculate the velocity of the wave. **(2marks)**

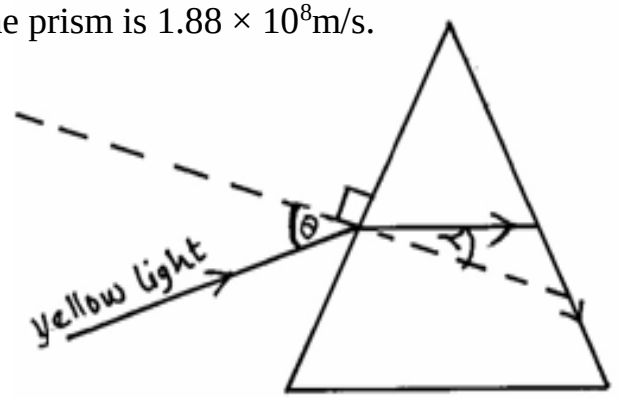
(b)(i) The echo sounder of a ship receives the reflected wave from a sea-bed after 0.2 seconds. What is the depth of the sea bed if the velocity of sound in water is 1450m/s. **(3marks)**

(ii) State **two** factors that affect the speed of sound in air. **(2marks)**

15.(a) State **two** conditions necessary for total internal reflection to occur. **(2marks)**

(b) Define the term critical angle as used in refraction of light. **(1mark)**

(d) The figure **below** shows the path of a ray of light through a glass prism. The speed of yellow light in the prism is 1.88×10^8m/s.



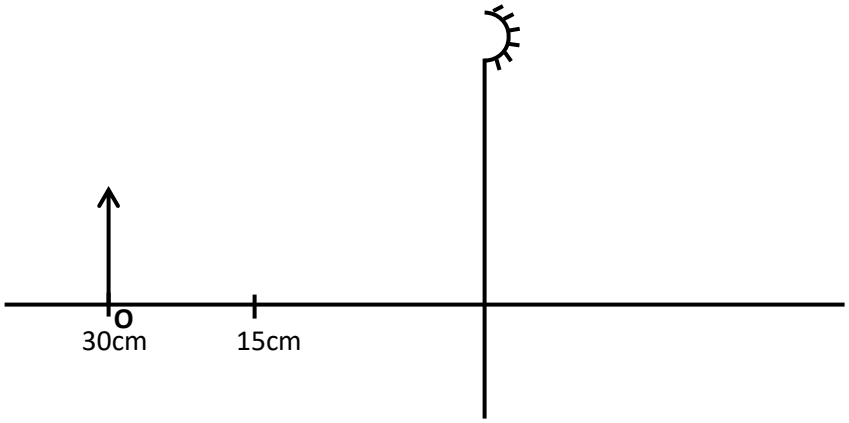
(i) Determine the refractive index of the prism material for the light (speed of light in vacuum, $c = 3.0 \times 10^8$m/s. **(3marks)**

(ii) Show on the figure, the critical angle, c, and determine its value. **(4marks)**

(iii) Given that r = 21.2°, determine the angle θ. **(3marks)**

16.(a) State the advantages of using a convex mirror as a driving mirror. **(2marks)**

(b) The figure **below** shows an object **O** placed infront of a converging mirror of local length 15cm.

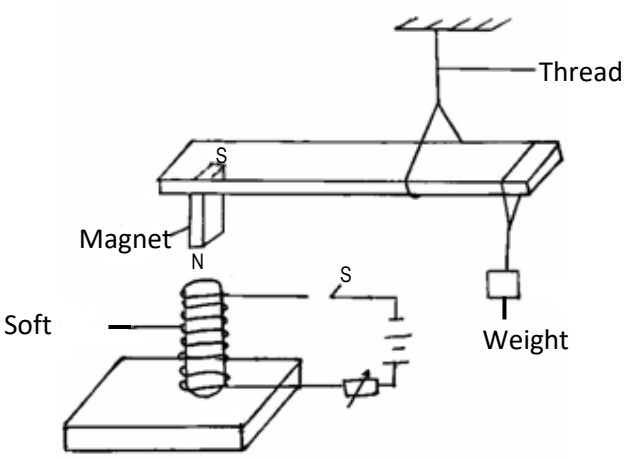


Draw on the figure a ray diagram to locate the image formed. **(3marks)**

(c) State why parabolic reflection is used in car headlights.

17.(a) State **three** factors that affect the strength of an electromagnet. **(3marks)**

(d) In the set up **below**, the suspended metre rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench:



(i) State and explain the effect on the metre rule when the switch S, is closed**.** **(2marks)**

(ii) What would be the effect of reversing the battery terminals? (**1mark)**

(c) The figure **below** shows two parallel current carrying conductors **A** and **B** placed close to each other. The direction of the current is into the plane of the paper.

On the same figure.

(i) Sketch the magnetic field pattern. **(1mark)**

(ii) Indicate the force F due to the current on each conductor. **(1mark)**

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