CROSSCOUNTRY MOCKS

PHYSICS

(MOCKS TRIALS 1-10)

SERIES 1 COMPILATION OF RECENT TOP CROSS-COUNTRY PHYSICS MOCKS IDEAL FOR KCSE REVISION PURPOSES.

KCSE MODEL MOCK TRIALS

SERIES 1

FOR MARKING SCHEMES CALL/WHATSAPP

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CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 1 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1

TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATES:

*(a) Write your **name** and **index number** in the spaces provided above.*
*(b) **Sign** and write the **date** of examination in the spaces provided above.*
*(c) This paper consists of **two** Sections **A** and **B**.*
*(d) Answer **all** the questions in sections **A** and **B** in the spaces provided.*

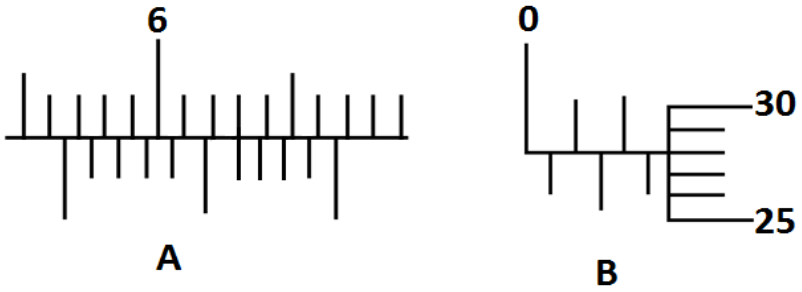
FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidate's Score
A	1-8	25	
	9	9	
	10	7	
B	11	9	
	12	12	
	13	8	
	14	10	
Total Score		80	

SECTION 25 MARKS

1. What you understand by the term SI unit. **(1 mark)**

2. Form four students used two measuring instruments to measure two quantities A and B as shown below



Given that **A - 2B = K** calculate the value of K. Express your answer SI unit and in standard form. **(4 mark)**

3. With a help of a diagram show how 15N force and 9N force can have a resultant force of

i. 24N **(1 mark)**

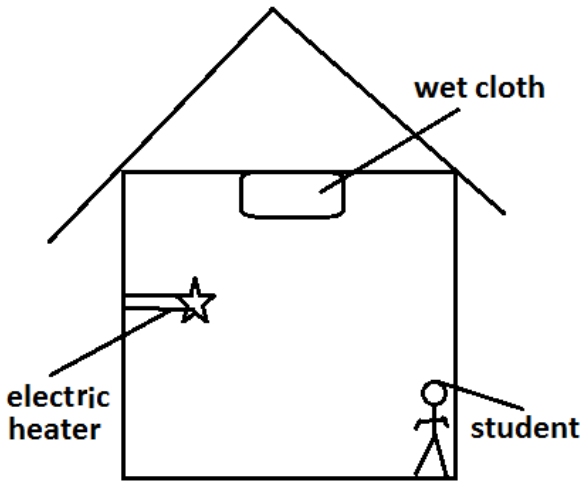
ii. 6N **(1 mark)**

4. State how a thermometer can better

a. Quick action **(1 mark)**

b. Accuracy (sensitive to small changes in temperature) **(1 mark)**

5. The diagram below shows a cross-section of a house. Electric heater is on, wet cloth is hanged on the roof and a student is standing near one wall of the house.

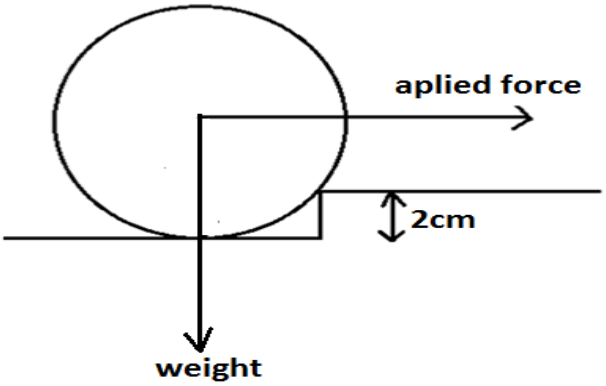


State the mode of heat transfer through which

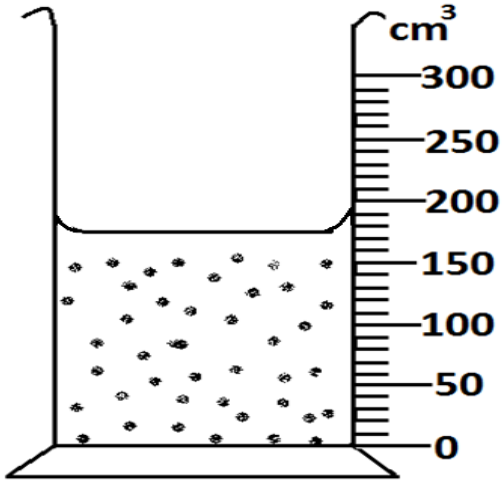
a. Wet cloth is getting heat **(2 mark)**

b. Student is not getting heat **(2 mark)**

6. The figure below shows a cylinder of radius 17cm being pulled by horizontal force against a step 2cm high. If a force of 11.2 N is just sufficient to turn the drawn so that it rises over the step, calculate its weight **(3 mark)**



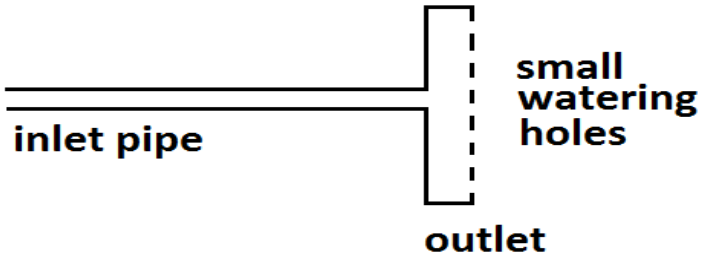
7. The diagram below shows a measuring cylinder with water.



15 metal balls are gently lowered. Show on the diagram the final volume of water if the metal balls have a density of 1200kg/m^3 and the mass of each ball is 7.2g**.** **(4 mark)**

8. .

a. Define pressure and state its SI unit **(2 mark)**



b. The diagram below shows a device used for watering crops out let has **N** number of holes. Inlet has a cross-section area of 2.4cm^2 and water flows at 15m/s. calculate the number of small holes if each hole has a cross-section area of 3mm^2 and water come out at 25m/s. **(3 mark)**

SECTION 55 MARKS

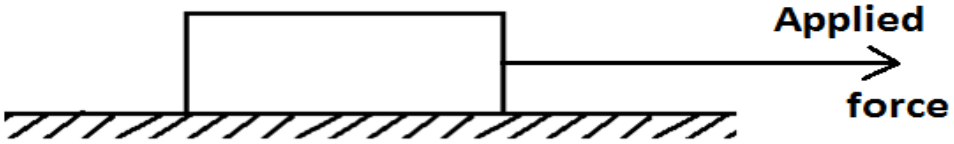
9.

a. A trailer of mass 30000kg travelling at a velocity of 20m/s collide with a bus of mass 10000kg travelling at 10m/s in the opposite direction. 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 mark)**

ii. The impulsive force on the trailer on impact. **(3 mark)**

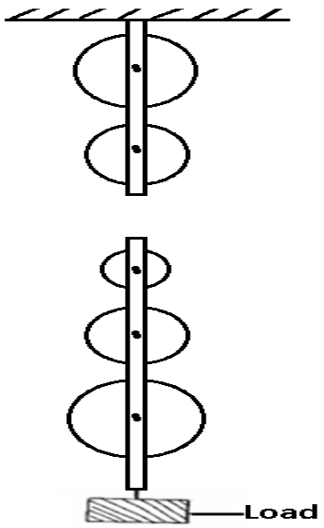
b. An wooden block of mass 600g is pulled along a horizontal bench with a constant force as shown below



If the block accelerate at 2m/s^2 and coefficient of friction between the block and the table is 2.5 calculate applied force**.** **(3 mark)**

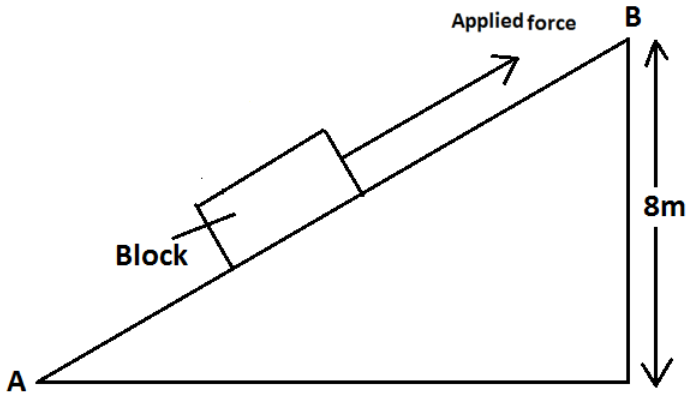
10.

a. The diagram below shows a block and tackle. Show on the diagram the path string passes through the pulleys and state velocity ratio (2 mark)



b. Define a transducer, give one example that illustrate how it work **(2 mark)**

c. A block of weight 120N is pulled along an inclined plane using a steady force as shown below



If distance AB is 25m and work done against friction is 240J calculate the value of applied force **(3 mark)**

11.

a. State pressure law **(1marks)**

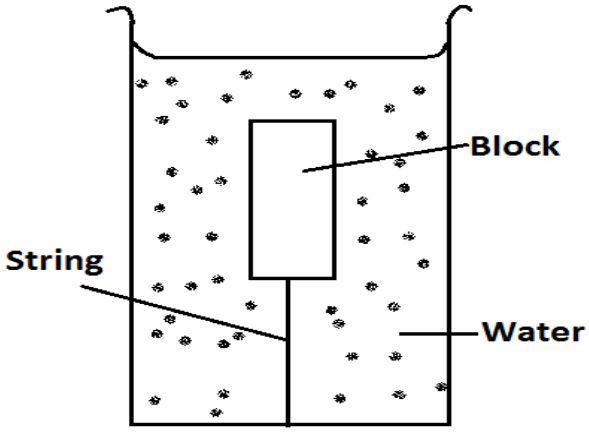
b. In an experiment to verify Charles laws state two quantities that are kept constant. (2marks)

c. A balloon seller has a cylinder containing hydrogen of volume $3.0m^3$ at a pressure of 2.6×10^5 N/m^2 at 27^0C he sells a balloons of volume $1250cm^3$ at a pressure of 1.04×10^5 N/m^2 at 27^0C. Calculate the number of balloons he can sell. **(3marks)**

d. Calculate the maximum pressure of a glass block of density $2500kg/m^3$ would exert on a horizontal surface, if the block measured 30 x 12 x 20cm. (3marks)

12. .

a. A rectangular block is held at the bottom of a container by a string as shown below



On the diagram show the forces acting on the bock **(3marks)**

b. If density of water is 1000kg/m^3 and the block has a volume of 750cm^3 and a density of 0.8g/cm^3 calculate the value of each force. **(3marks)**

c. An object weighs 1040g in air, 640g when fully immersed in water and 720g when fully immersed in a liquid. If the density of water is 1000kg/m^3, find the density of the liquid. **(3marks)**

d. In a hydrometer what is the purpose of

i. Lead shots. **(1marks)**

ii. Narrow stem **(1marks)**

iii. Wide bulb **(1marks)**

13. A copper of heat capacity 600J/K contains 200g of water at 20^0C. Dry steam at 100^0C is passed through the water while stirring until it reaches a final temperature of 60^0C. Given that specific heat of capacity of water as 4200J/Kgk and specific latent heat of steam as 2260,000 J/kg

a. Heat absorbed by water (**2 marks)**

b. Heat absorbed by calorimeter **(2 marks)**

c. Write an expression on heat lost by steam heat lost by steam **(2 marks)**

d. Calculate the mass of the steam condensed **(2 marks)**

14.

a) Explain why a body moving in a circular path at constant velocity is said to be accelerating.**1mk**

b) A stone is projected horizontally from top of a cliff with initial horizontal velocity of 20m/s if the stone land s 100m from the bottom of the cliff, calculate height of the cliff. **(3 marks)**

c) A string of negligible mass has a bucket tied at the end. The string is 70cm long and the bucket has a mass of 450g. The bucket is swung horizontally making 8.4 revolutions per second. Calculate

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

ii. The tension on the string. **(3 marks)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 1 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

(THEORY)

TIME: 2 HRS

INSTRUCTIONS TO CANDIDATES

1. *Write your name and your Index number in the spaces provided.*
2. *This paper consists of **two** sections, Section **A** and **B.***
3. *Answer **ALL** the questions in both section in the spaces provided in this paper.*
4. *Mathematical tables and electronic calculators **may be** used.*
Take: Planck's constant =6.6×10^{-34} Js

FOR EXAMINER'S USE ONLY:

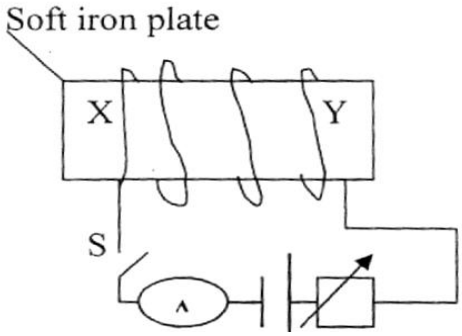
SECTION	QUESTION	MAXIMUM SCORE	STUDENTS SCORE
A	1-12	25	
B	13	11	
	14	09	
	15	15	
	16	10	
	17	10	
	TOTAL	**80**	

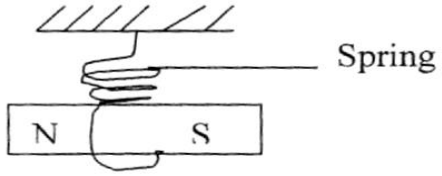
QUESTIONS

1. State any 2 ways of in increasing the size of an image formed by a fixed pinhole camera. **(2 mks)**

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

3. The diagrams below show a soft iron plate in a solenoid and a permanent magnet suspended by a spring.





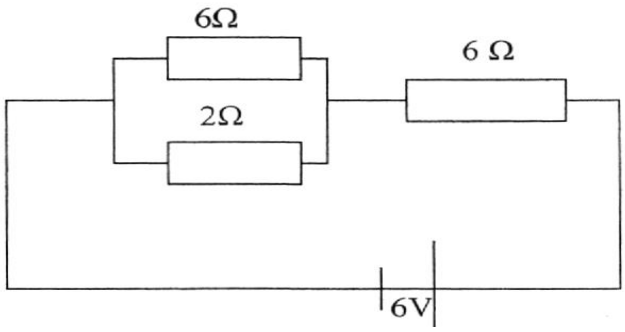
State with reason the behaviour of the magnet when the switch S is closed. **(2 mks)**

4. A man, standing between 2 parallel vertical walls, claps his hands. He hears the first echo 0.3 seconds later and the next echo after a further 0.2 seconds. If the velocity of sound in air is 300m/h. Calculate the distance between the walls. **(3 mks)**

5. The table below shows an electromagnetic spectrum. Complete the table in the order of increasing wavelength from A- B. **(2 marks)**

			Visible Light			

6.The figure below shows a 6V battery connected to an arrangement of resistors.



Determine the current flowing through 2 Ω resistor. **(4 marks)**

7.State difference between semi conductors and metallic conductors**.** **(1 mark)**

8. A radioactive sample has a mass of 16g and a half-life of 10 days. How much of the original sample remains after 40 days. **(2 marks)**

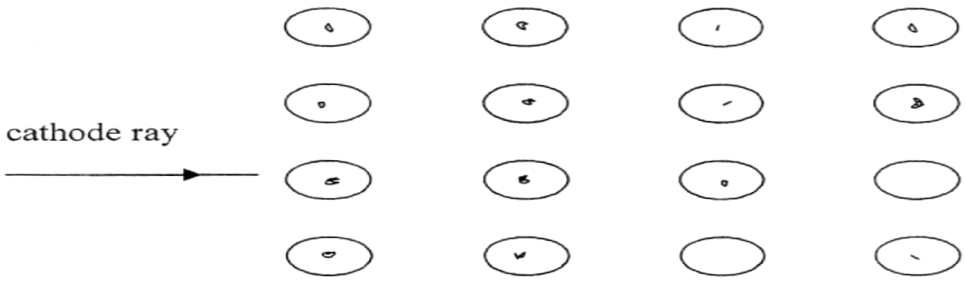
9. Negatively charged rod is brought near the cap of a lightly charged electroscope. The leaf divergence first reduces but as the rod comes nearer, it diverges more.

i) State the charge of the electroscope. **(1 mark)**

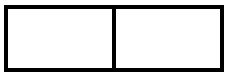
(ii) Explain the behaviour of the leaf above. **(1 mark)**

10. Water waves pass a point in a swimming pool at the rate of 30 crests per 60 seconds. One of the crests was observed to take 2 seconds to travel between 2 points, 6m apart. Determine the wavelength of the water waves. **(2 marks)**

b. The figure below shows a cathode ray beam entering a magnetic field, perpendicular to the plane of the paper complete the diagram to show the path of the beam in the field. **(1 mark)**



11.The diagram below shows a junction diode.



Complete the diagram to show how the diode can be connected in a reverse bias mode. (1 mark)

12.An Uranium 236 isotope has a symbol $^{2361}_{92}U$ when bombarded by a neutron, it splits to give Substances K and L and 2 neutrons. Calculate the values of a and b in the equation below. (1 mark)

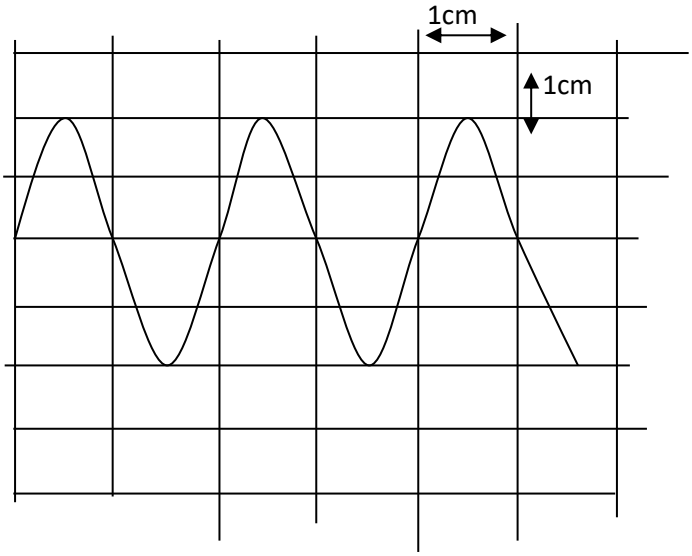
$$^{236}_{92}U + ^{1}_{1}n \longrightarrow ^{95}_{56}K + ^{a}_{b}L + ^{+2}_{0}\text{n}$$

SECTION B 55MKS

13a) Explain why a cathode ray tube is evacuated **(1 mark)**

b) State four properties of cathode rays **(2 marks)**

c) The figure shows the waveform displayed on the cathode ray oscilloscope screen when an alternating voltage is applied on the Y-input. The time- base is set at 1ms/cm and the Y-gain at 10v/cm



CALCULATE;

i. The amplitude of the ac input voltage **(2marks)**

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

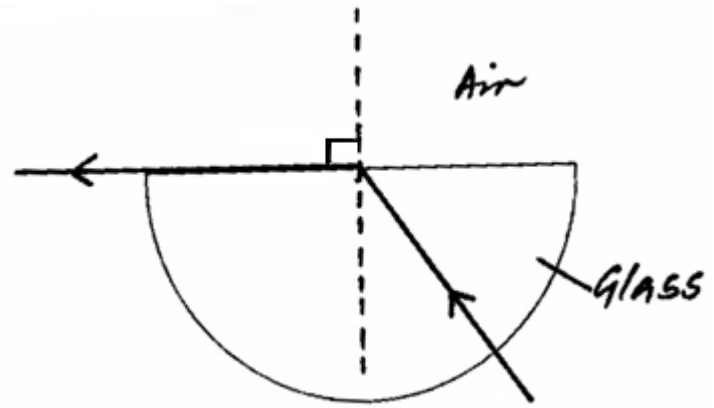
d) The threshold frequency of sodium is $5.6x10^{14}$Hz .Find

i. Work function of sodium **(2marks)**

ii. The kinetic energy of the ejected electrons when sodium is shone with light of frequency $8.6x10^{14}$ Hz **(2 marks)**

14. State the meaning of the term critical angle as applied in refraction of light**.** **(1 mark)**

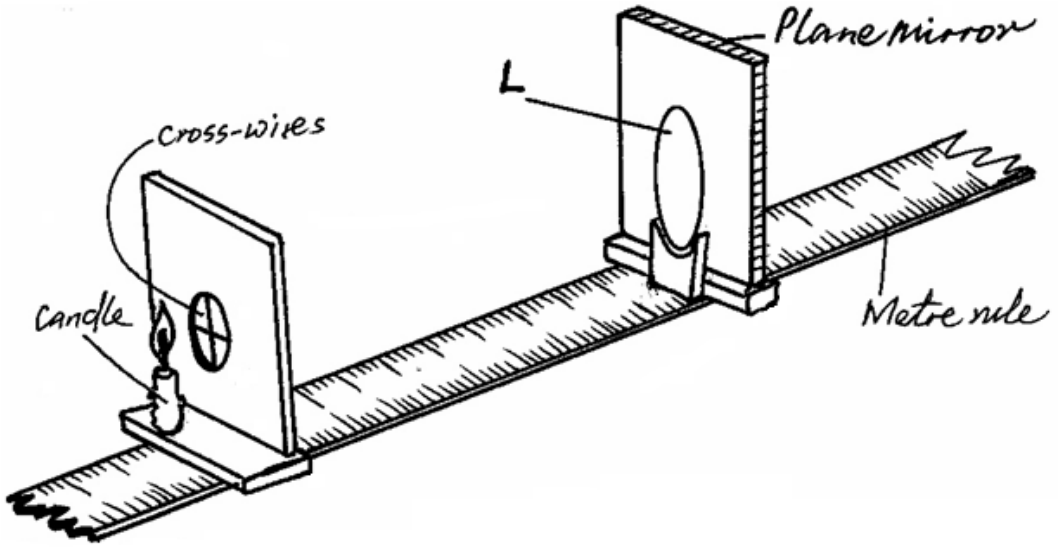
ii) The figure shows a ray of light incident on a glass-air interface.



(i) Show on the diagram the critical angle, **c**. **(1 mark)**

ii) Given that the refractive index of the glass is ${}_a\eta_g$, and that the critical angle **c** = 42°, determine the value of is ${}_a\eta_g$. **(3 marks)**

(b) The figure shows an experimental set up consisting of a mounted convex lens **L**, cardboard screen with cross-wires at the centre, a plane mirror, a metre rule and a candle.



Describe how the set-up may be used to determine the focal length, f, of the lens. **(4 marks)**

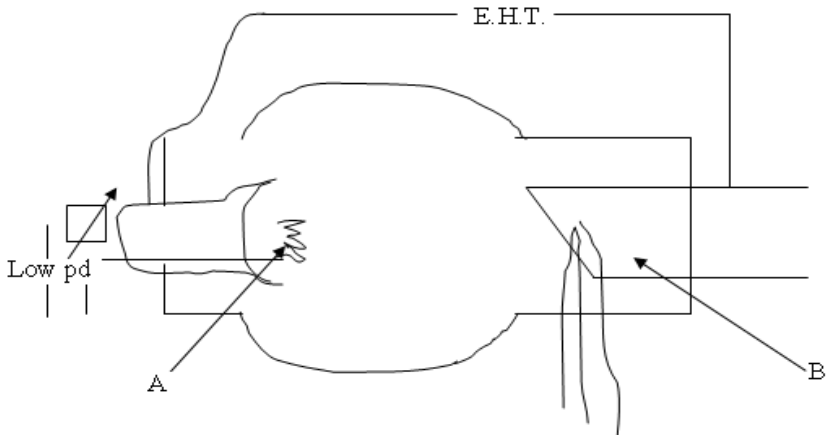
15.a) State one advantage of high voltage transmission. **(1mark)**

(b) A generator produces 150kw at a voltage of 5kv. The voltage is stepped up to 60kv and transmitted through cables of resistance 15Ω to a step down transformer in a substation. If both transformers are 80% efficient, calculate the:

(i) Current through the transmission cables. **(3marks)**

(ii) Power lost during transmission. **(3marks)**

(c) The figure below shows the features of an x ray tube



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

(ii) Explain how change in the potential across PQ change the intensity of the x-rays produced in the tube. **(1marks)**

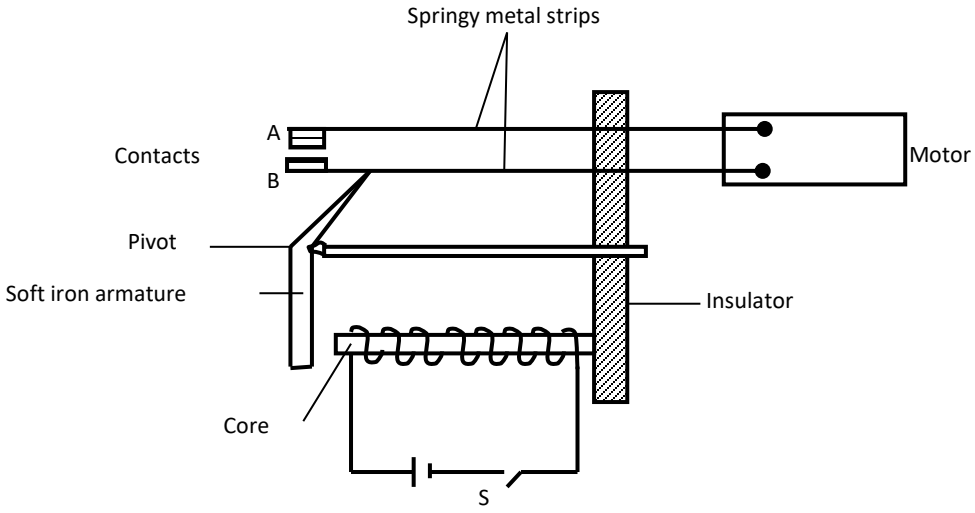
(iii) During the operation of the tube, the target becomes very hot. Explain how the heat is caused. **(1mark)**

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

(b) In a certain X ray tube, the electrons are accelerated by a p.d of 12000v. assuming that all the energy goes to produce x rays, determine the frequency of the x rays produced(take planks constant $h=6.62x10^{-34}$Js, and the charge of an electron $e=1.6x10^{-19}$**(3mks)**

16.Figure 8 shows an electromagnetic relay being used to switch an electric motor on and off. The electromagnet consists of a coil of wire wrapped around a core. The motor in figure is switched off.

Figure 8



(a) Suggest suitable material for the core. **(1mark)**

(b) What happens to the core when switch S is closed? **(2marks)**

c)Why do the contacts A and B close when the switch S is closed. **(2marks)**

(c) When the switch S is opened, what will happen to;

(i) The core **(1mark)**

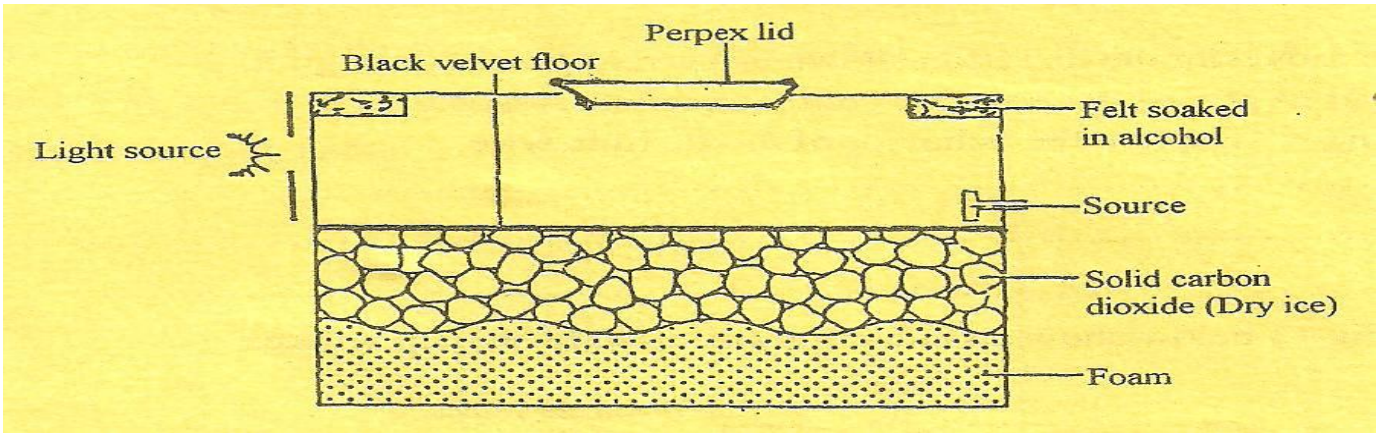
(ii) Soft iron armature. **(1mark)**

(d) Give **one** other application of an electromagnet. **(1mark)**

(e) State **two** ways in which an electromagnet could be made more powerful. **(2marks)**

17. Explain why carbon-14 ($^{14}_{6}C$) is radioactive while carbon $^{12}_{6}C$ is not. **(1 mark)**

(b) The figure below shows features of a diffusion cloud chamber used for detecting radiations from a radioactive source.



Explain how the chamber works when a radioactive particle is introduced at the source.

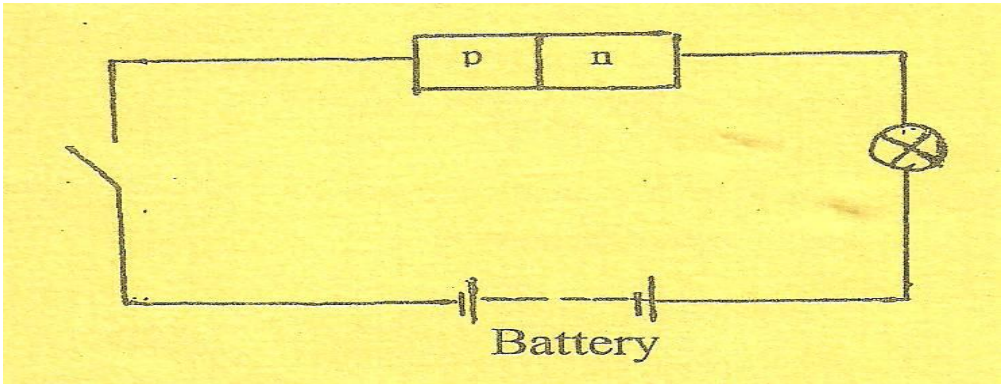
(2 marks)

(c) (i) What is the purpose of solid carbon (iv) oxide. **(1 mark)**

(d) **(i)**Using a diagram explain how doping produces a p-type semi-conductor. **(3 marks)**

(ii) What is biasing? **(1 mk)**

(iii) The diagram below shows a circuit with a p-n junction and a very low power bulb.



State with reason the observations made on the bulb when the switch is closed. **(2 marks)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 2 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1

TIME: 2 HOURS

Instructions to candidates

a) This paper consists of two sections ***A*** and ***B***.
b) Answer **all** the questions in the two sections in the spaces provided after each question
c) All working **must** be clearly shown.
d) Electronic calculators and Mathematical tables may be used.
e) All numerical answers **should be expressed** in the **decimal** notations.

FOR EXAMINER USE ONLY

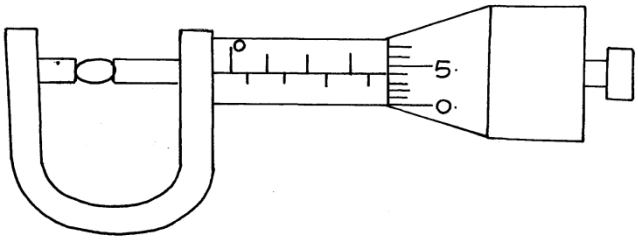
SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 14	25	
B	15	12	
	16	10	
	17	09	
	18	14	
	19	10	
TOTAL		80	

SECTION A (25 MARKS)

Answer all the questions in this section in the spaces provided.

1. Figure 1. shows a micrometer screw gauge being used to measure the diameter of a ball bearing.

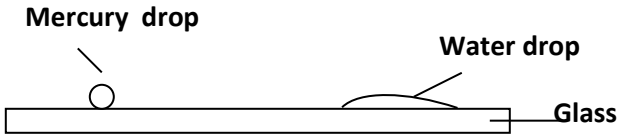
Fig.1



If the instrument has a negative zero error of 0.01mm, record the actual diameter of the ball bearing. **(1 mark)**

2. Figure 2. shows drops of mercury and water on a glass surface,

Fig. 2



Explain the difference in the shapes of the drops. **(2 marks)**

3. State why diffusion is faster in gases than in liquids. **(1 mark)**

4. When a Bunsen burner is lit above a wire gauze, it is observed that the flame initially burns above the gauze shown in figure 3 (i). After sometime, the flame burns below as well as above the gauze as shown in figure 3(ii).

Fig. 3



(i) **(ii)**

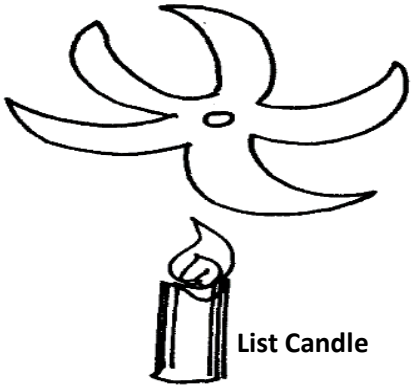
Explain the observation. **(2 marks)**

5. In an experiment to demonstrate Brownian motion, smoke was placed in a smoke cell and observed using a microscope. The smoke particles were seen moving randomly in the cell. Explain the observation. **(1 mark)**

6. A paper vane in a horizontal axis was placed above a Bunsen burner as shown in figure 4.

When the burner was lit, the paper vane begun to rotate. Explain the observation. **(2 marks)**

Fig. 4

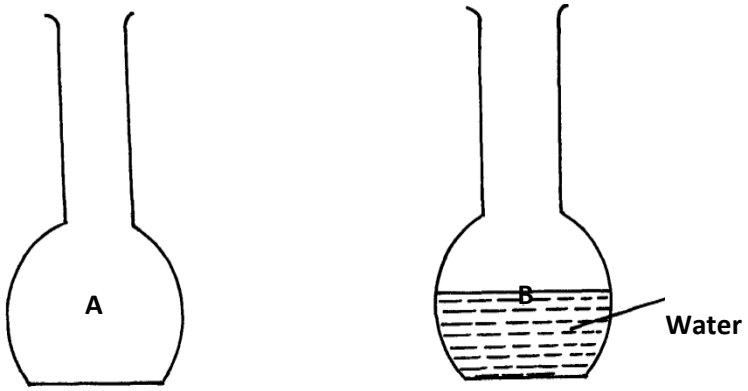


7. An electric kettle with shiny outer surface is more efficient than one with a dull outer surface, give a reason for this. **(1 mark)**

8. What is the reason why trailers carrying heavy loads have many wheels. **(1mark)**

9. Two flasks **A** and **B** were placed on a horizontal surface as shown in figure 5.

Fig. 5

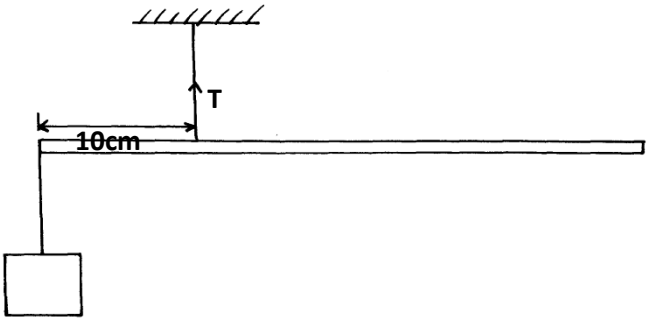


State and explain which flask is more stable. **(2 marks)**

10. Figure. 6 below shows a metre rule balancing when a mass of 200g is hung at one end.

Determine the tension, T in the string. **(3 marks)**

Fig. 6



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

12. A pipe of diameter 12mm is connected to another of diameter18mm. if water flows in the wider pipe at the speed of 2m/s, determine the speed of water in the narrow pipe. **(3 mks)**

13. On the axes provided in the figure 7, sketch the graph showing variation in pressure with volume of a fixed mass of gas that obeys Boyle's law. (1 mark)

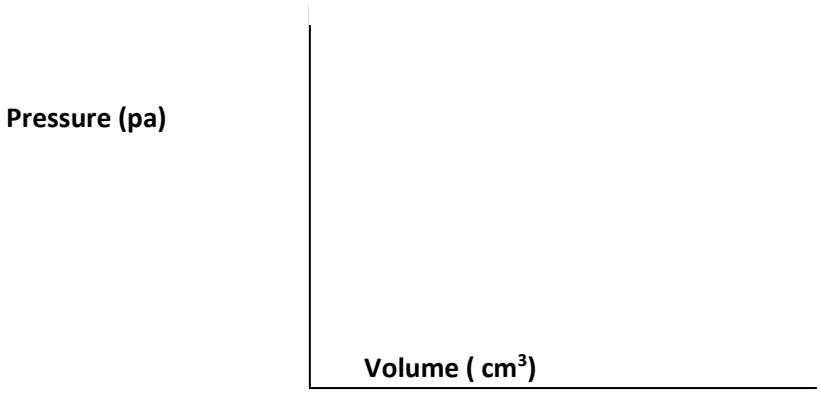


Fig. 7

14. An oil drop has a volume of $0.01mm^3$. When it is placed on the surface of water, it spreads out to form a circular patch of area $500cm^2$.

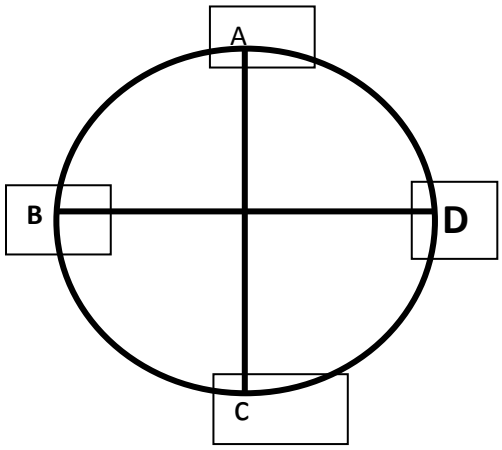
(i) Calculate the size of the molecule of the oil. **(3 marks)**

(ii) State **one** assumption made in (i) above. **(1 mark)**

SECTION B (55 marks)

15. (a)Define angular velocity **(1 mark)**

(b) the figure below shows an object of mass 0.2kg whirled in a vertical circle of radius 0.3m at uniform speed of 4m/s



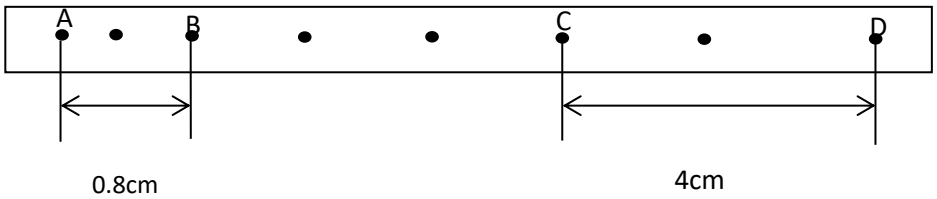
(c) Determine the tension of the string at:

(i) Position A **(2 marks)**

(ii) Position B **(2 marks)**

(iii) Suggest the point where the string is likely to snap. **(1 mark)**

(d) The figure below shows the motion of a trolley on a ticker tape timer whose frequency is 100HZ



Determine:

(i) Initial velocity at points AB. **(2 marks)**

(ii) Velocity at points CD **(2 marks)**

(iii) Acceleration of the trolley during the motion. **(2 marks)**

16. (a) Give the reason why a density bottle is more accurate than a measuring cylinder when used to measure volume of liquids. **(1 mark)**

(b) State two precautions taken when using a density bottle. **(2 marks)**

(c) A form one student wanted to determine the density of copper. She wrote the following procedure: Study it and answer the questions that follow.

a) Measure the mass x_1 (g) of a clean dry empty density bottle
b) Fill the bottle partly with copper turnings and measure the mass x_2(g)
c) Fill the bottle with water up to the neck and measure its mass x_3(g)
d) Empty the bottle and rinse it.
e) Fill it with water and replace the stopper. Measure the mass x_4(g) of the bottle filled with water.
Write an expression for:

(i) Volume of the bottle **(2 marks)**

(ii) Mass of copper turnings **(1 mark)**

(iii) Volume of copper turnings. **(2 marks)**

(iv) Density of copper. **(2 marks)**

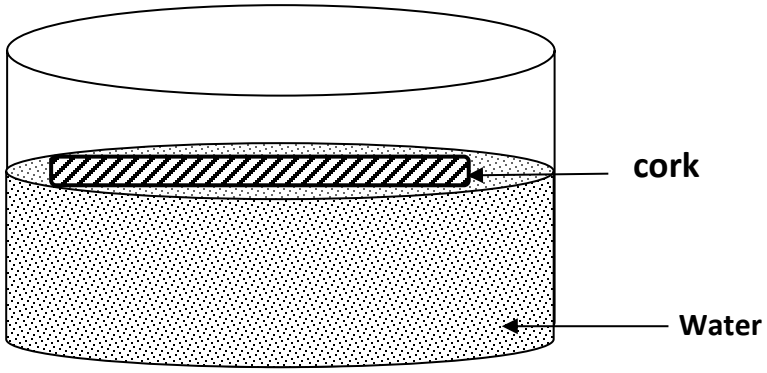
17. (a) State the law of floatation **(1 mark)**

(b) A metal block weighs 0.8N is suspended by a string in water. If the block is completely immersed in water the tension in the string is 0.5N. Find

(i) The upthrust on the block (1 mark)

(ii) The density of the block. (3 marks)

(c) The figure below shows a cork of mass 25g floating in water.



Determine the minimum volume of copper that must be attached so that the two will just submerge.(Relative density of copper = 9.0, Relative density of cork= 0.25) **(3marks)**

(d) Explain how a submarine can be made to.

(i) Float on water **(1 mark)**

18. (a) You are provided with the following apparatus:

A filter funnel, a thermometer, a stop watch, ice at 0°C, an immersion heater rated P watts, a beaker, a stand, boss and clamp and a weighing machine.

Describe an experiment to determine the specific latent heat of fusion of ice. Clearly state the measurements to be made. **(3 marks)**

(b) 200 g of ice at 0°C is added to 400g water in a well lagged calorimeter of mass 40g. The initial temperature of the water was 40°C. If the final temperature of the mixture is X°C,(Specific latent of fusion of ice L = 3.36×10^5 Jkg^{-1}, specific heat capacity of water, c = $4200Jkg^{-1}K^{-1}$, specific heat capacity of copper = 400 $Jkg^{-1}K^{-1}$.)

(i) Derive an expression for the amount of heat gained by ice to melt it and raise its temperature to X°C **(2 marks)**

(ii) Derive an expression for the amount of heat lost by the calorimeter and its content when their temperature falls to X°C. **(2 marks)**

(iii) Determine the value of X. **(3 marks)**

(c) A hydrogen balloon of volume 1.2 m^3 is released at the ground level where the pressure is680 mmHg and a temperature of 20 °C. Determine the volume of the balloon at a height of2500m above the ground where the pressure drops to 500 mmHg and the temperature is 4°C. **(4 marks)**

19. A balloon seller has a cylinder of helium gas which he uses to blow up his balloons. The volume of the cylinder is $0.10m^3$. It contains helium gas at a pressure of $1.0 \times 10^7 Nm^{-2}$. The balloon seller fills each balloon to a volume of $1.0 \times 10^{-2}m^3$ and a pressure of $2.0 \times 10^5 N/m^2$

(a) Explain in terms of particles how the helium in the cylinder produces a pressure **(1 mark)**

(b) Calculate the total volume that the helium gases occupy at a pressure of 1.2×10^5 N/m^2. Assume the temperature of the helium does not change **(3 marks)**

(c) Calculate the number of balloons of volume $1.0 \times 10^{-2}m^3$ that the balloon seller can fill using the gas **(2 marks)**

(d) The graph below shows how the pressure of a gas trapped inside a sealed container changes with temperature. The pressure is caused by the gas particles continually hitting the sides of the container.

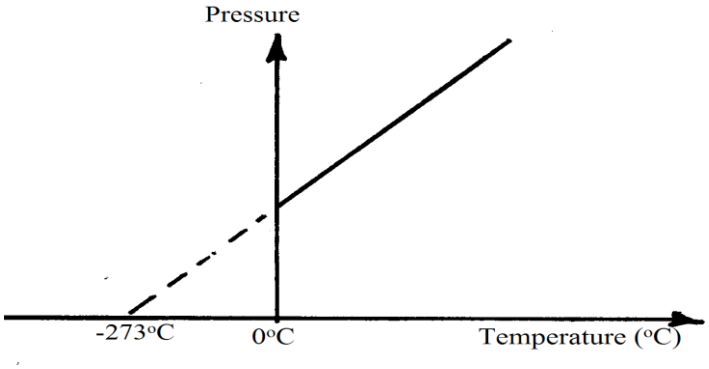


Figure 6

(i) Write down the name of the temperature at which the gas particles stop hitting the sides of the container **(1 mark)**

(ii) What is the momentum of the gas particles at this temperature? Give reason for the Answer **(2 marks)**

(iii) Give the value of the temperature in Kelvin **(1 mark)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 2 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

TIME: 2 HOURS

Instructions to candidates

a) This paper consists of two sections A and B.
b) Answer all the questions in the two sections in the spaces provided after each question
c) All working must be clearly shown.
d) Electronic calculators, mathematical tables may be used.
e) All numerical answers should be expressed in the decimal notations.

SECTION	QUESTION	MAX MARKS	SCORE
A	1 – 12	25	
B	13	14	
	14	16	
	15	09	
	16	08	
	17	08	
TOTAL		80	

SECTION A (25 MARKS)

1. The fig below shows the magnetization method

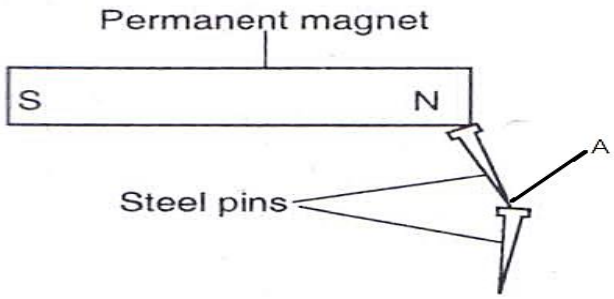


Figure 1

(i) State the method of magnetization shown above **(1 mark)**

(ii) State the polarity of point A in the pin attached to the magnet **(1 mark)**

2. The figure below shows two mirrors inclined at a certain angle x. A viewer counts a total of 7 images by looking directly into them from the object O. Determine the value of angle X **(2 marks)**

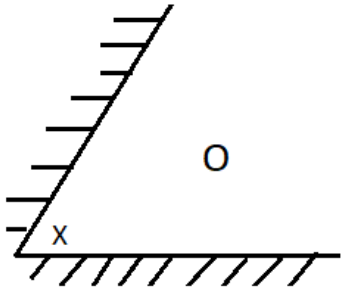


Figure 2

3. UV rays are made to fall on the cap of a negatively charged electroscope, state and explain the observation made. **(2marks)**

4. The figure below shows a cross section of a dry cell.

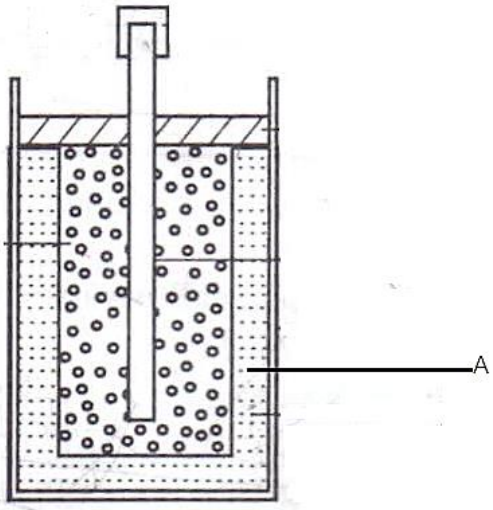


Figure 3

(i) Name the part labeled A **(1 mark)**

(ii) State the use of manganese iv oxide in the cell **(1 mark)**

5. The figure below shows a ray incident on the boundary between two media 1 and 2 at an angle α.

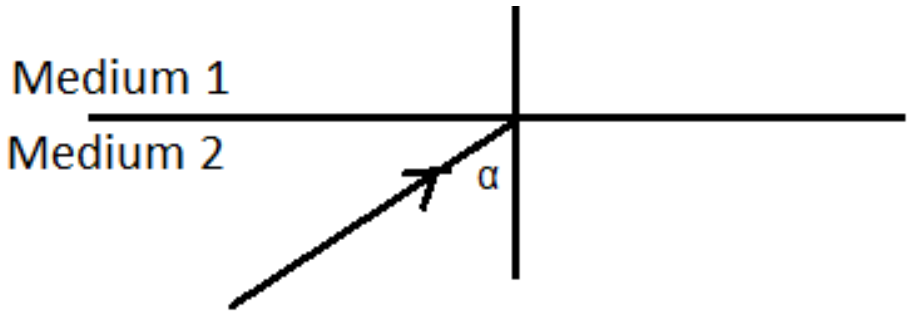


Figure 4

Given that, the refractive index of medium 2 with respect to medium 1 is 1.5 and that the refracted ray forms an angle of 60° with the boundary. Calculate the angle of incidence α **(3 marks)**

6. Given the following resistor networks

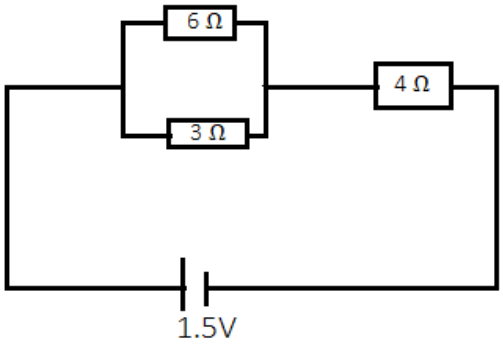


Figure 5

(i) Calculate the effective resistance (2 marks)

ii. calculate the current through the 4 Ω resistor **(1 mark)**

7. The table below shows part of the electromagnetic spectrum

		frared	isible light		

(I) Name the radiation named A **(1 mark)**

(II) State one method of production of C **(1mark)**

8. Give two reasons why the earth pin is usually longer than the neutral and live pin **(2 marks)**

9. (i) state the reason why tungsten is used as an anode target in an X- ray tube. **(1 mark)**

(iii) Distinguish between hard and soft X-rays **(1mark)**

10. State the reason as to why convex mirror is preferred over a plane mirror for use as a driving mirror **(1mark)**

11. An iron box has a resistance of 30 Ω and takes a current of 5A. Calculate heat in kJ developed in 2 minutes. **(2 marks)**

12. State two factors affecting speed of sound in air **(2 marks)**

SECTION B (55 MARKS)

13. (a) State Lenz's law **(1 mark)**

(b) The diagram below shows two coils placed close to each other

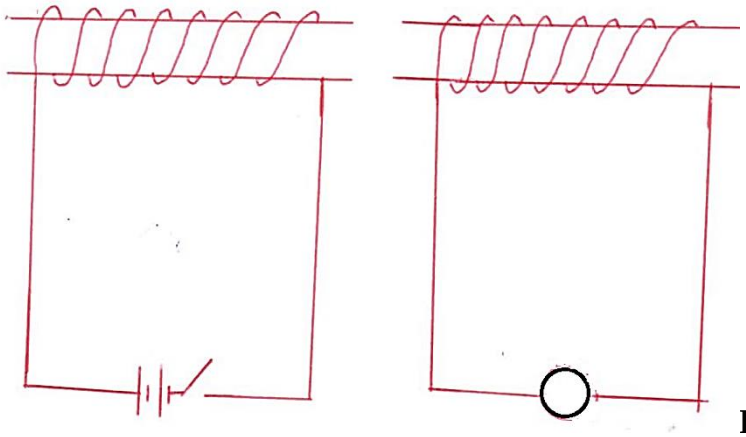


Figure 6

(i) Indicate in the diagram the direction of the deflection of the galvanometer when switch S is closed **(1 mark)**

(ii) Compare the difference noted in the deflection of the galvanometer on closing the switch and on opening the switch **(1 mark)**

(iii) Explain the difference noted in (ii) above **(1mark)**

(iv) State any two ways that can be done to increase the deflection of the galvanometer **(2marks)**

(b) The generator at a power plant produces a voltage of 25KV for long distance transmission on overhead power lines. This is stepped up to 400KV. It is later stepped down to 240V for domestic use.

(i) State the reason why the voltage is stepped up to 400KV **(1mark)**

(iii) A transformer is used to step up the voltage. Calculate the ratio of primary turns to secondary turns needed for this transformer **(2marks)**

(iv) Given that the step down transformer has a current output of 20A and it is 80% efficient. Calculate the current through the primary coil of the transformer **(3marks)**

(c) State one energy loss in a transformer and how it is minimized **(2marks)**

14. **(a)** Define the term Threshold wavelength **(1mark)**

(b) The figure below is a graph of the stopping potential Vs against frequency in an experiment on photoelectric effect.

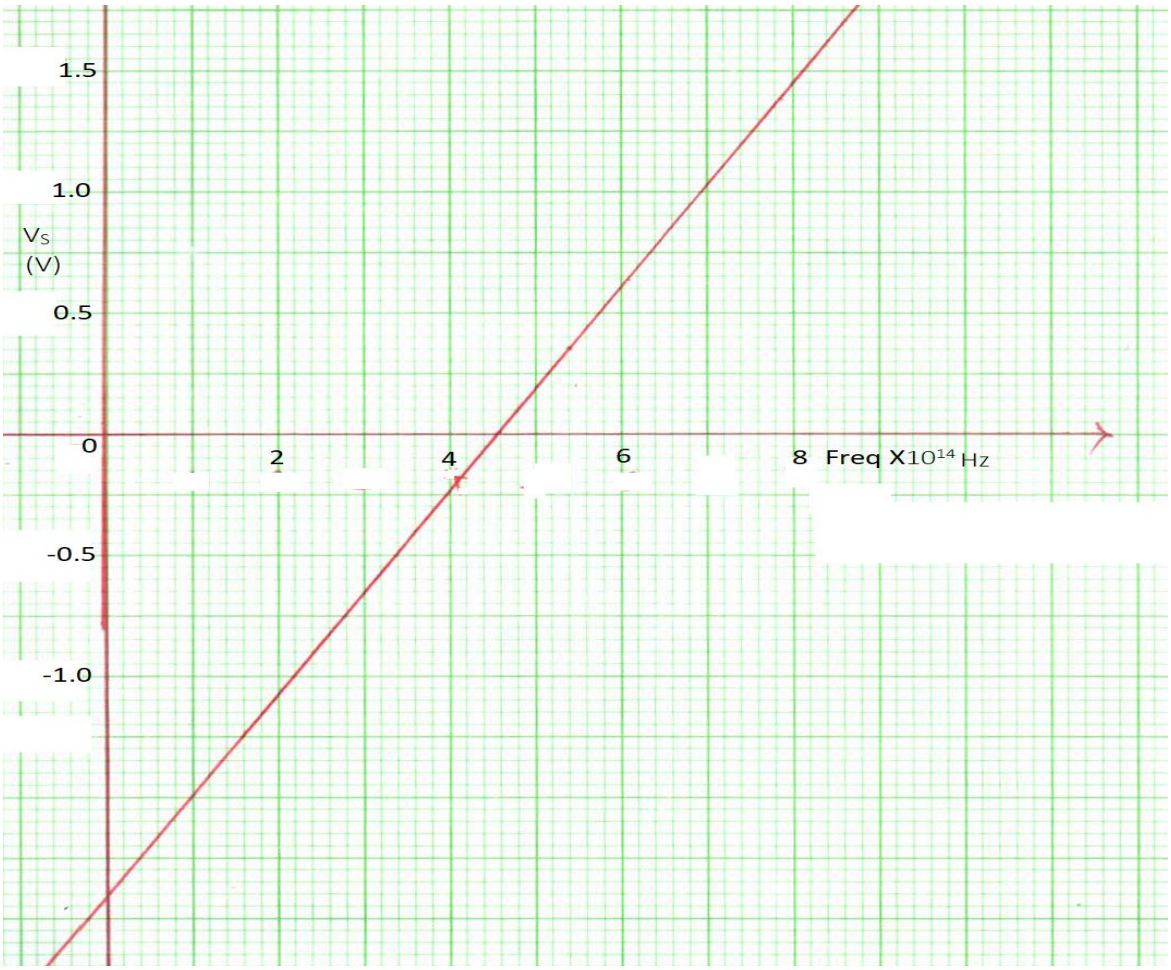


Figure 7

Given that the stopping potential Vs is related to the frequency by equation $V_s e = hf - Wo$, where e is the charge of an electron ($e = 1.6 \times 10^{-19} C$), Determine;

(i) Planks constant, h **(3 marks)**

(ii) Find the threshold frequency **(1 mark)**

(iii) Work function, Wo of the metal in electron volts **(2marks)**

(b) The figure below shows a diagram of a cathode ray oscilloscope

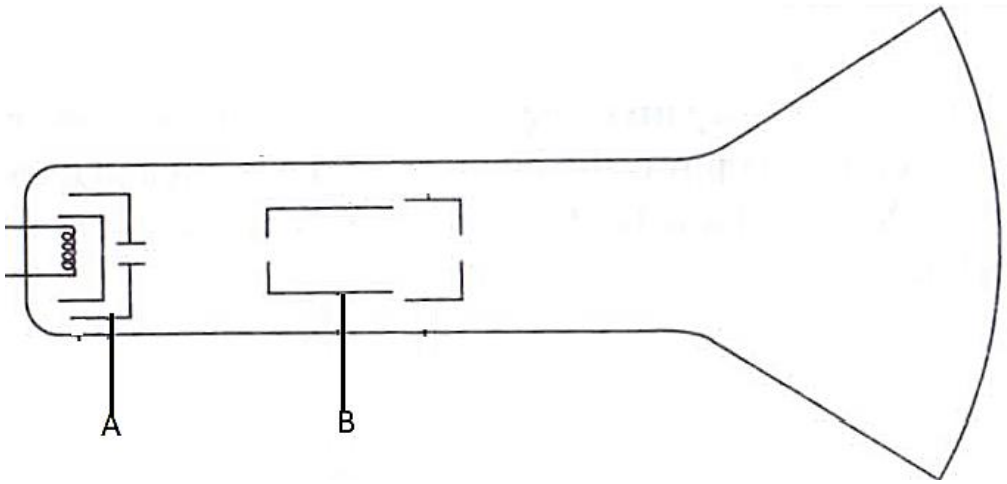


Figure 8

Name the parts labeled;

(i) A :……. **(1mark)**

(ii) **B :…….** **(1 mark)**

(iii) State two functions of the electron gun **(2marks)**

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

(v) The figure below represents a display of an ac signal on the CRO screen

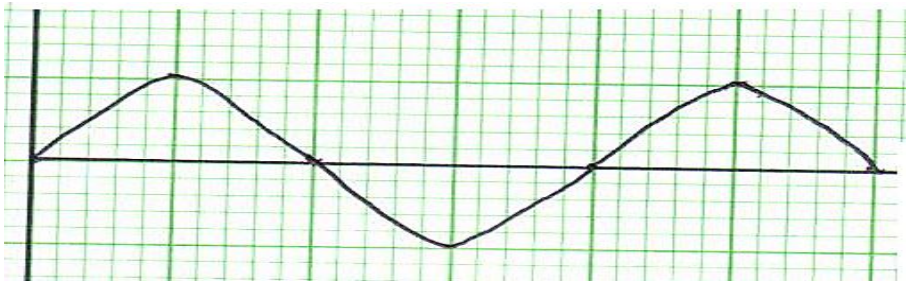


Figure 9

Determine the frequency of the signal given that the time base setting is 200ms per division

(3marks)

15. (a) Distinguish between intrinsic and extrinsic semi-conductors **(1 mark)**

(b) The diagram below show a p-n junction,

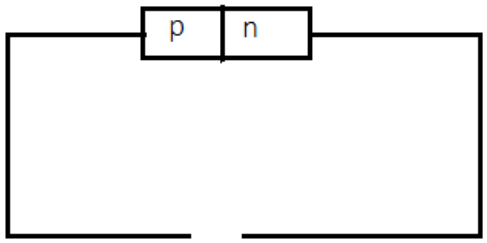


Figure 10

Complete the terminal of the external cell to show a reverse biased diode **(1 mark)**

(c) The figure below shows an ac connected in series with a diode and CRO

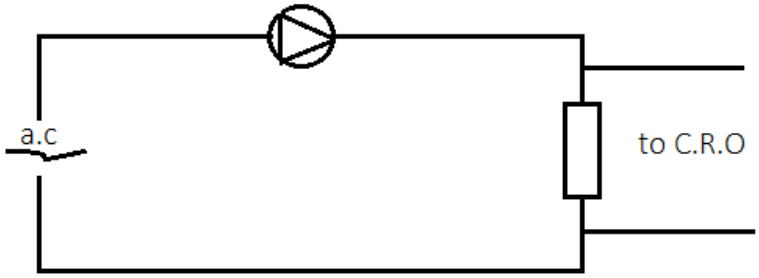


Figure 11

(i) State the type of rectification shown above (1mark)

(ii) Sketch on the axes provided in the wave that is seen on the CRO screen from the circuit shown in (i) above **(2marks)**



Figure 12

(d) Describe how an n-type semi-conductor is formed **(2marks)**

(e) Sketch a current- voltage characteristic of a junction diode with both forward and reverse bias **(2marks)**

16. (a) The figure below shows plane waves incident on a curved reflecting surface, draw the reflected wave fronts **(1mark)**

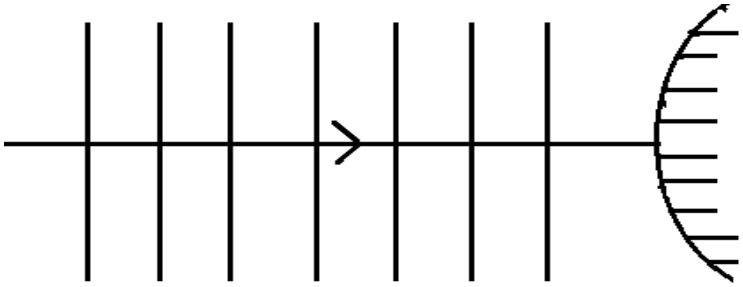


Figure 13

(b) The diagram below shows water waves moving from shallow water to deep water

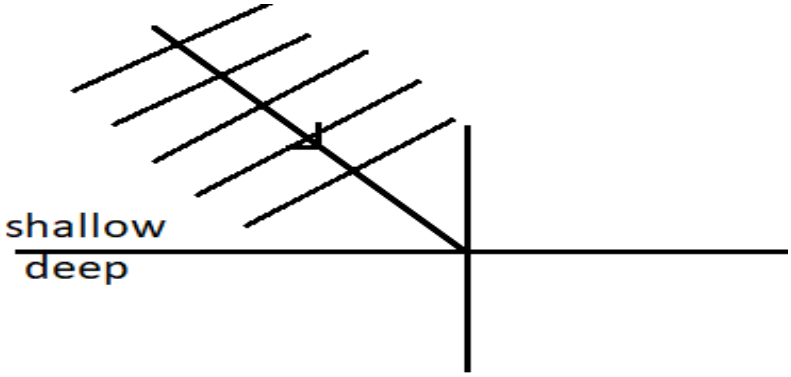


Figure 14

Sketch on the diagram the refracted wave fronts (2 marks)

(c) The figure below shows a wave profile.

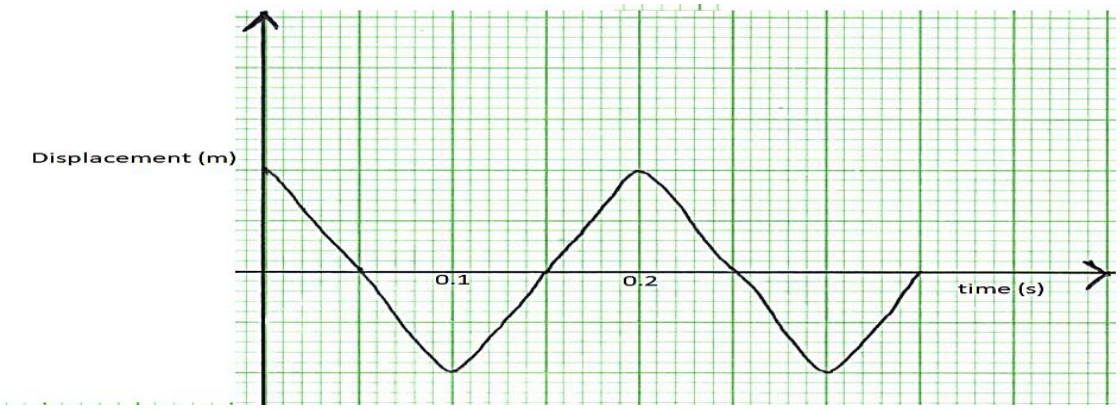


Figure 15

. Determine the frequency of the wave **(2marks)**

(d) An object is positioned 12cm from the Centre of a converging lens of focal length 18cm. Find the position and nature of image formed **(3marks)**

17. (a) Define the term half-life **(1 mark)**

(b) The following nuclear reaction is part of radioactive series

$$^{238}_{92}U \xrightarrow{S} {}^{234}_{90}X \xrightarrow{r} {}^{234}_{91}Y$$

Name the radiations represented by r and s

r…… **(1mark)**

s…… **(1mark)**

(c) The figure below shows the features of a diffusion cloud chamber used for detecting radiations for radioactive source

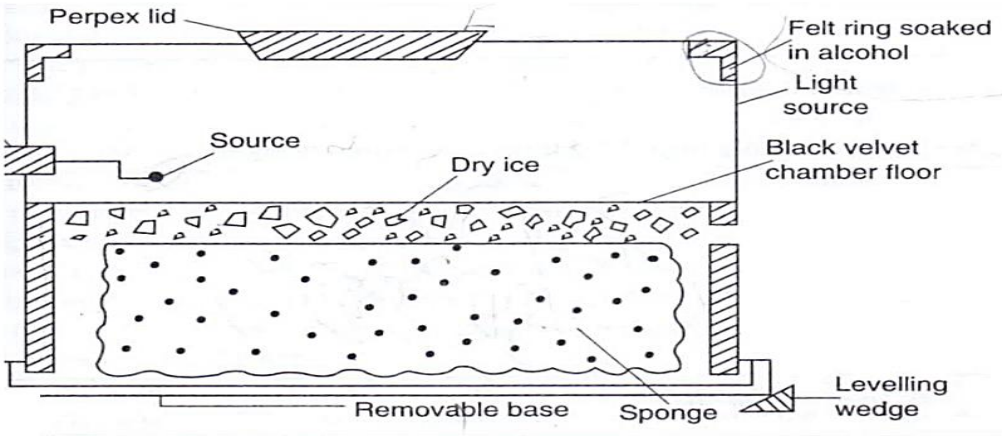


Figure 16

(i) Give a reason as to why Perspex lid is rubbed with a piece of cloth **(1mark)**

(ii) Explain how radiations from the radioactive source is detected in the chamber **(3marks)**

(iii) State one advantage of cloud chamber over a charged electroscope when used as a detector of radiations **(1mark)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 3 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..
DATE……..

232/1

PHYSICS

Paper 1 (THEORY)

2 hours

Instructions to candidates

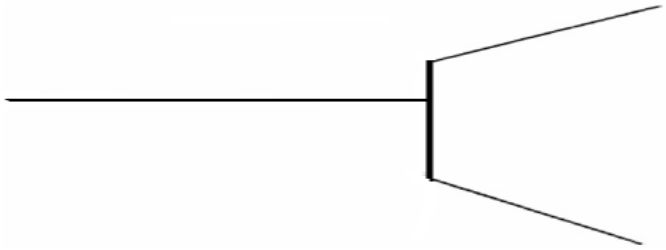
(a) Write your name, index number in the spaces provided above.
(b) Sign and write the date of the examination in the spaces provided
(c) This paper consists of **TWO** Sections: **A** and **B**.
(d) Answer **ALL** the questions in section **A** and **B** in the spaces provided.

For examiners use only

Section	Question	Maximum score	Candidates score
A	1-13	25	
B	14	11	
	15	09	
	16	08	
	17	09	
	18	10	
	19	08	
	TOTAL SCORE	80	

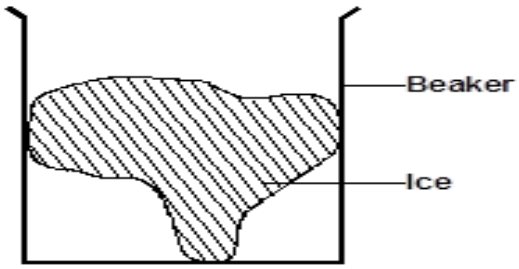
SECTION A: 25marks

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)**

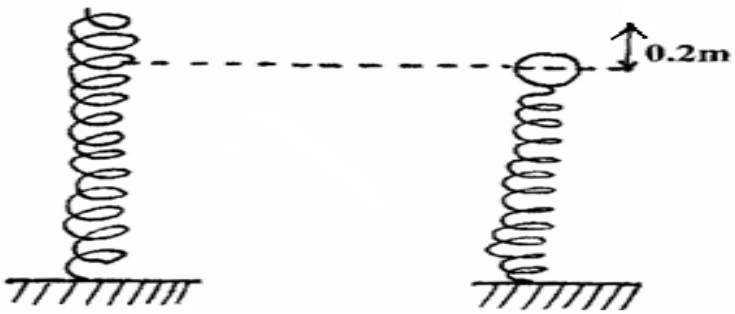
3.The figure below shows beaker containing a block of ice.



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

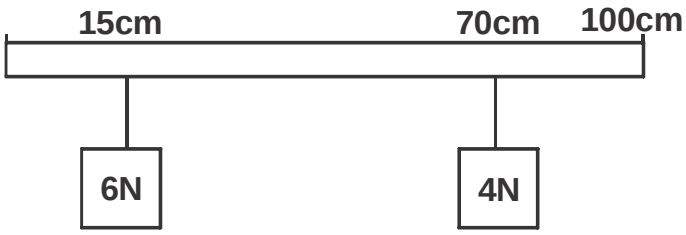
4. An aero plane is moving horizontally through still air at a uniform speed. It is observed that when the speed of the plane is increased, its height above the ground increases. State the reason for this observation. **(2 marks)**

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)**

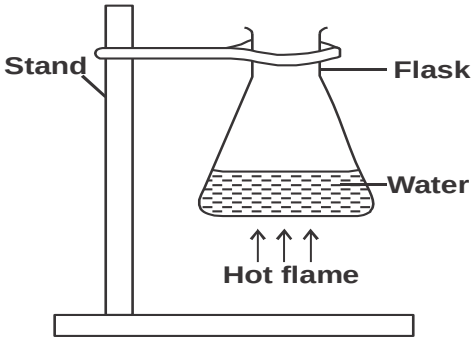
6. The figure below shows a uniform metre rule of weight 3N supporting two weights. The metre rule is pivoted somewhere such that it is horizontally balanced. (Pivot not shown)



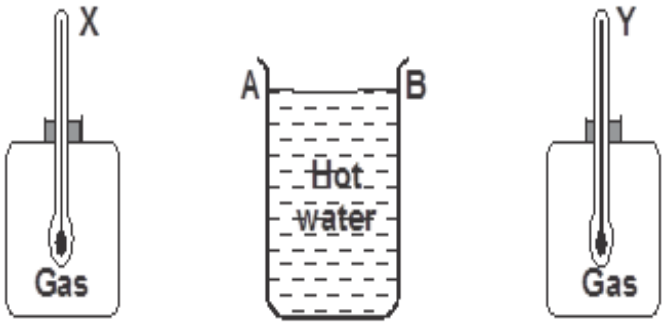
The 6N weight is at 15cm mark while the 4N weight is at 70cm mark. Determine the position of the pivot from zero cm mark**.** **(3 marks)**

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)**



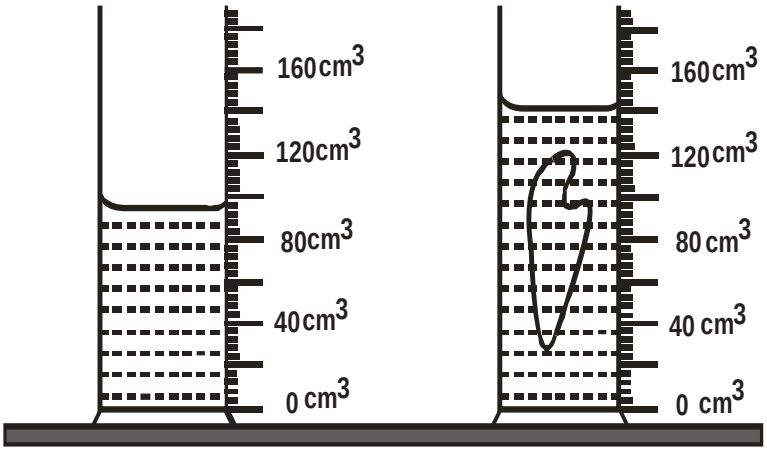
9. The figure below shows a cylindrical container having hot water at 95^{o}C. End A is shiny while end B is dull black. At equal distances from the container is placed two identical gas jars fitted with thermometers X and Y.



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)**

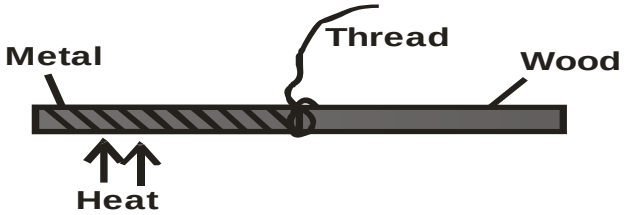
11. The figure below shows the change in volume of water in a measuring cylinder when an irregular solid is immersed in it.



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

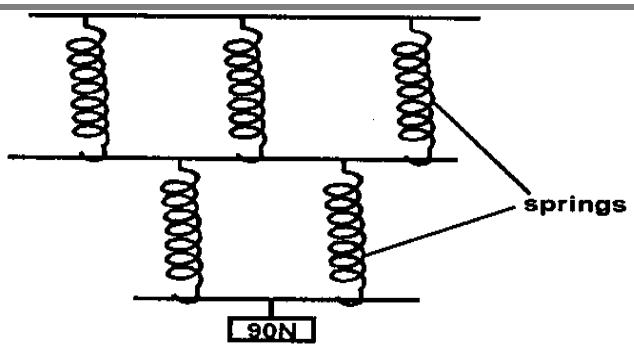
(3 marks)

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*



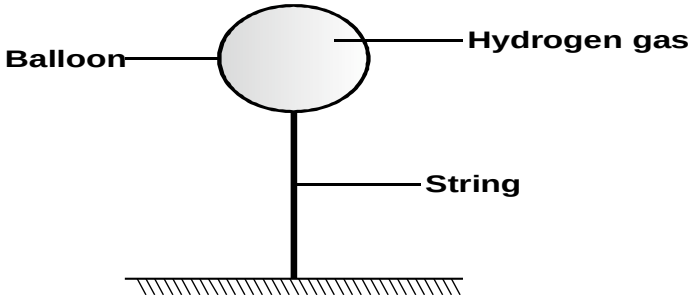
Determine the total extension of the system. (Take the weight of the cross bars to be negligible)

(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)**

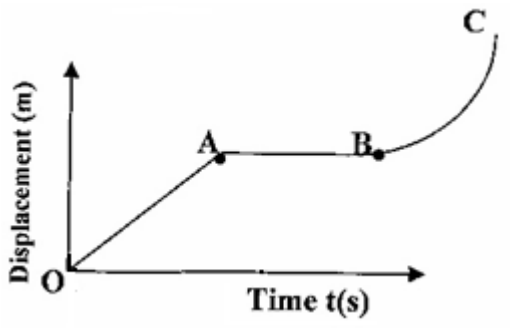
(**iii)** the tension in the string. **(2 marks)**

(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)**

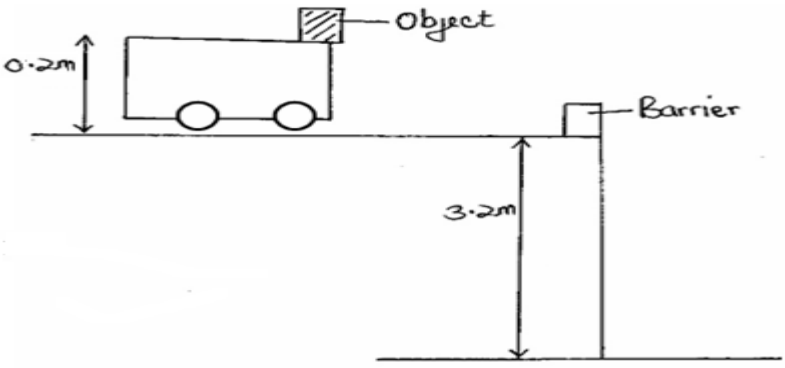
OA……..……..…

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)**

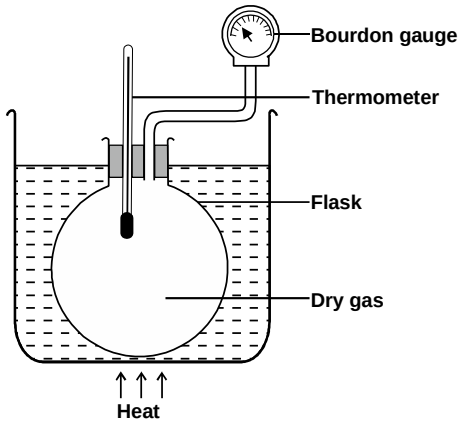
ii) Give a reason why the object on the trolley flies off on impact. **(1 mark)**

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.

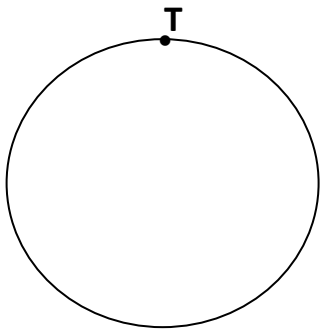


Describe briefly how the set-up can be used to verify pressure law. **(4 marks)**

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.

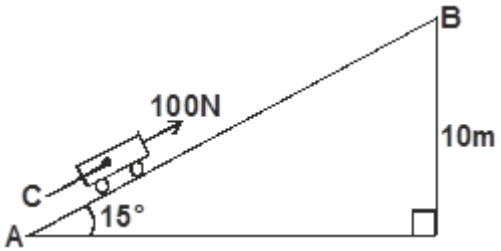


i) Determine the velocity V of the mass at point T. **(3marks)**

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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 3 PAPER 2

NAME…… INDEX NO…….

SCHOOL…….... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2 (THEORY)
2 HOURS

Instructions to candidates

(a) Write your name, index number in the spaces provided above.
(b) Sign and write the date of the examination in the spaces provided
*(c) This paper consists of **TWO** Sections: **A** and **B**.*
*(d) Answer **ALL** the questions in section **A** and **B** in the spaces provided.*
***(e)** All working **MUST** be clearly shown.*
(f) KNEC mathematical tables and silent non-programmable electronic calculators may be used.

For examiners use only

Section	Question	Maximum score	Candidates score
A	1-13	25	
B	14	11	
	15	11	
	16	13	
	17	10	
	18	10	
	TOTAL SCORE	80	

SECTION A: 25marks

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

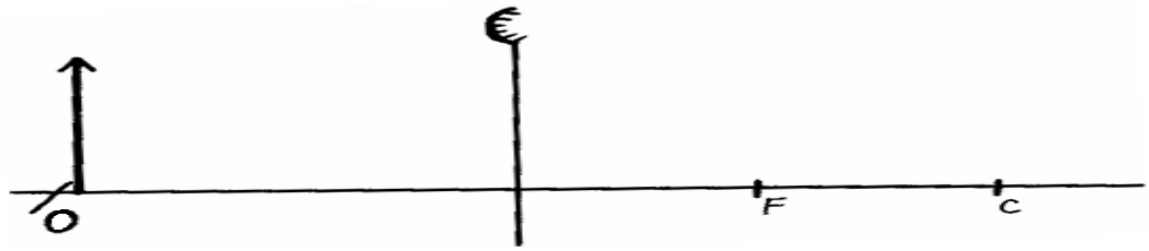
adio wave		frared rays		ltra-violet	-Rays

Name the radiation represented by

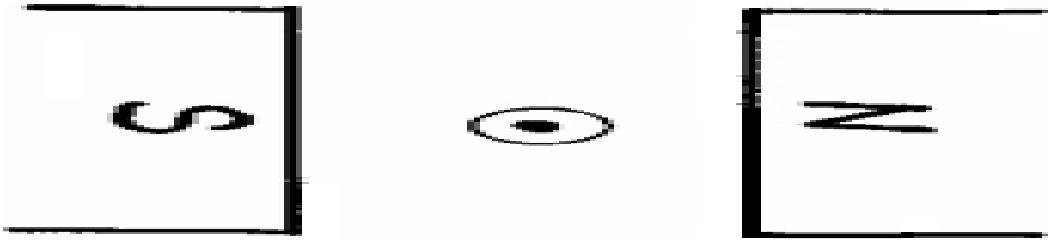
A(1mark)

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)**



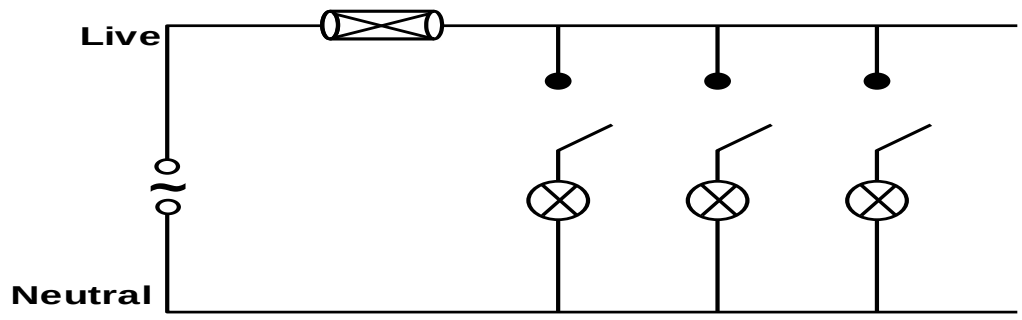
3. The figure below shows a wire carrying current whose direction is out of the paper. The wire is placed in a magnetic field.



(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)**

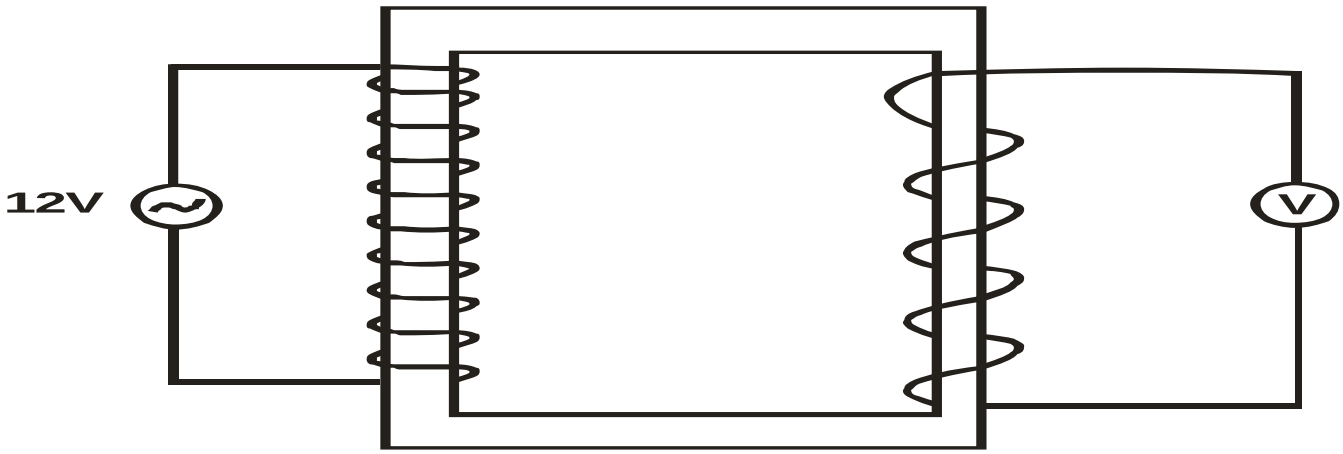
4. The figure below shows part of the lighting circuit of a house.



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

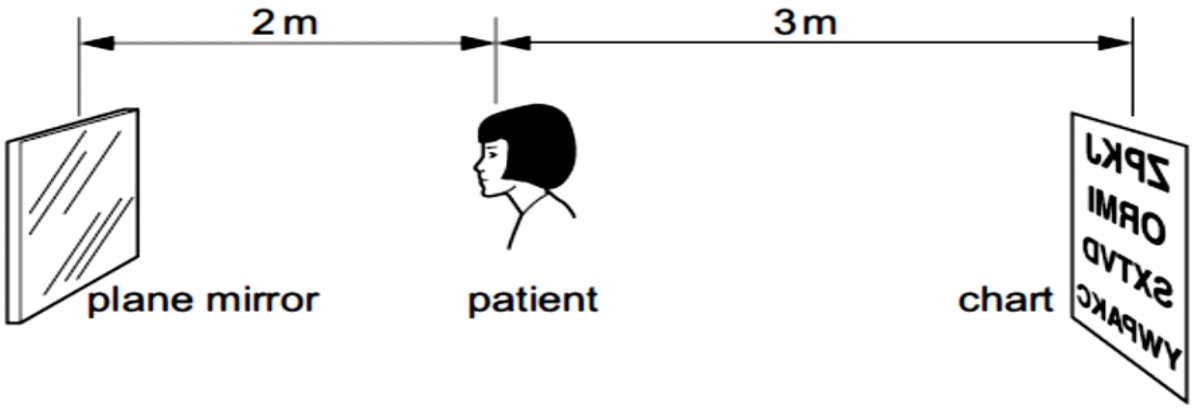
ii) If each lamp has a power of 60W at voltage of 240V. Calculate the current through one lamp when it is switched on. **(2 marks)**

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)**

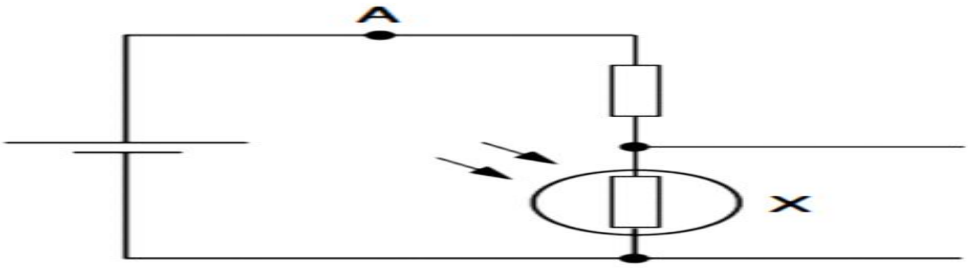
6. The diagram shows a patient having her eyes tested. A chart with letters on it is placed behind her and she sees the chart reflected in a plane mirror.



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.



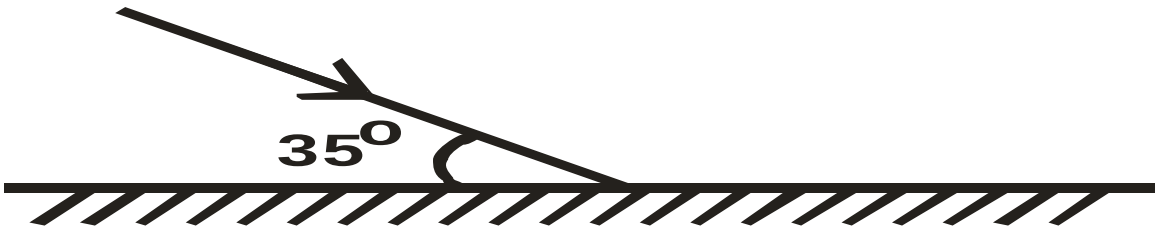
State and explain how the potential difference across X varies as the light shining on it becomes brighter. **(2marks)**

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.

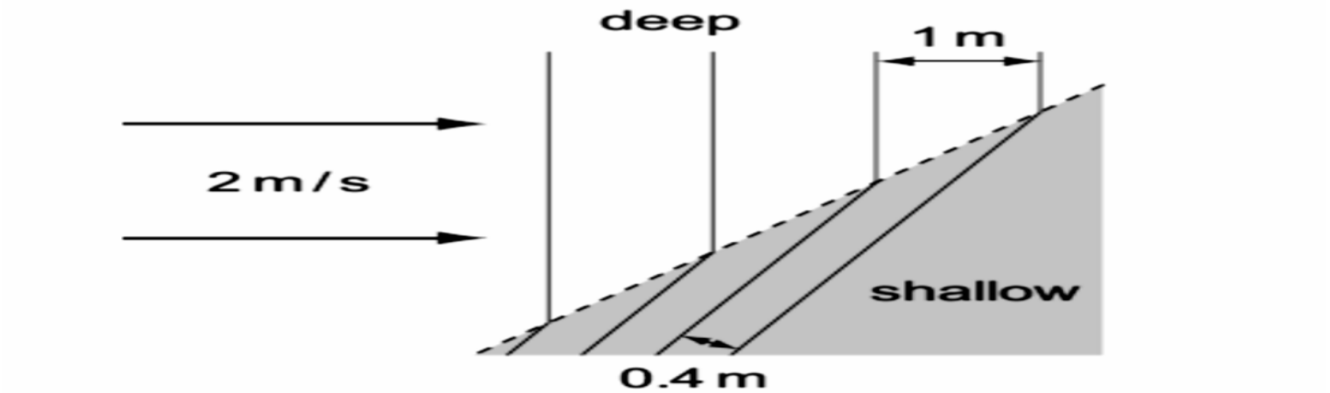


Indicate on the iron bar the polarity of resulting magnet. **(1 mark)**

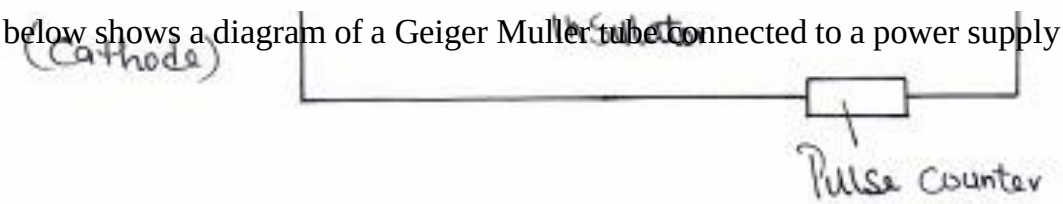
12. An echo sounder of a ship transmits sound waves to the depth of the sea and receives the echo after 2.4 seconds. If the speed of sound in water is $1600ms^{-1}$, determine the depth of the sea.**(3 marks)**

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.



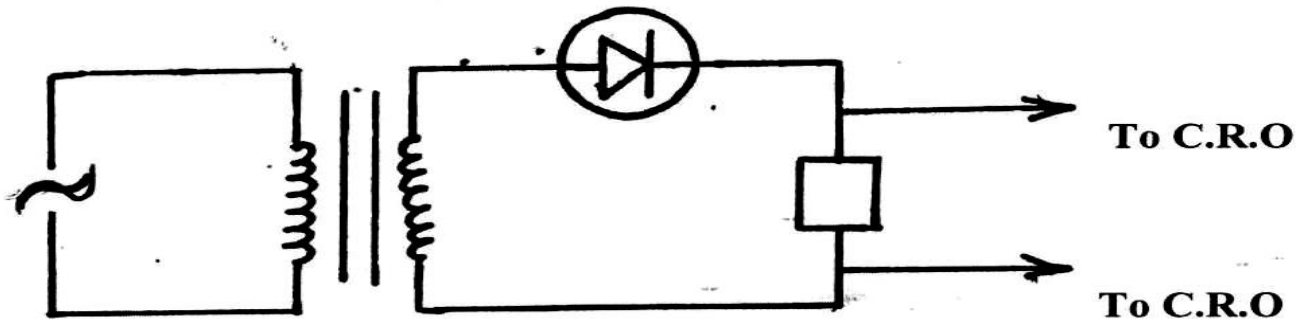
(i) Why should the argon gas be at low pressure? **(1mark)**

(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)**

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



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

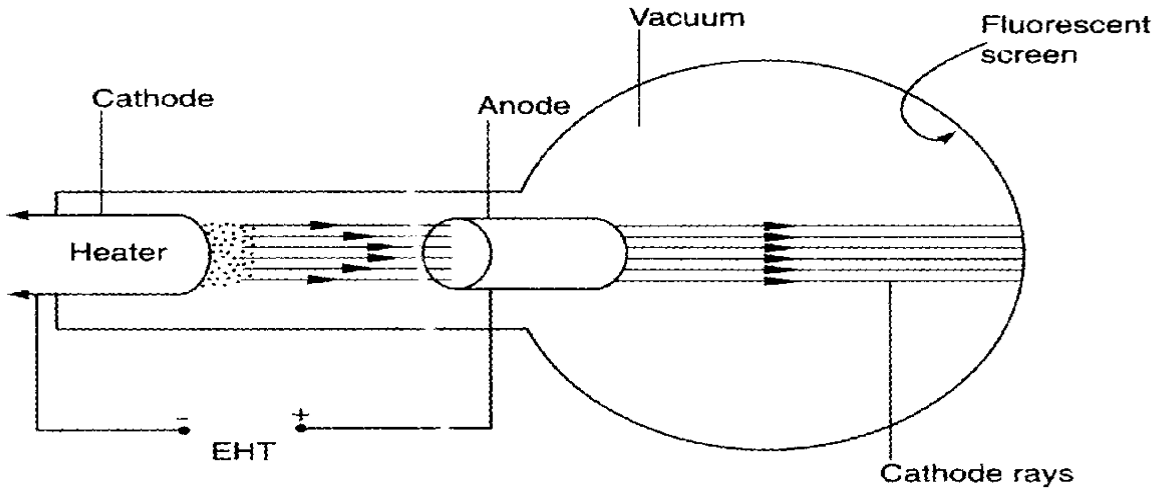
0ii) What type of rectification is shown? **(1mark)**

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)**

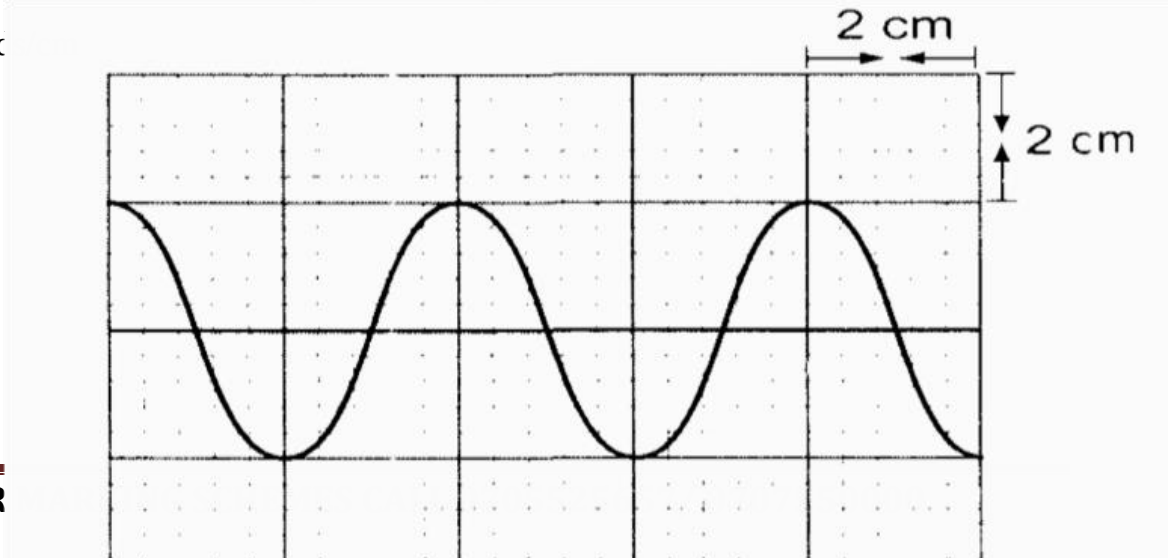
c) State the effect of having air in the tube instead of a vacuum **(1 mark)**

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 milliseconc



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).

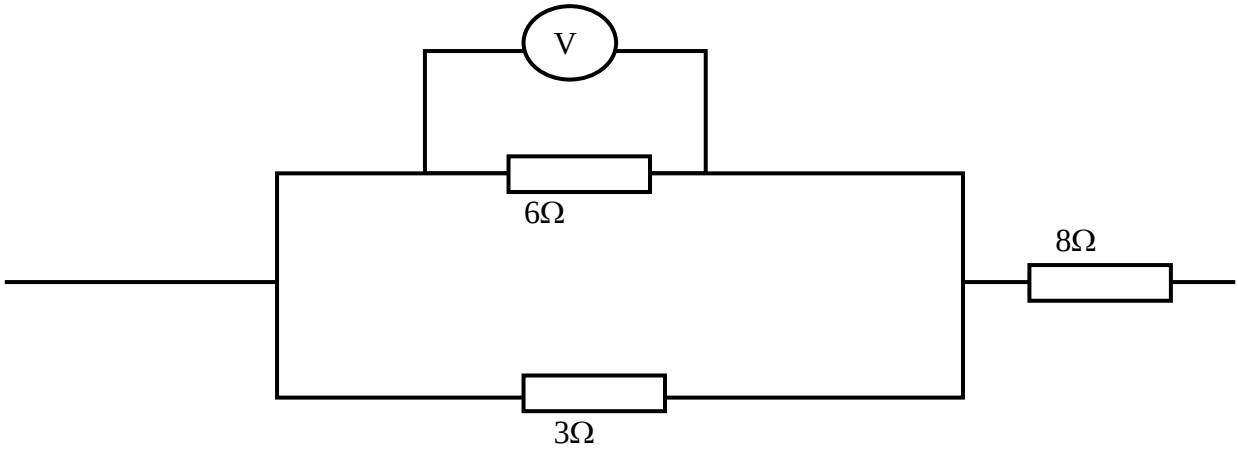
(i) Determine the energy of the incident radiation. **(3 marks)**

(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)**

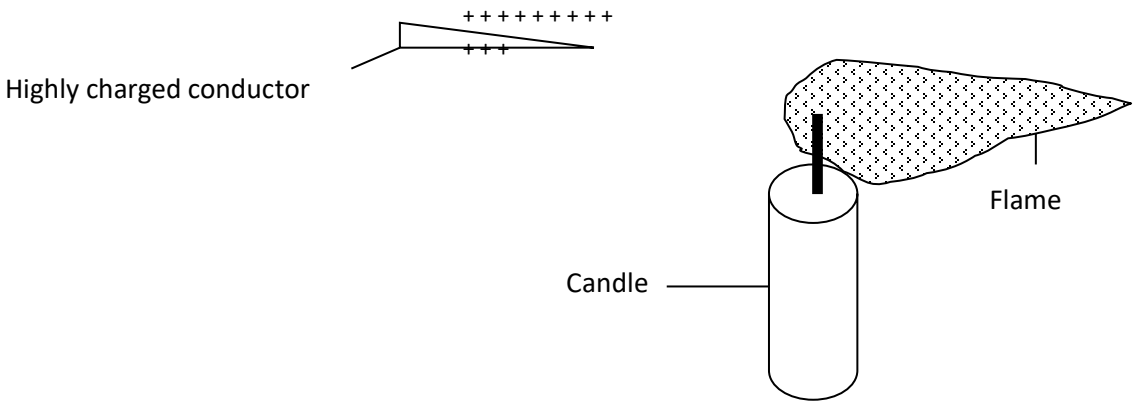
(ii) Current through the 3Ω resistor **(2marks)**

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

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

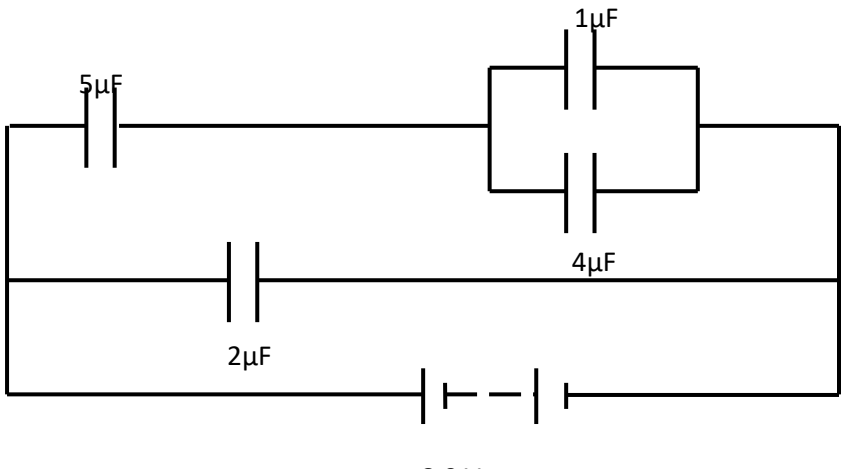
(ii) A cell supplies a current of 2.0A when connected to a 0.6Ω resistor and 1.5A when the same cell is connected to a 0.9Ω resistor.Find the e.m.f and the internal resistance of the cell. **(3marks)**

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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 4 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

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PHYSICS

PAPER 1

TIME 2 HRS

INSTRUCTIONS

i) Answer All questions in the spaces provided.
ii) Use the following CONSTANTS where applicable.
iii) All working must be clearly shown for numerical questions.
iv) Candidates should check to ascertain that all questions are printed as indicated in the table below.

Constants

i) Density of water = $1g/cm^3$ or $1000kg/m^3$.
ii) Gravitational acceleration = $10m/s^2$.

SECTION A (25 MARKS)

1. The figure below shows a Vernier caliper scale.

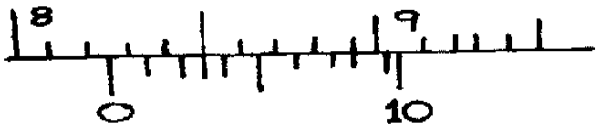


Fig. 1

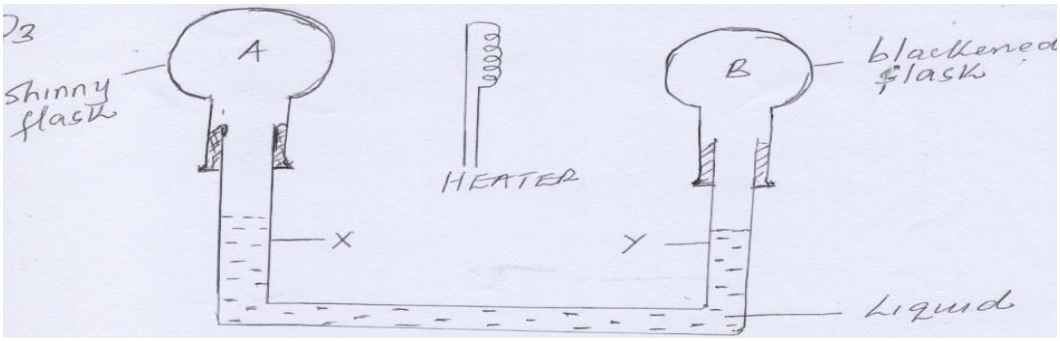
If the Vernier calipers used had a zero error of -0.02 what is the actual reading of the scale. **(2mks)**

2. Find the total pressure experienced by a diver 8 meters below the sea surface. **(3mks)**

Take; *Atmospheric pressure = 103360N*

Density of sea water = 1030 kg/m^3

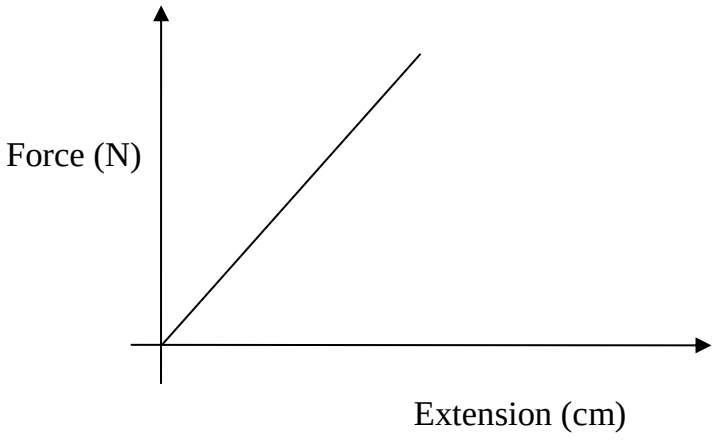
3. The figure below shows an electric heater placed midway between flask A and B. flask A is shinny on the outside and flask B is blackened on the outside.



a) Name the process by which heat travels from heater to the flask. **(1mk)**

b) State the observation that will be made. **(1mk)**

4. The following is a graph of force against extension for a spring



On the same axes, sketch a graph of force against extension for a spring double the length, same thickness, same material as the spring above **(1mk)**

5. Water flows steadily along a horizontal pipe at a volume rate of 8.0×10^{-3} m^3/s. if the area of cross section of the pipe is $20cm^2$. Calculate the velocity of the fluid. (3mks)

6. Two parallel forces are acting on a body of mass 0.7 kg as shown in the figure below.



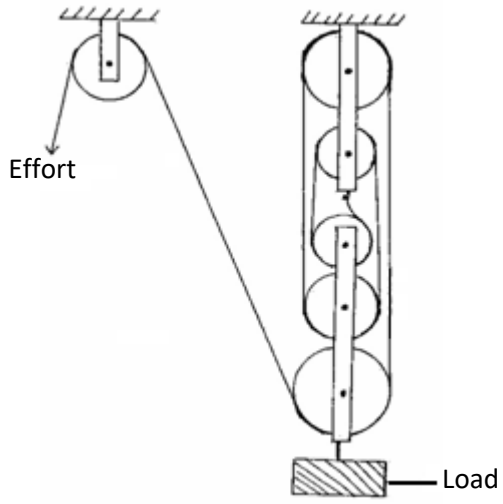
Calculate the acceleration of the 0.7Kg mass **(3mks)**

7. (a) State pressure law. **(1mk)**

b) Air is compressed at a constant temperature until its pressure rises from 82cmHg to 140cmHg. If the initial volume of air is $85cm^3$, find the final volume of air. **(3mks)**

8. Explain the cause of random motion of particles as observed in Brownian motion in a smoke cell experiment. **(1mk)**

9. 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. **(3 mark)**

10. Figure below shows a liquid in a long cylindrical tube closed at one end with a cork. The cork is tight fitting but movable.

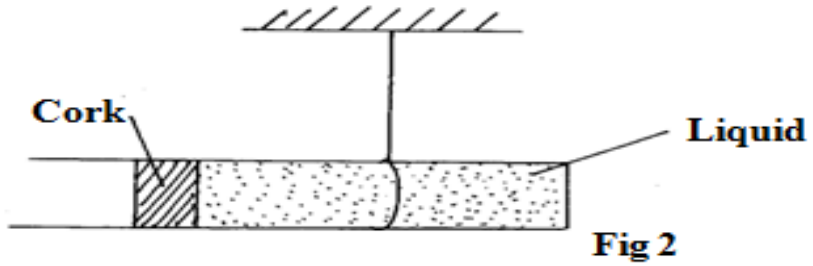


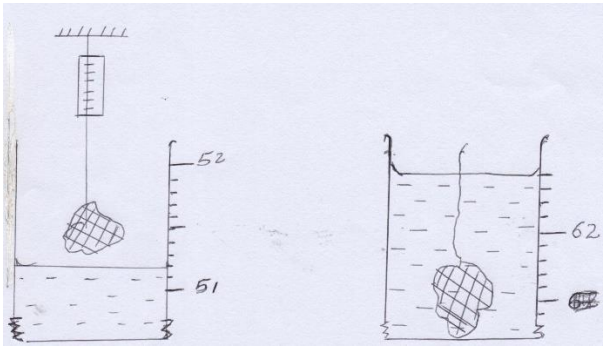
Fig 2

State and explain the observation that would be made when the tube is heated uniformly. **(2mks)**

SECTION B (55 MARKS)

11. A) state Archimedes principle. **(1mk)**

b) Figure below shows an experiment used to determine the density of an irregular piece of metal. The mass of metal in air is 200g.



i) Determine the volume of the stone in cubic metres. **(2mks)**

ii) Calculate the density of the metal to 3 significant figure. **(2mks)**

c) Given that the density of water is $1g/cm^3$, determine;

i) The mass of water displaced. **(2mks)**

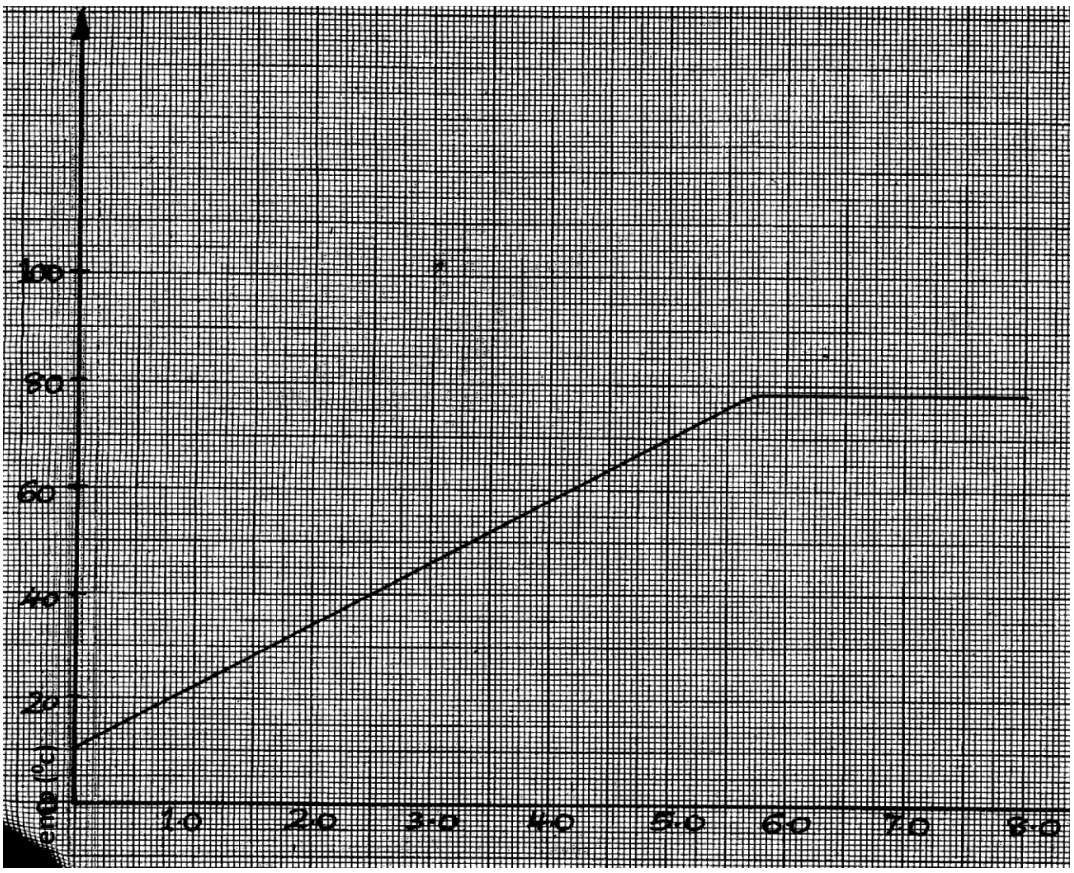
ii) The upthrust acting on water. **(2mks)**

iii) The relative density of the metal. **(2mks)**

d) A solid displaces 5.5cm3 of paraffin when floating and 20.5cm^3 when fully immersed. Given that the density of paraffin is 800kg/m^3, determine the density of the solid. **(3mks)**

12. a) State **one** factor that affect the boiling point of a liquid. **(1mk)**

b) 100g of a liquid at a temperature of 10°C is poured into a well lagged calorimeter. An electric heater rated 50W is used to heat the liquid. The graph in Figure 8 below shows the variation of the temperature of the liquid with time.



i) From the graph, determine the boiling point of the liquid. **(1mk)**

ii) I) Determine the heat given out by the heater between the times t=0.5 minutes and t=5.0 minutes. **(2mk)**

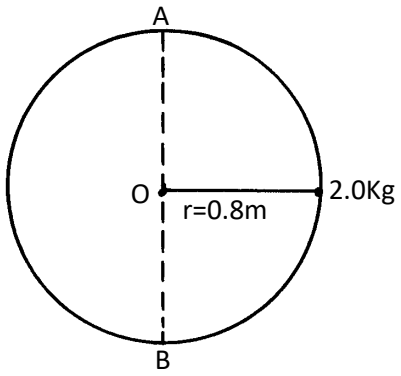
II) From the graph determine the temperature change between the times t=0.5 minutes and t=5.0 minutes. **(1mk)**

III) Hence determine the specific heat capacity of the liquid. **(3mk)**

iii) 1.8g of vapor was collected from the liquid between the times t=6.8 minutes and t=7.3 minutes. Determine the specific latent heat of vaporization of the liquid. **(4mks)**

13. a) Define angular velocity. **(1mk)**

b) The diagram below shows an object of mass 2.0kg whirled in a vertical circle of radius 0.8m at a uniform speed of $50ms^{-1}$.



Determine;

i) The centripetal force on the object. **(3mks)**

ii) The tension in the string when the object is at **A.** **(2mks)**

iii) The tension in the string when the object is at **B**. **(2mks)**

c) The speed of rotation is gradually increased until the string snaps. At what point is the string likely to snap? Explain. **(2mks)**

14. a) State the principle of parallel forces. **(1mk)**

b) A uniform plank of wood weighing 50N and of length 5m is suspended by two ropes A and B, 1.5m a part A is 2m from end and B is 1.5m from the other end, as shown in fig. 1 below. A concrete block of weight 100N is suspended from the center of the plank.

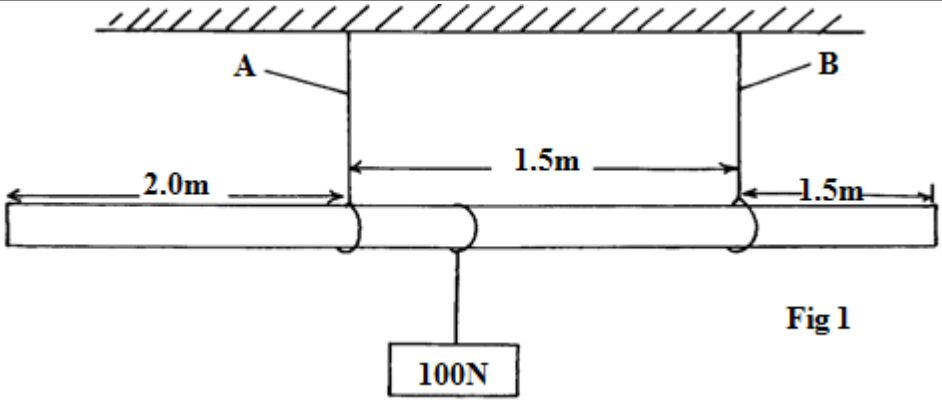


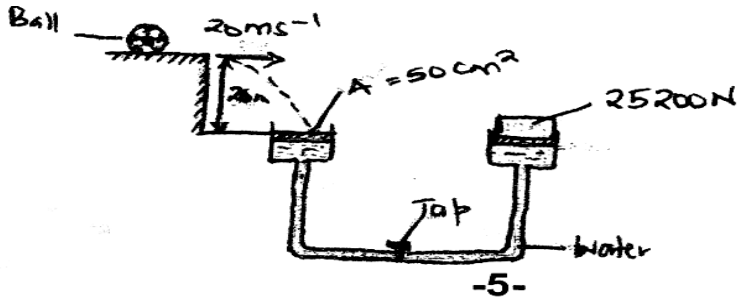
Fig 1

Calculate the tension, T_A on the string **A** **(3mks)**

c) I) state two ways in which the stability of a body can be increased. **(2mks)**

II) State one way in which vehicle assembling companies enhances stability in vehicles. **(1mks)**

15. The figure below shows a ball of mass 50kg being thrown from a top of wall 20m high with a horizontal velocity of 20m/s. It stuck the piston A of hydraulic lift and no water splashed out. The other piston B had a weight of 25200N placed on it. Assuming the tap was opened at the time the ball stuck the piston A.



Determine;

(i) The time taken by the ball to strike the surface of piston A. **(3 mks)**

(ii) The distance from the foot of the wall to where it hit piston A. **(2 mks)**

(iii) The vertical velocity with which the ball struck piston A. **(2 mks)**

(iv) The force with which the ball struck piston A. **(2 mks)**

(v) The area of piston B if the load on the piston B did not move and that the two pistons were initially at the same level. **(3 mks)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 4 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

TIME 2 HRS

INSTRUCTIONS

i) Answer All questions in the spaces provided.

ii) Use the following CONSTANTS where applicable.

iii) All working must be clearly shown for numerical questions.

iv) Candidates should check to ascertain that all questions are printed as indicated in the table below.

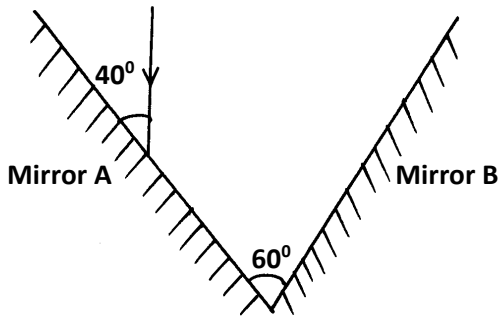
Constants

i) Density of water = $1g/cm^3$ or $1000kg/m^3$.

ii) Gravitational acceleration = $10m/s^2$.

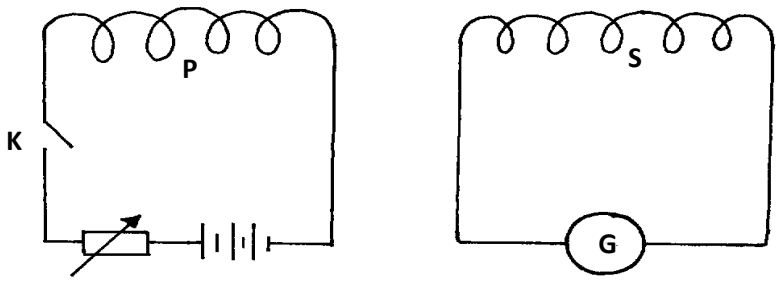
SECTION A (25 MARKS)

1. A ray is incident on two mirrors inclined at 60^0 as shown in the diagram below. **(3mks)**



Determine the angle of reflection on mirror **A**, hence trace the path of the ray as it leaves mirror **B.**

2. a) The coils **P** and **S** are connected as shown below. **P** is connected to a battery, rheostat and a switch **K**. **S** is connected to a galvanometer **G**.



State the behavior of the pointer on **G** in the following cases;

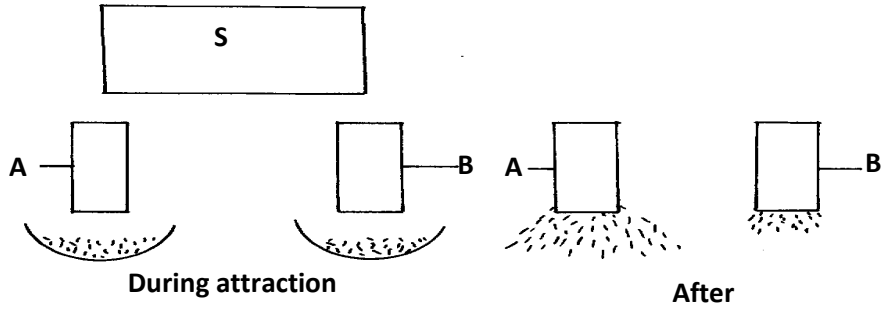
i) When **K** is switched on (closed) **(1mk)**

II) When **K** is opened. **(1mk)**

b) A transformer has 200 turns in the primary coil and 1000 turns in the secondary coil. If the transformer is 100% efficient and the current in the secondary coil is 0.15A, determine the current in the primary coil. **(3mks)**

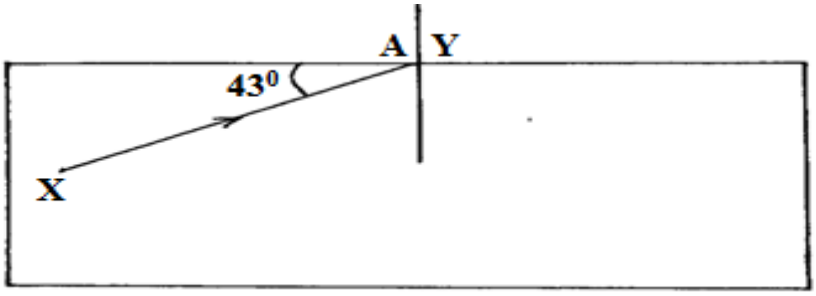
3. Figure below shows a simple experiment using a permanent magnet and two metal bars **A** and **B**

Put close to the iron filings.



State with a reason which bar is made from a soft magnetic material. **(2mks)**

4. The diagram below shows a ray of light **xy** traveling through a glass block of critical 42^0 to point **A**

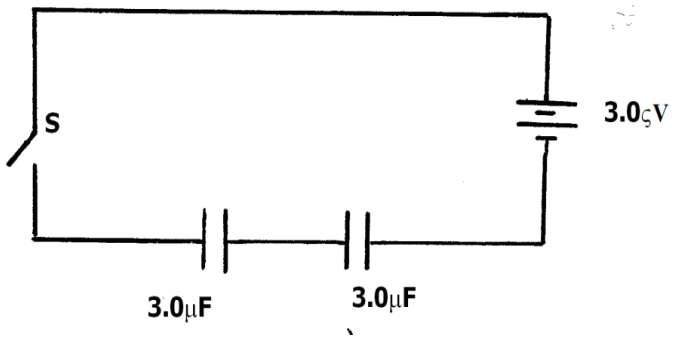


a) Calculate the refractive index of the glass block. **(3mks)**

b) On the same diagram, draw the path of the ray as it travels past point **A**. **(1mks)**

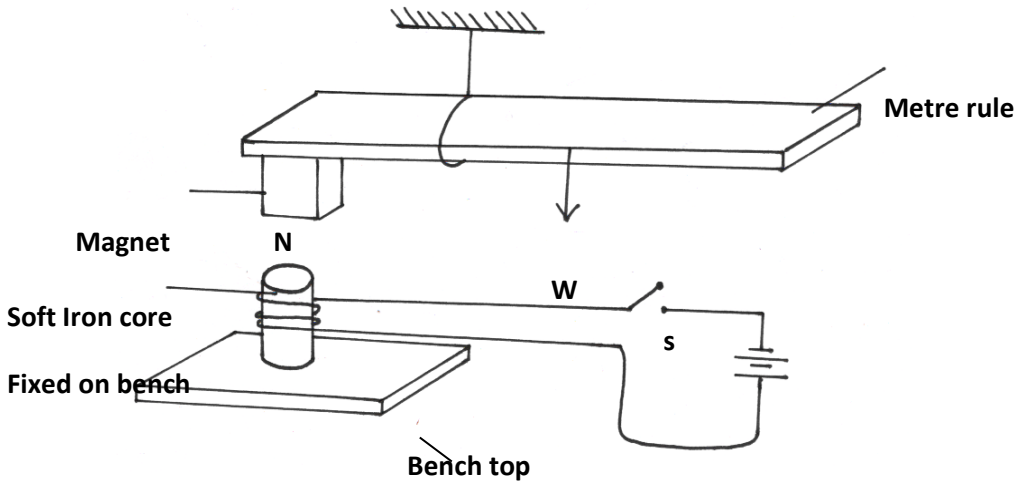
5. The photoelectrons liberated from an illuminated metal surface constitute a photoelectric current. What is the effect of decreasing the intensity of illumination on the magnitude of the photoelectric current? **(1mk)**

6. Figure below shows a battery of e.m.f 3.0v connected in series will two capacitors.



Determine the energy stored in the combined capacitors when the switch is closed. (3mks)

7. The figure below shows a meter rule in equilibrium with the magnet and weight W. The Soft iron core is fixed to the bench.



State and explain the effect on the meter rule when the switch S is closed **(2mks)**

8. State how polarization is reduced in a dry cell. **(1mk)**

State two differences between the cathode ray tube (CRT) of a T.V and the cathode ray oscilloscope (CRO). **(2mks)**

9. Distinguish between a P-type and a N-type extrinsic semiconductors. **(2mks)**

SECTION B (55 MARKS)

10. (a) Students set up a mass attached to a spring such that when it oscillates it taps on water surface in a wide shallow tank as in figure 11 below.

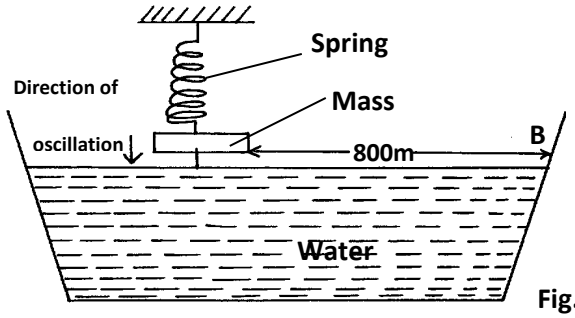


Fig. 11

The students measured time for 20 oscillations and found that the mass takes 36 seconds.

Determine:

(i) The periodic time of the mass **(2mks)**

(ii) The frequency of the waves produced on the water surface **(2mk)**

(iii) The speed of the waves if the students counted four ripples between the mass and end **B** of the tank **(3mks)**

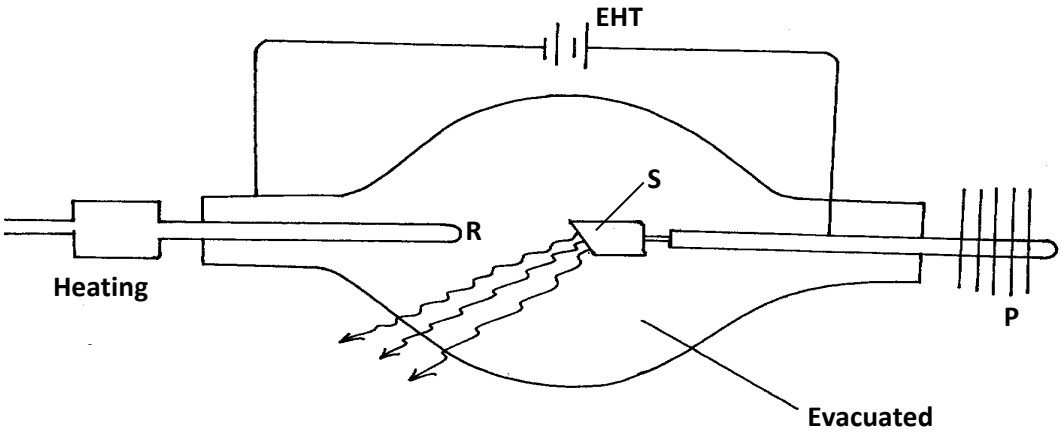
(b) State any **two** factors that would increase the speed of sound in air **(2mks)**

(c) An echo sounder of a ship received the reflected waves from a sea bed after 0.20s.

(i) Determine the depth of the sea bed if the velocity of sound in water is 1450m/s **(2mks)**

(ii) When the ship above passes over a sunken reef, the echo sounder receives an echo after 0.16s. Determine the height of the sunken reef **(2mks)**

11. (a) The diagram below shows an X-ray tube drawn by a student. Use it to answer the questions which follow.



(i) State with reason the material used for the part labeled **R**.
(2mks)

(ii) Why is the tube evacuated **(1mk)**

(iii) How can the wavelength of the X-rays emitted from this tube be reduced **(1mk)**

(b) X-rays are emitted when a tube operates at 3×10^2 V and a current of 0.01 A is passing through it (take $e = 1.6 \times 10^{-19}$C, Me $= 9 \times 10^{-31}$kg). Calculate;

(i) The velocity of the electron on hitting the target. **(3mks)**

(ii) The minimum wavelength of the X-rays emitted **(3mks)**

C (i) State **one** properties of X-rays **(1mk)**

(ii) Sate **one** uses of X-rays

(1mk)

12. a) Differentiate between a nuclear fusion and nuclear fission. **(2mks)**

b) The equation below represents a nuclear reaction.

$$^{218}_{84}P_o \longrightarrow {}^{218}_{85}A + {}^{q}_{p}Y$$

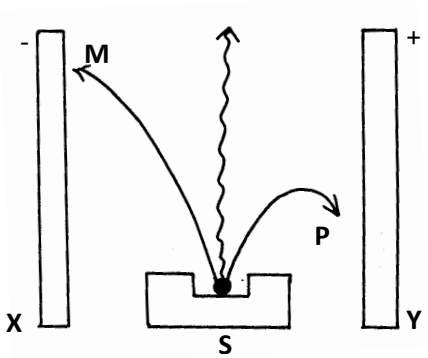
i) Determine the values of **p** and **q.** (2mks)

p……..……..

q……..……..

ii) Identify **Y**……..…… **(1mk)**

c) The figure below represents deflection of various radiations from a radioactive source S placed in electric field between two plates **X** and **Y.**



Identify the radiations marked with letters **M** and **P.**

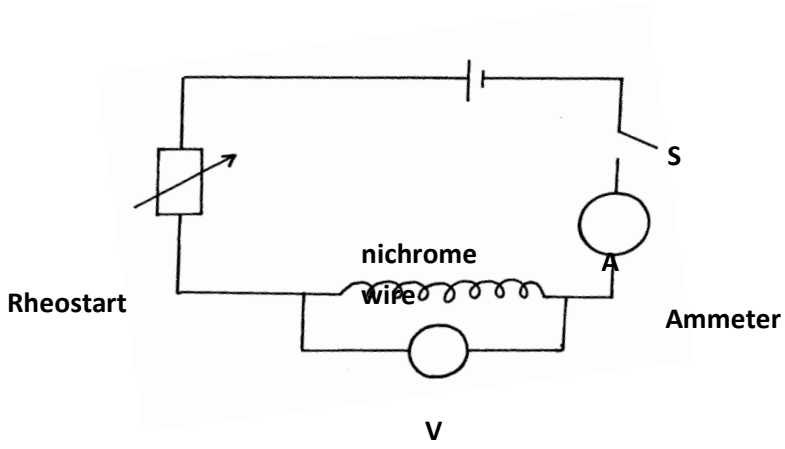
(2mks) **M**……

P……

d) A sample of radioactive substance initially has $8x10^{25}$ particles. The half life of the sample is 98 seconds. Determine the number of particles that will have decayed after 294 seconds. (3mks)

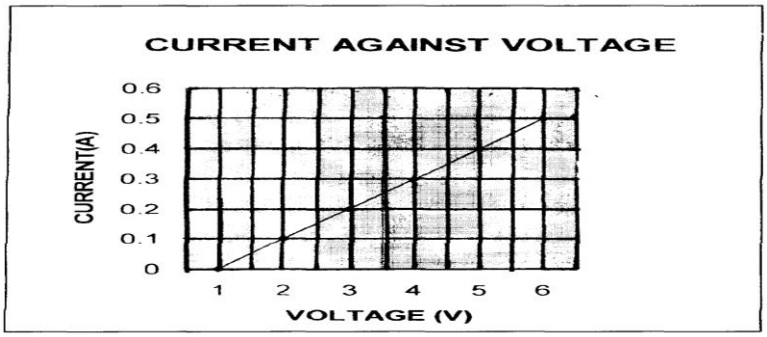
14. a) State Ohm's Law. **(1mk)**

b) The figure below shows a circuit that can be used to verify Ohm's law



Explain briefly how the setup can be used to verify ohm's law **(3mks)**

c) The graph below was obtained from experiment to determine the effective resistance of two resistors connected in parallel. If the value of one resistor is 50 ohms. determine the value of the other resistor.



From the graph, determine

i) effective resistance of the two resistors **(2mk)**

ii) the value of the other resistor **(3mks)**

15. **(a)** An object **O** stands on the principal axis of a concave mirror as shown in figure 9 below.

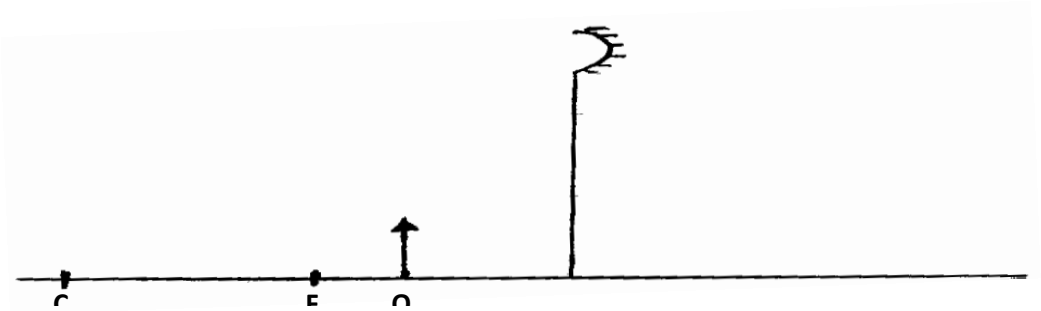
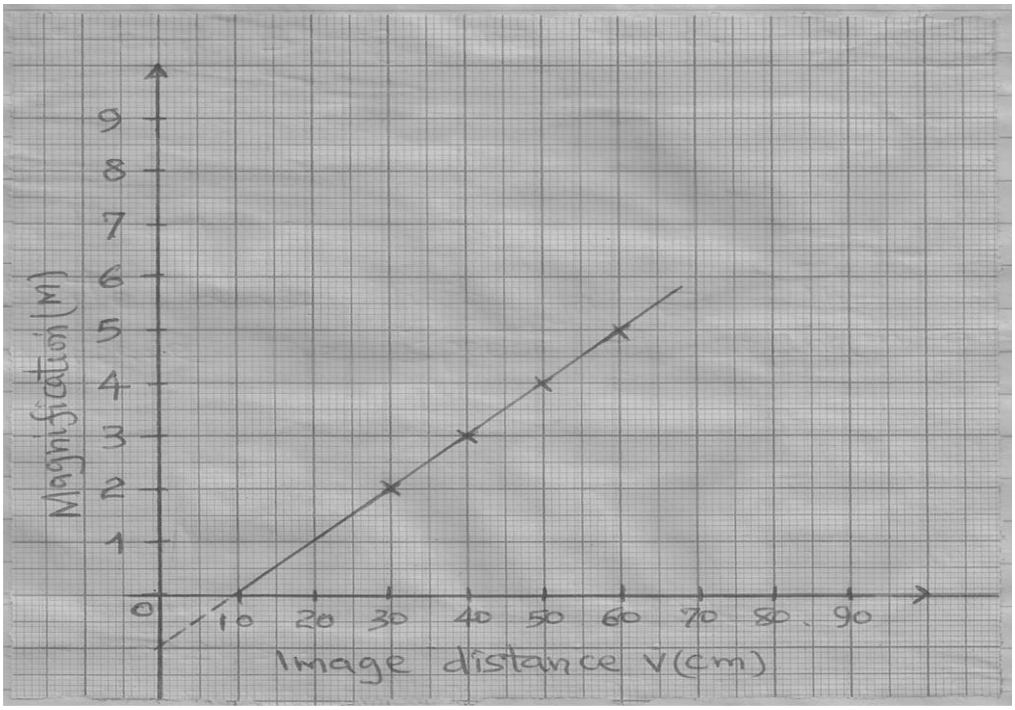


Fig. 9

(i) By drawing suitable rays, show the position of the image **(3mks)**

(ii) Determine the magnification of the image formed **(2mks)**

(b) In an experiment to determine the focal length of a converging lens, a group of form four students collected some data and used the results to plot the graph shown in figure below.



Using the graph above, determine:

(i) The object position when the image position is 45 cm **(2mks)**

(ii) Slope of the graph. **(2mks)**

(iii) The focal length of the lens given **m = $\frac{v}{f}$ - 1**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 5 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1 (THEORY)
TIME: 2 HOURS

Instructions to candidates:

(a) Write your Name and Index Number in the spaces provided.
(b) Sign and write the date of examination in the spaces provided above.
(c) This paper consists of **15** printed pages.
(d) This paper consists two sections **A** and **B.**

For Examiner's Use Only

Section	Question	Max. Score	Candidate's Score
A	1 – 12	25	
B	13	10	
	14	10	
	15	11	
	16	13	
	17	11	
Total Score		80	

SECTION A (25 MARKS)

*Answer **ALL** questions in this section in the spaces provided*

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)**

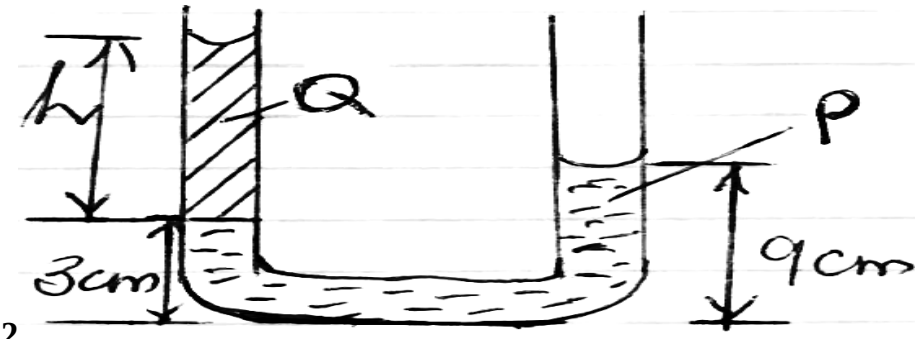


Fig. 2

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}.

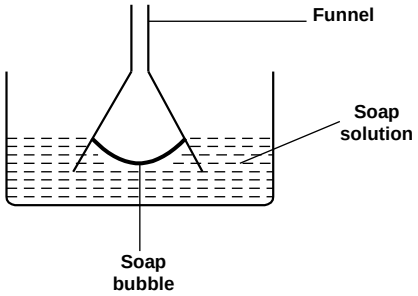
(a) What is an inelastic collision? **(1mk)**

(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.



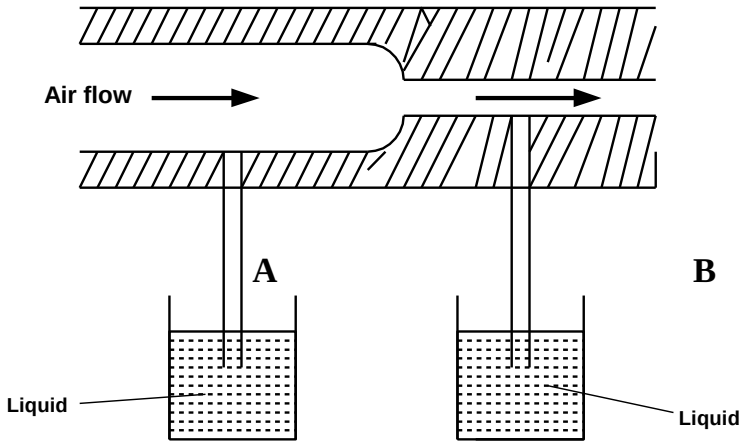
Fig. 4

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.

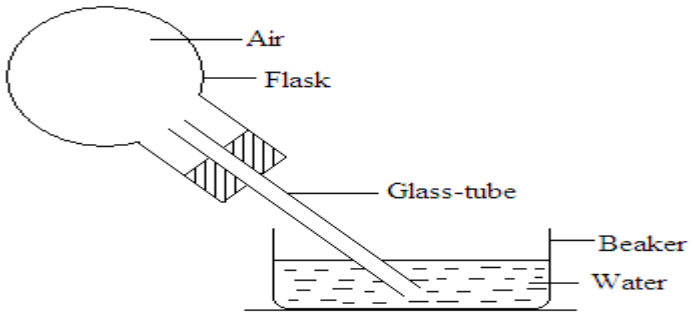
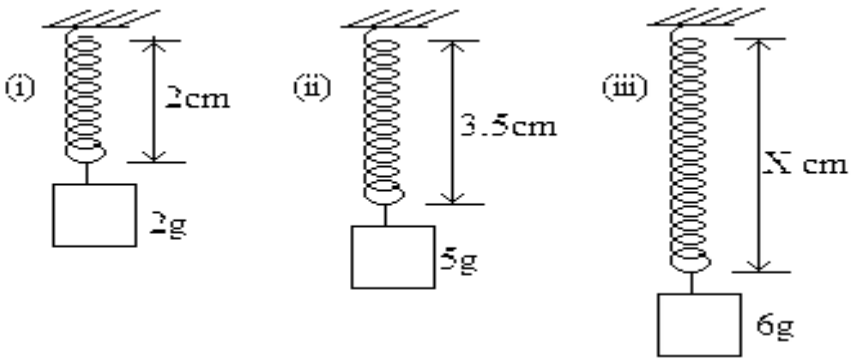


Fig. 6

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)**

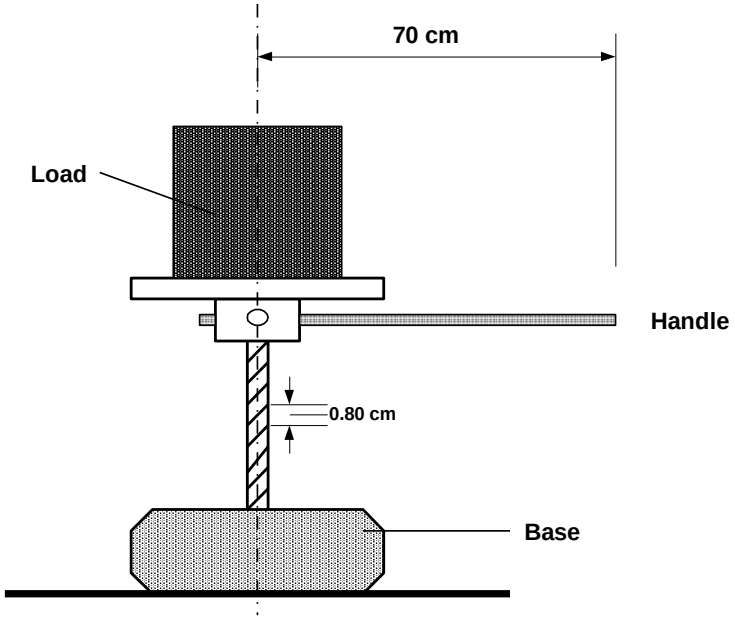
SECTION B (55 Marks)

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)**

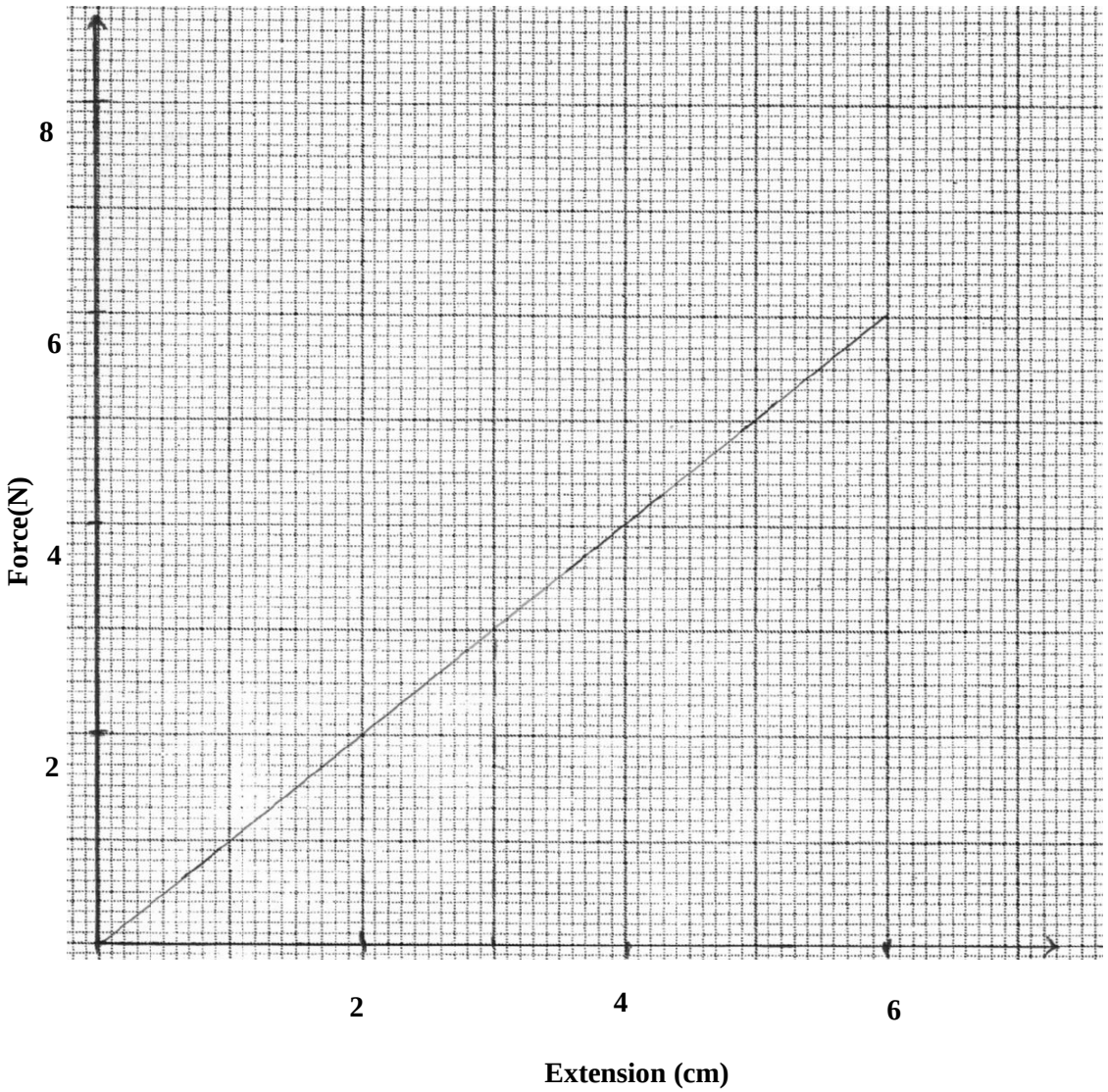
iii) the mechanical advantage of the screw jack. **(2 marks)**

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.



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

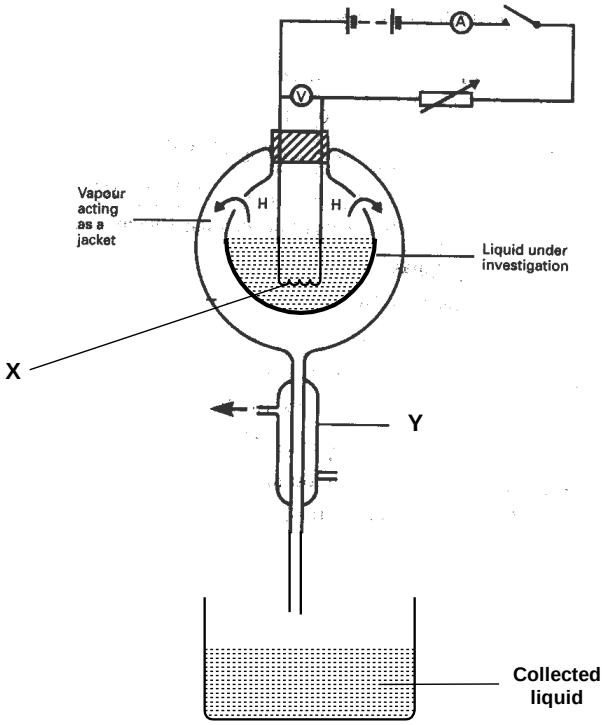
(ii) Use the graph to determine the spring constant. Give your answer in SI units **(3marks)**

(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)

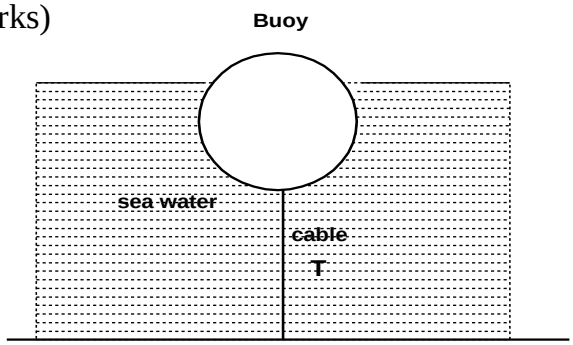


Fig.10

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.

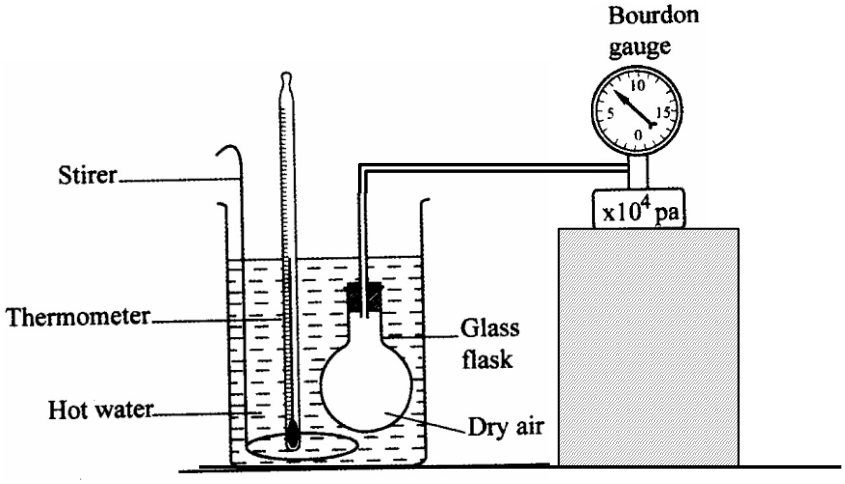


Fig. 11

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^oc. 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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 5 PAPER 2

NAME…… INDEX NO…….

SCHOOL…….... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

TIME: 2 HOURS

Instructions to candidates

a) This paper consists of two sections A and B.

b) Answer **ALL** the questions in sections A and B in the spaces provided.

c) **ALL** working **MUST** be clearly shown.

d) Mathematical tables and silent electronic calculators may be used.

e) This paper consists of 12 printed pages

f) Take: Acceleration due to gravity g = 10 ms^{-2}.

g) Density of mercury ≡13600 kg/m^3

For examiners use only

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 13	25	
B	14 – 17	55	
TOTAL		80	

SECTION A– 25 MARKS

1. The figure 1 below shows a pinhole camera.

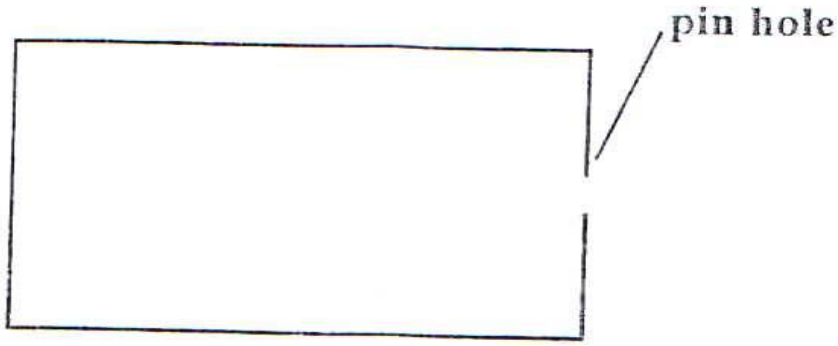


Fig 1

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.

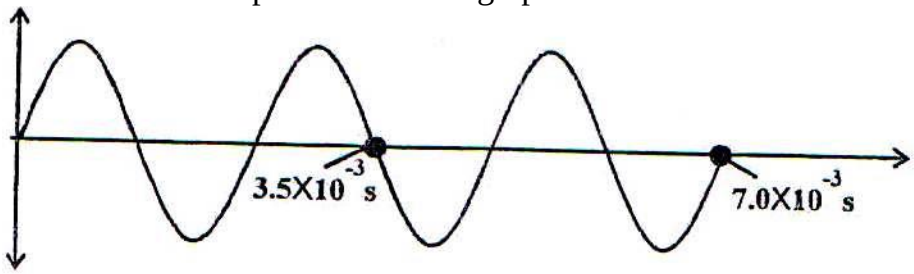


Fig 2

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).

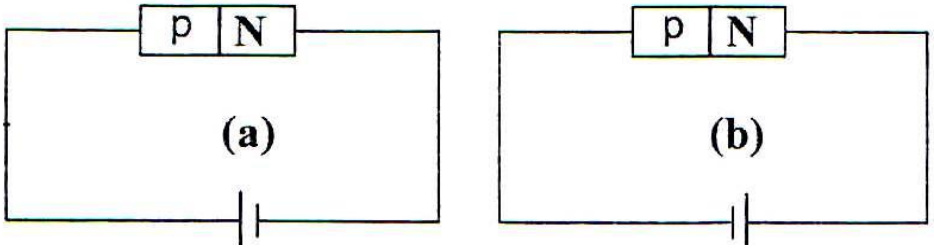


Fig 3

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)**

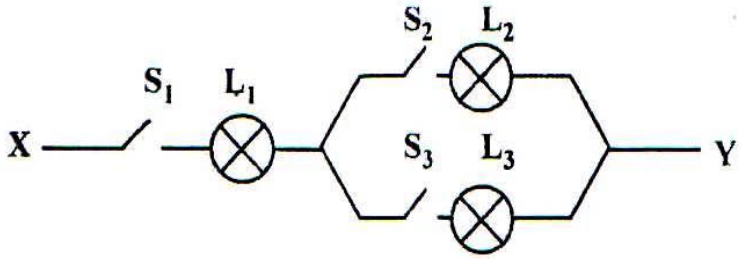


Fig 4

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.

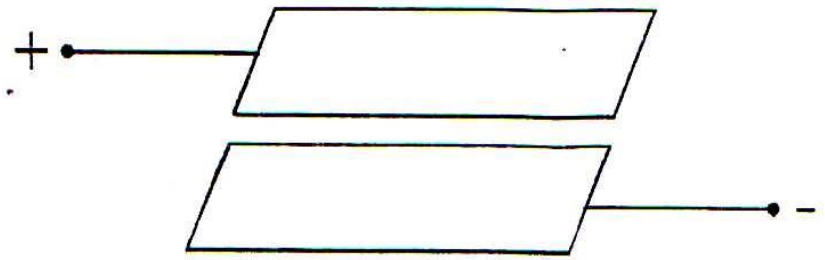


Fig 5

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.

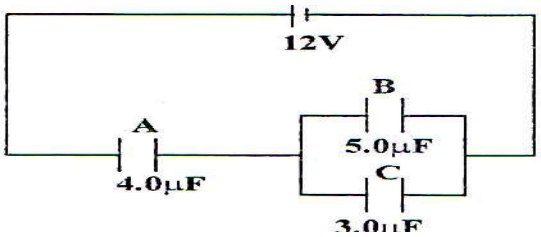


Fig 6

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.

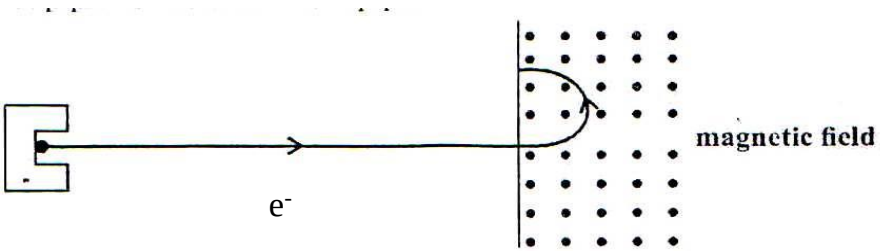


Fig 7

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.

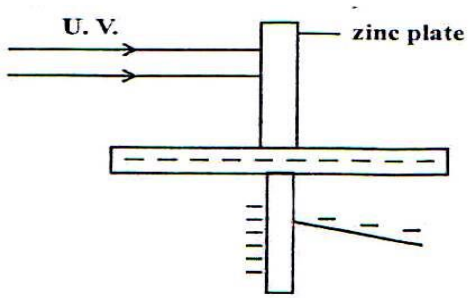


Fig 8

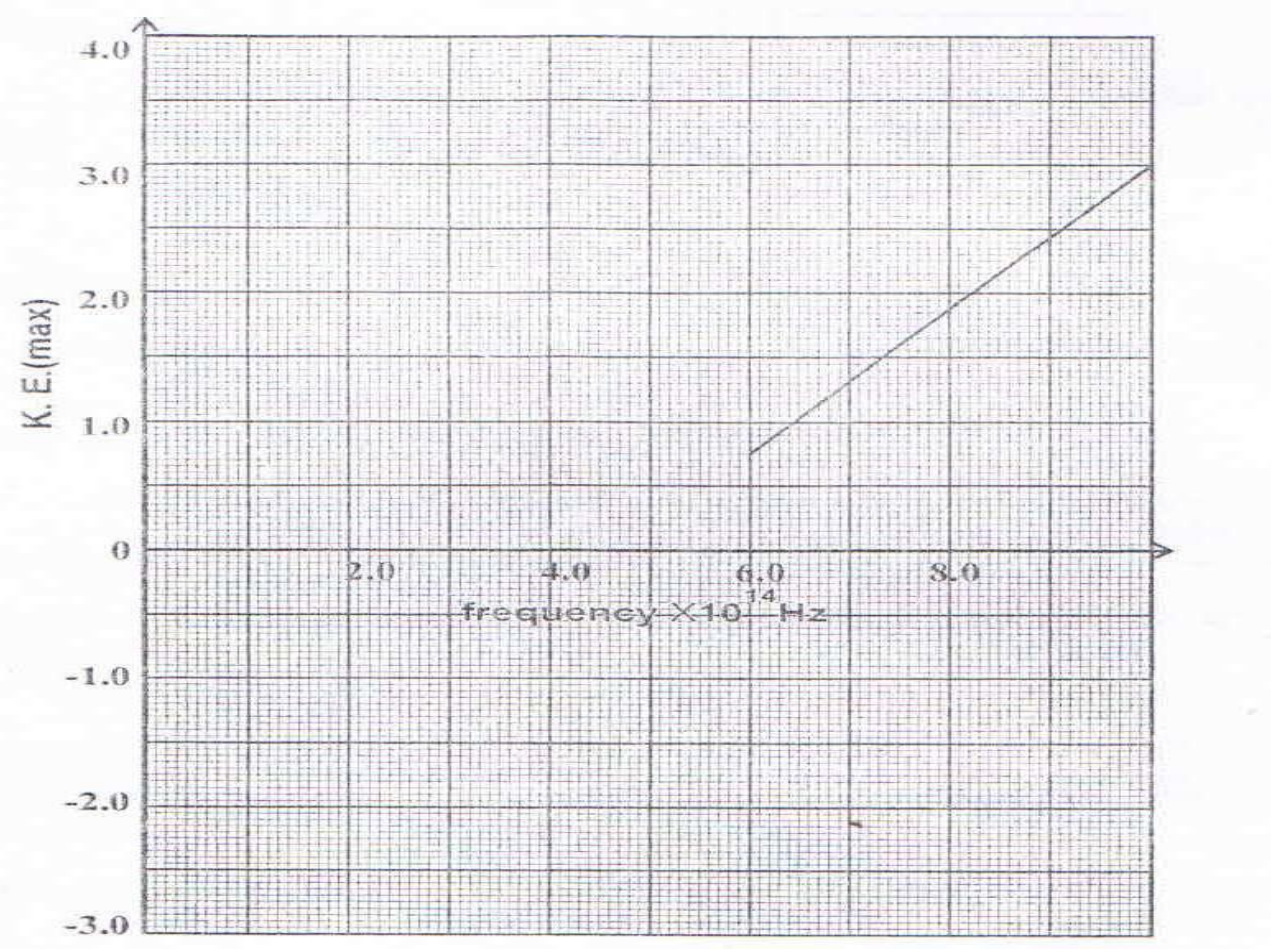
Explain the following observations

(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.

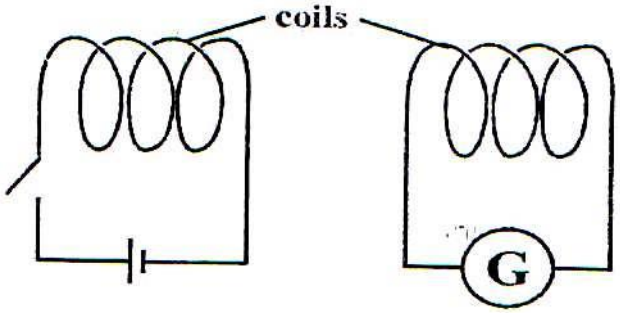


Fig 9

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)**

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.

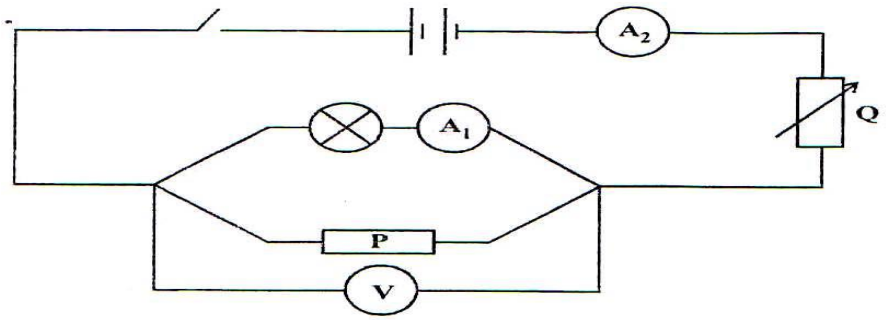


Fig10

(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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 6 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1

2 HOURS

Instructions to candidates

- Write your name and class in the space provided.
- This paper consists of two sections; **SECTION A** and **B**
- Mathematical tables and electronic calculators may be used
- Take: Acceleration due to gravity: **g = 10m/s^2**

For Examiner's Use Only

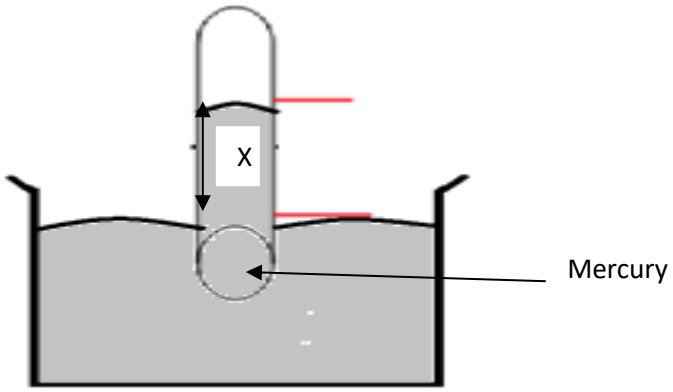
Section	Question	Maximum Score	Candidate's Score
A	1 – 12	25	
B	13	10	
	14	11	
	15	12	
	16	10	
	17	12	
	Total Score	80	

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



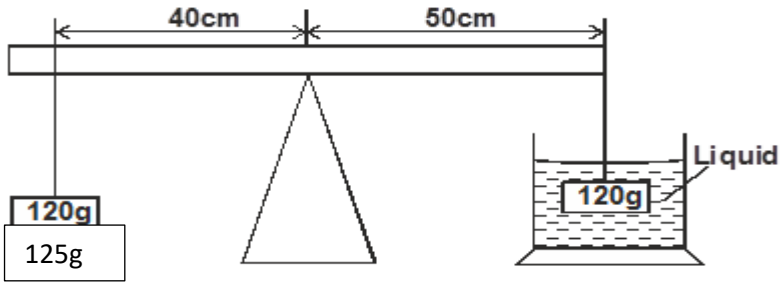
a. Name the instrument **(1mark)**

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)**

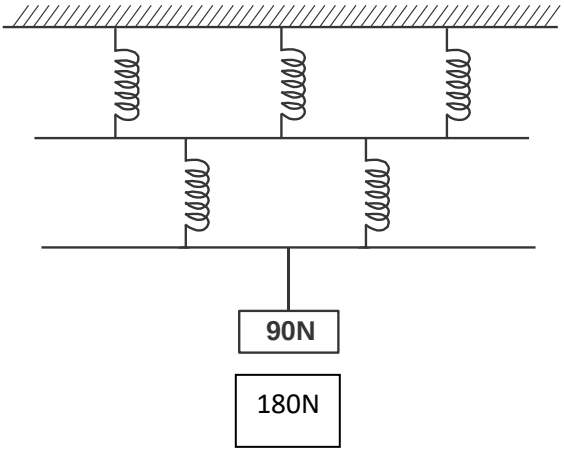
5. Explain why a small car travelling at a very high speed is likely to be dragged into a long track travelling in the opposite direction **(2marks)**

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^{0}cis 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)

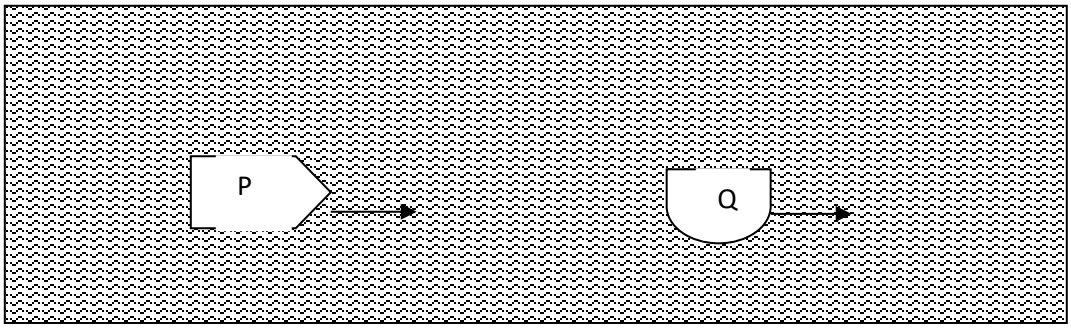
ii) Linear velocity of the stone (2 marks)

iii) Periodic time (2 marks)

14. 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)

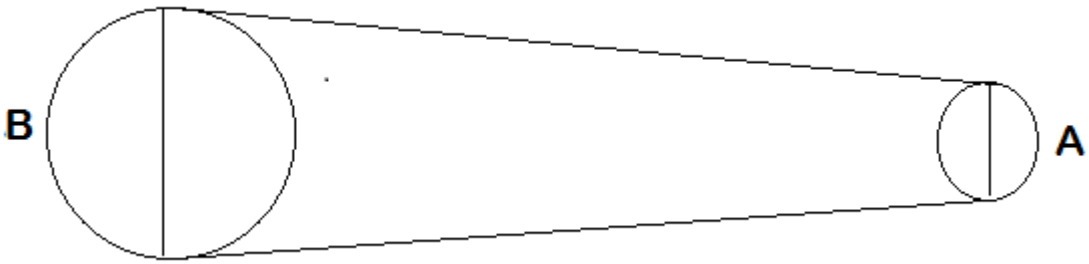
b) The figure below shows cross-section of two submerged bodies P and Q in an ocean. The bodies were then pulled by a ship in the direction shown.



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

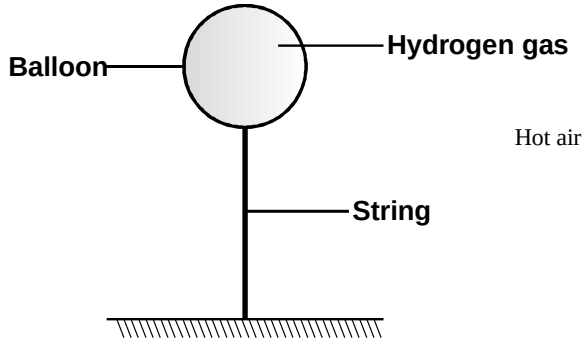
ii) On the same diagram, show the path followed by each body and their streamlines (2 marks)

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)



15. 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)

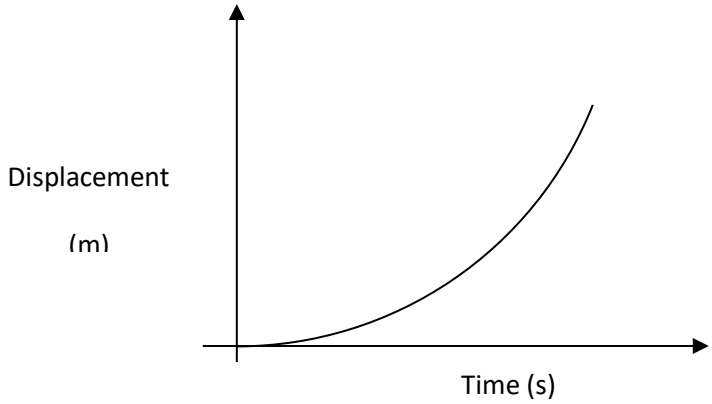
ii) The weight of air displaced by the balloon (2 marks)

iii) Upthrust force on the balloon (1 mark)

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

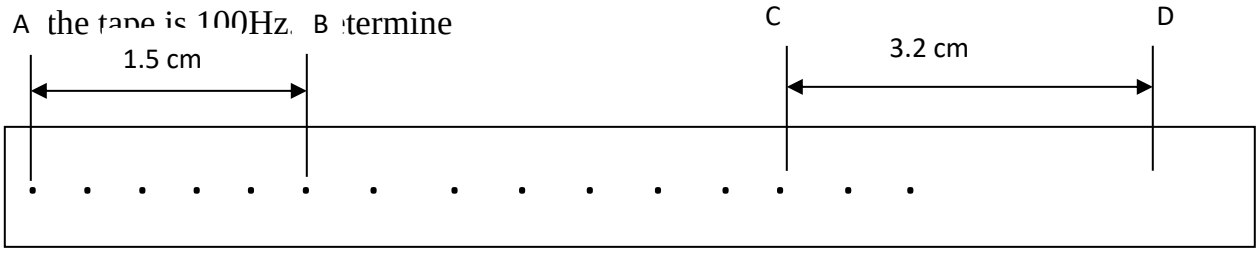
v) the acceleration with which the balloon begins to raise when released.(3marks)

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



on the same graph sketch the results ot 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 A the tape is 100Hz, B termine

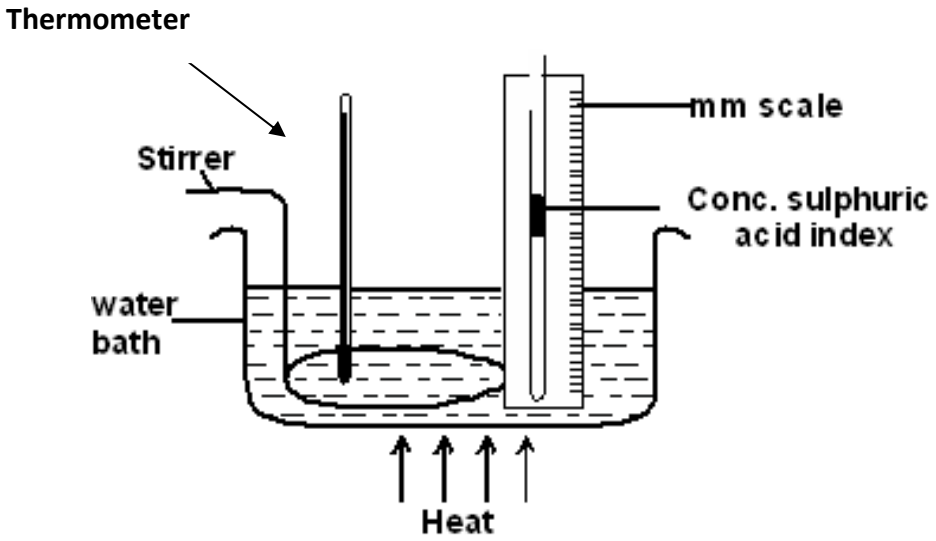


i)The period of the ticker timer **(2 marks)**

ii) Velocity AB and CD **(4 marks)**

ii) The average acceleration **(3 marks)**

17. 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.(3mks)

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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 6 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATES:

- Write your **name** and **index number** in the spaces provided above
- This paper consists of **two** sections **A** and **B.**
- Answer **all** questions in section **A** and **B** in the spaces provided.
- Mathematical tables and electronic calculators may be used.
- Take'g' l0m/s 2

For Examiners' Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 - 14	25	
B	15	15	
	16	14	
	17	14	
	18	12	
TOTAL		**80**	

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

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

FIG.1

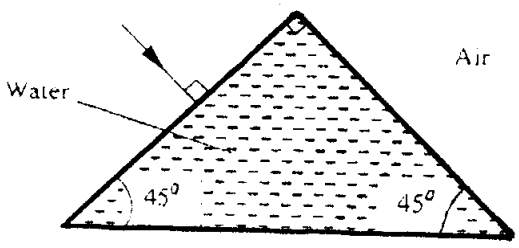


FIG.1

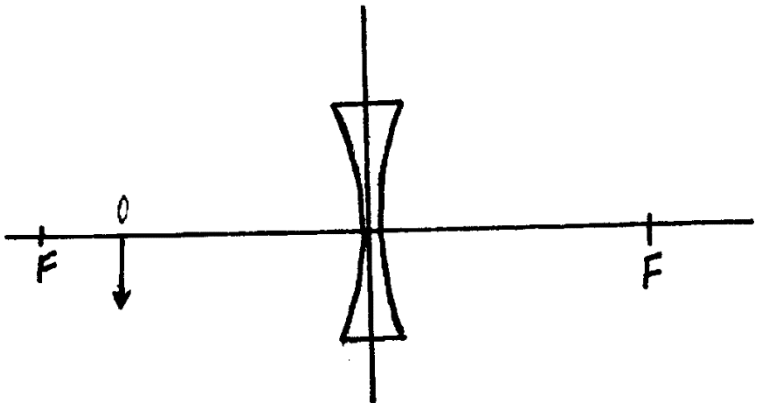
Sketch the path of the ray as it passes though the prism. Critical angle for water is 49^0 (1mk)

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)

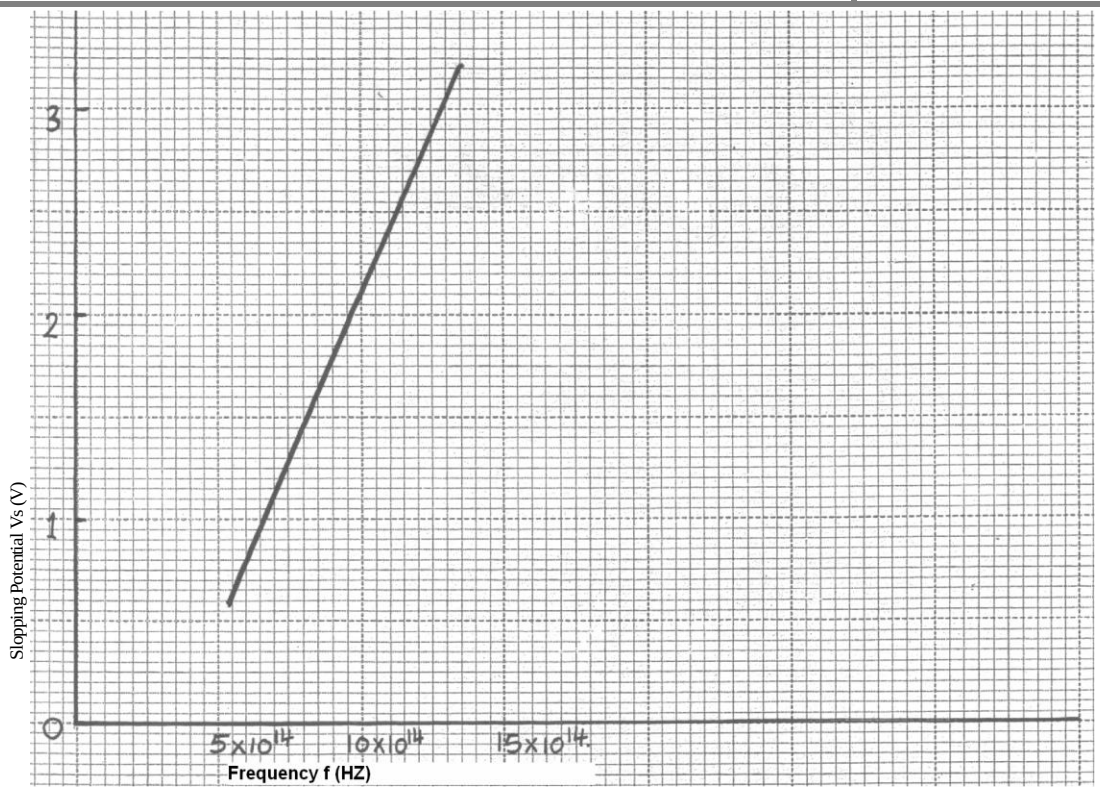


10. State the difference between X-rays and Gamma rays in the way in which they are produced. **(1mk)**

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

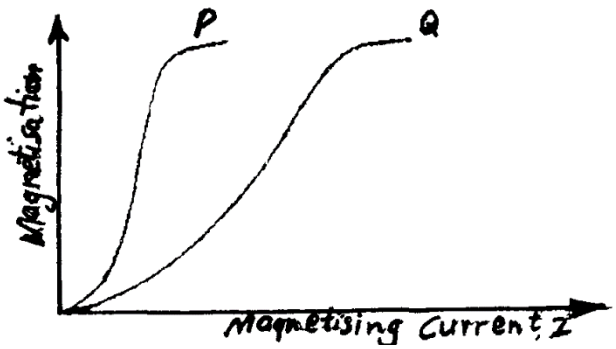


FIG.4

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.

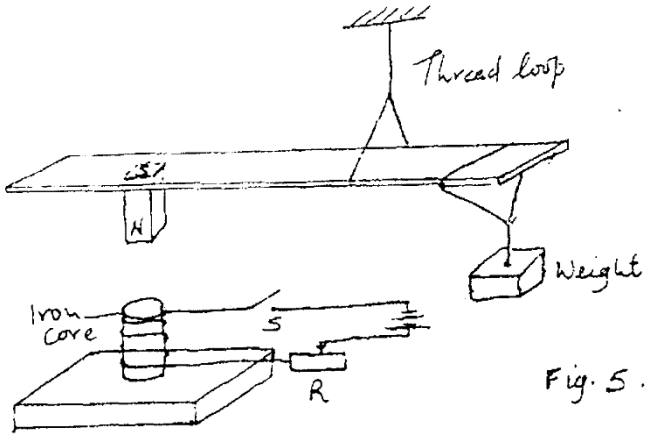


Fig. 5.

(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 in the current circuit. **(3mk)**

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

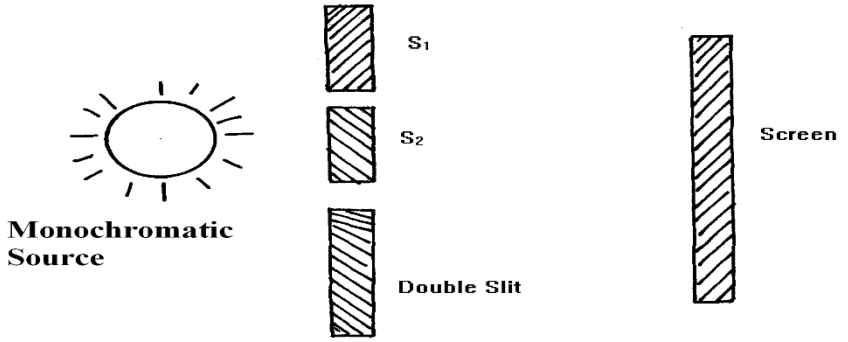
(ii) State two distinctions between the way sound waves and electromagnetic waves are transmitted (2mk)

(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)**

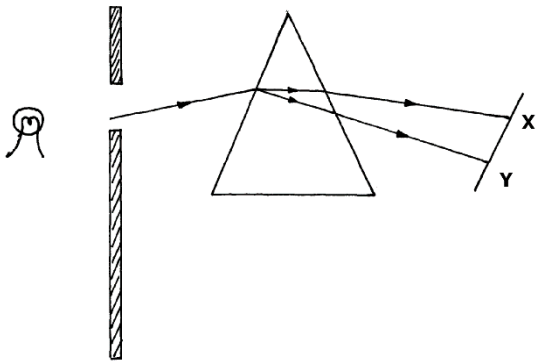
(ii) Describe what is observed on the screen **(2 mks)**

(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.



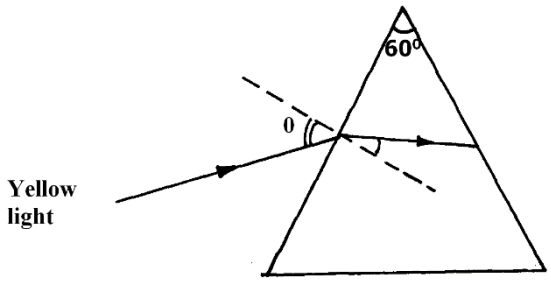
(i) What is the name of the phenomenon represented in the diagram? **(1mks)**

(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 = 3.0×10^8 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

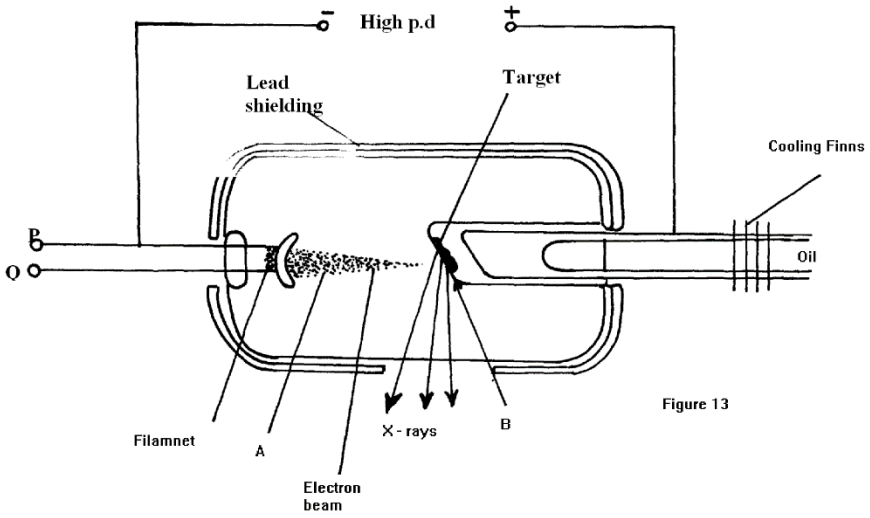


Figure 13

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) ln 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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 7 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232 / 1

PHYSICS

PAPER 1

2 HOURS

INSTRUCTIONS TO CANDIDATES

- *Write your name and index number in the spaces provided above.*
- *This paper consists of Two sections A and B*
- *Answer ALL the questions in sections A and B in the spaces provided.*
- *All working MUST be clearly shown*
- *Mathematical tables and Electronic calculators **may** be used.*

Take: Acceleration due to gravity g = 10ms^{-2}

Density of water= 1000kgm^{-3}

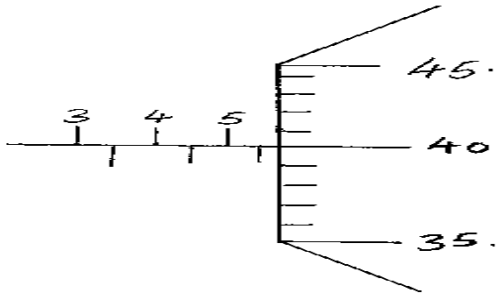
For Examiners Use Only

Section	Question	Maximum Score	Candidates' Score
A	1 – 13	25	
B	14 - 20	55	
	TOTAL SCORE	80 mks	

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)**

4. The diagram below shows two bulbs P and Q painted white and black

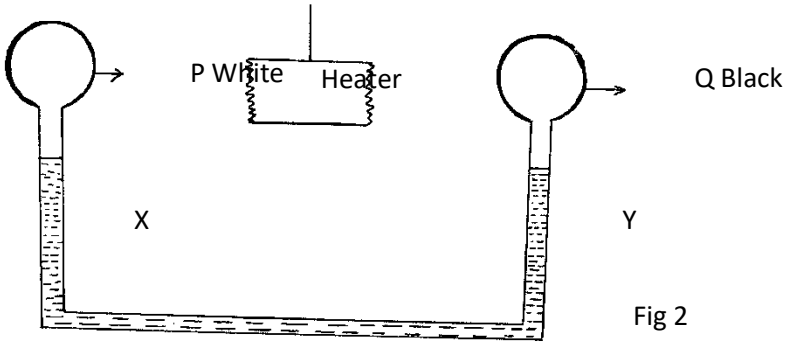
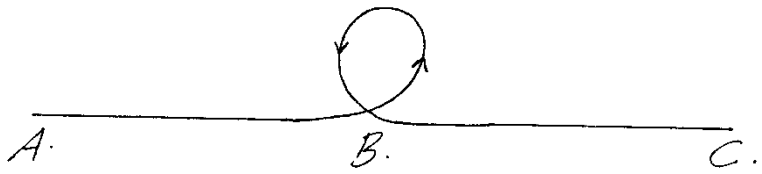


Fig 2

Explain what happens when the heater is turned on? **(2mks)**

5. The figure below shows the path taken by a fluid flowing from region A to C



Explain the looping at B **(1mk)**

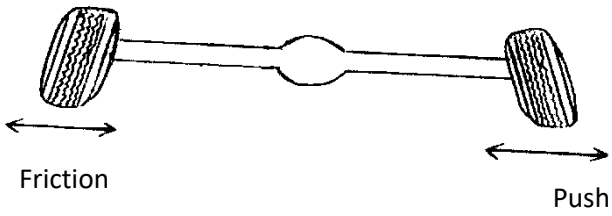
6. A car of mass 1000kg traveling at 36km/h is brought to rest over a distance of 20m. Find

(i) The acceleration **(2mks)**

(ii) The breaking force in Newton's **(1mk)**

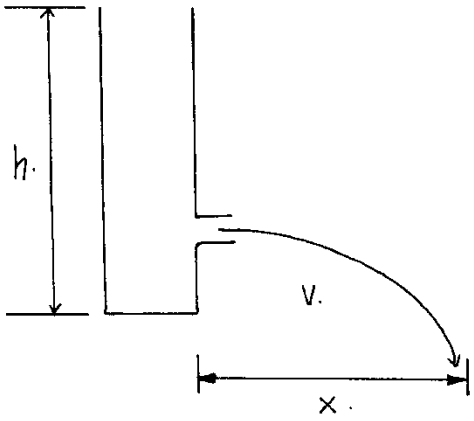
7. A carbon dioxide cylinder contains $300cm^3$ of gas at a pressure of 2.40×10^7 pa. Atmosphere pressure is 1.01×10^5 pa. Calculate the volume of the gas at atmospheric pressure **(2mks)**

8. The figure below shows a cambered wheels



What is the advantage of these**?** **(1mk)**

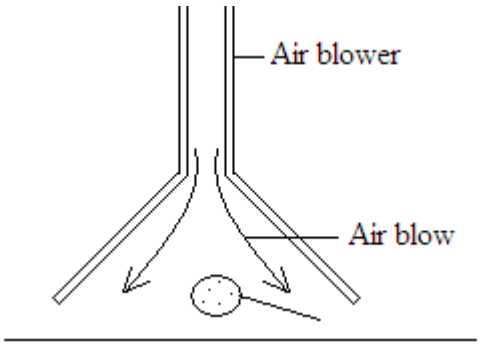
9. The diagram below shows a water tank of height h?



What is the relationship between the velocity V of the water jet and the height h (1mk)

10. 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)

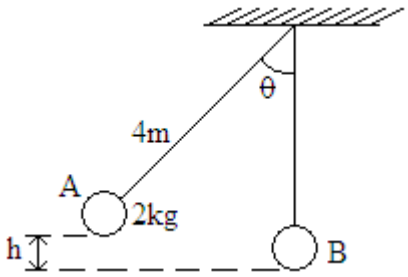
11. The figure below shows a pith ball being lifted in to a funnel end of a blower.



Explain this observation **(2 mks)**

12. 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)**

13. 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.

14.

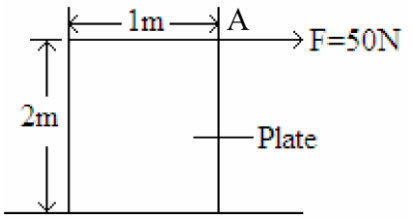
a. Use simple sketches to show the three states of equilibrium.

Name the states. **(3 mks)**

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,

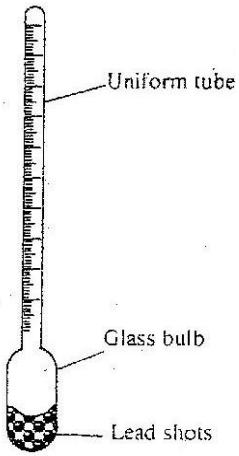
I) write an expression for the heat given out steam. **(1mk)**

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.

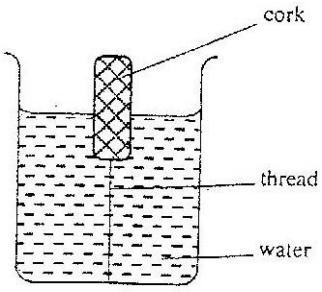


Figure 14

(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, □, of the table can be varied.

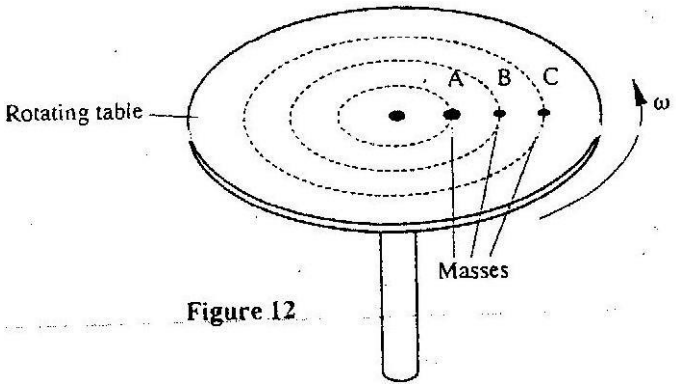


Figure 12

(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)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 7 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

2 HOURS

Instructions to candidates.

- Write your name and admission number in the spaces provided above.
- This paper contains two sections**A** and **B**.
- Answer all questions in both sections **A** and **B**.
- Where necessary,take g=10N/Kg,speed of light c= 3.0×10^8 ms^1

For examiner's only.

Section	Question	Maximum score	Candidates score
A	Q1- 12	25	
B	13 14 15 16 17	15 6 12 13 9	
	TOTAL	**80**	

SECTION A (30MKS)

1. State the laws of reflection **(2marks)**

2. Draw the magnetic field around the two conductors shown below. **(2mark)**

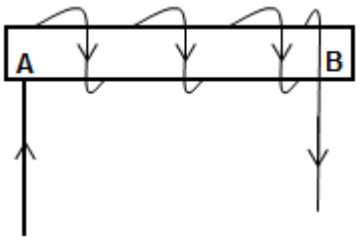


3. Give a reason why attraction in magnetism is not regarded as a reliable method of testing polarity of a magnet. **(2marks)**

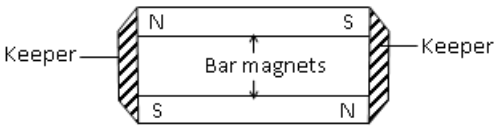
4. State two advantages of using a convex mirror as a driving mirror. **(2marks)**

5. State two advantages of an alkaline accumulator over lead acid accumulator. **(2mks)**

6. The figure below shows iron bar rod AB inside a coil of a wire. When the current flows through the coil in the direction shown. Identify the polarity of end A and B. **(1mk)**



7. The figure below shows how magnets are stored in pairs with keepers at the end.



i) Name the most suitable metal used to make the keepers **(1 mk)**

ii) Explain how the metals above help in retaining magnetism longer. **(1 mk)**

8. State the two conditions necessary for total internal reflection to occur. **(2marks)**

9. The filament of an electric lamp is made of tungsten. Why is tungsten a satisfactory material for the lamp filament? (1mark)

10. The chart below shows an arrangement of electromagnetic spectrum.

radio waves	A	infra-red	visible light	B	x-rays	gamma rayrs

A) Name the radiation represented by A(1mark)

B)Name the device that can be used to detect radiation B (1mark)

11. Two similar razor blades were placed on a wooden block and the other on an iron block as in figure 10.

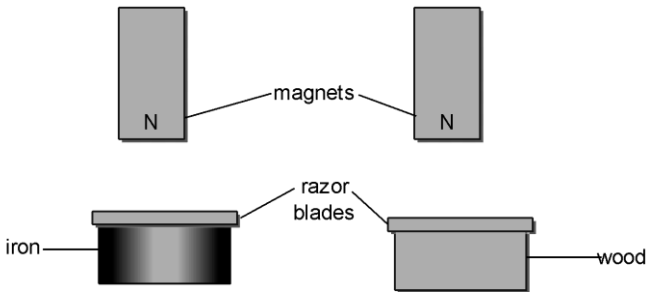


Fig 10.

It was observed that the razor blade on the wooden block is attracted by the magnet while that on the iron block was not. Explain. **(2 marks)**

12. The following shows a displacement time graph of a wave. The velocity of the wave is 40cm/s

Determine the:

i. Period **(1 marks**

ii. Frequency **(2 marks)**

iv. Wavelength **(2 marks)**

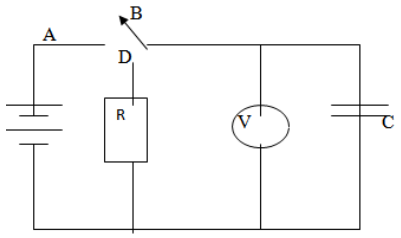
SECTION B (50MKS)

13. (a) Explain why is not advisable to carry a pointed umbrella when it's raining**. (2 mks)**

(b) State one factor which affects the capacitance of a capacitor. **(1 mark)**

(c) State one use of leaf electroscope **(1mark)**

d) Explain how capacitor C, in the figure below is

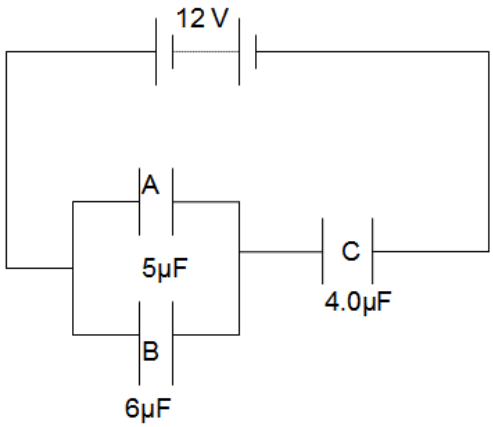


i. charged **(2mark)**

ii. Discharged **(2mark)**

(e) The figure below shows electrical circuit with three capacitors A, B and C of capacitance 5 µF, 6 µF and

3 µF respectively connected to a 12 V battery.



Determine:

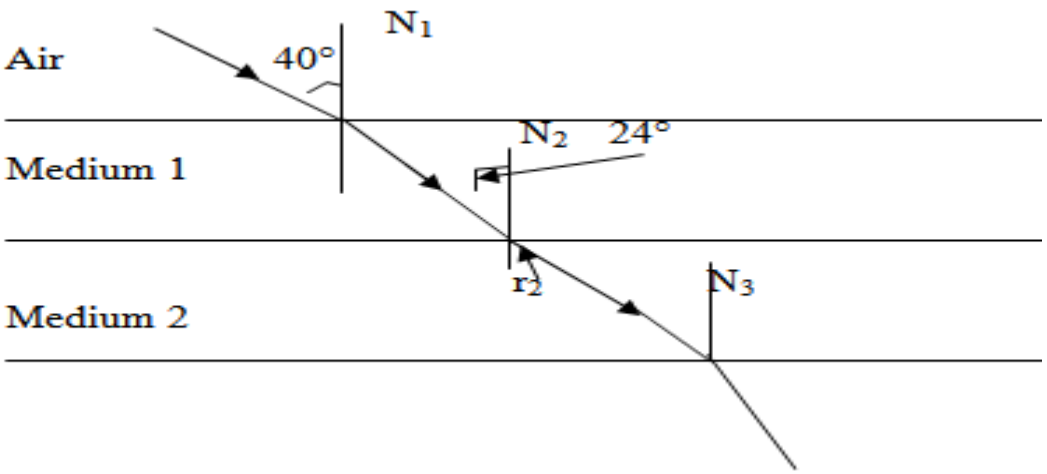
(i) The combined capacitance of the three capacitors **(3 marks)**

(ii) The charge on the capacitor C **(2 marks)**

(iii) The potential difference across the capacitors B. **(2 marks)**

14. a) state Snell's law **(1mark)**

b) A ray of light travels from air into medium 1 and 2 as shown



Calculate

i. The refractive index of medium 1. **(2mark)**

ii. The angle of refraction r2 in medium two given that the refractive Index of medium 2 is 1.33. **(3marks)**

15. a) (i) State Ohm's law **(1 mark)**

b) Two resistors R1 and R2 are connected in series to a 10V battery. The current flowing then is 0.5 A when R1 only is connected to the battery the current flowing is 0.8A. Calculate the

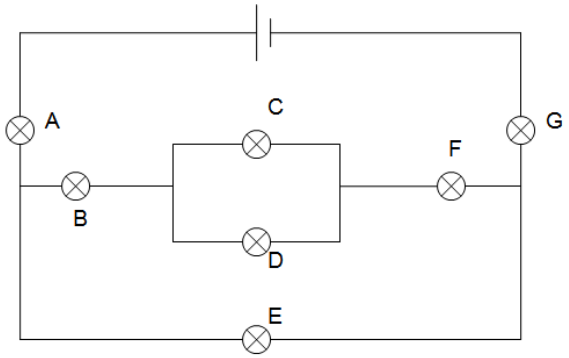
(i) Value of R2 **(3 marks)**

(ii) Current flowing when R1 and R2 are connected in parallel with the same battery.

(2 marks)

(iii) Recharging is one of the practices and maintenance of accumulators. State one measurement, which need to be taken to help you decide when an accumulator is due for charging . **(1 mark)**

(c) In the circuit diagram A, B, C, D, E, F and G are identical lamps.



(i) Explain which lamps are the brightest and which are the dimmest. **(2 marks)**

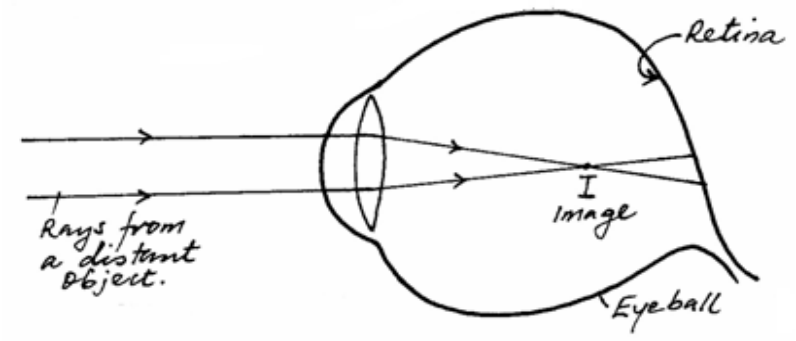
(ii) If the circuit breaks between lamps B and F, explain the change of brightness in the other lamps. **(3 marks)**

16. A lens forms an image that is four times the size of the object on a screen. The distance between the object and the screen is 100cm when the image is sharply focused.

a) State with reasons what type of lens was used. **(2mks)**

b) Calculate the focal length of the lens. **(4mks)**

c) The figure below shows a human eye with a certain defect.



(i) State one cause of this defect. **(1 mark)**

(ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. **(2 marks)**

d) i) State why convex mirrors are used in supermarkets to check shoplifters. **(1mk**

(ii State 3 similarities between the eye and the camera. **(3mks)**

17. (a) Use the figure 11 below to answer the questions that follows.

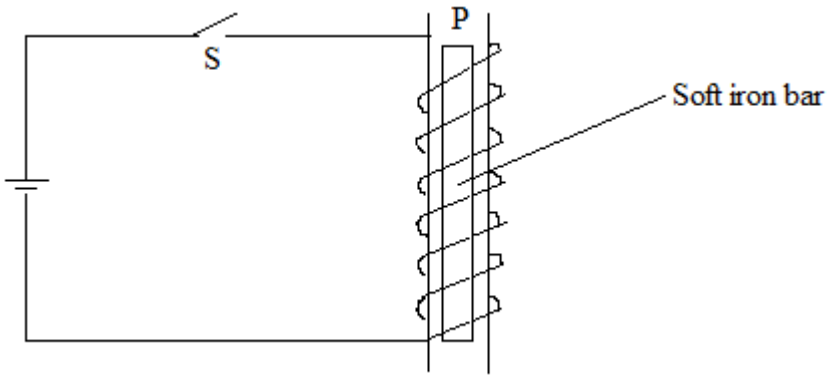


Fig.11

(i) Show the direction of the current on the turns when the switch S is closed**.** **(1marks)**

(ii) State the polarity at P **(1marks)**

(iii) Explain using domain theory what happens on the soft iron bar. **(1marks)**

(iv). If steel bar was used instead, what could be the difference? **(2marks)**

(b) The following diagram (figure 12), shows a part of an electric d.c motor.

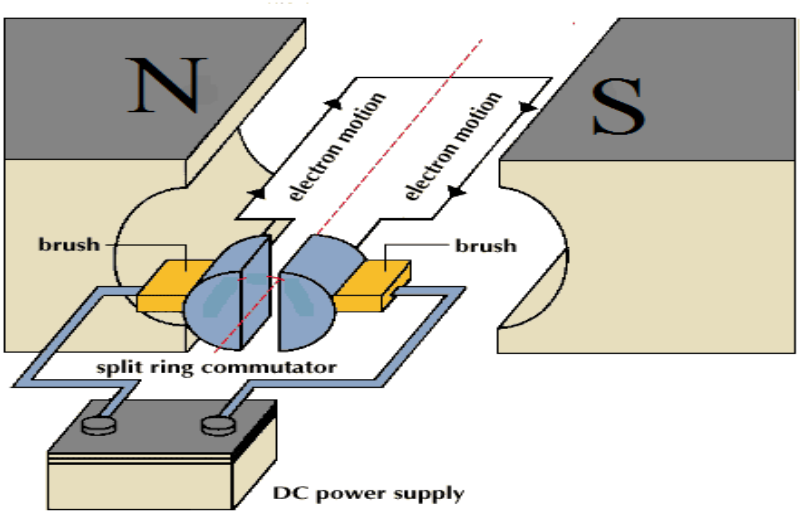


Fig 12.

(i) On the diagram above show the direction of rotation of the coil. **(1marks)**

(ii) State the effect of increasing the number of turns of the rotating coil of an electric motor.(1marks)

(c) Sketch the magnetic field pattern around the conductor carrying current on figures 13 and 14 shown below. **(2marks)**

Fig 13.

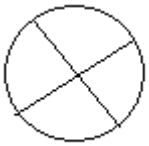
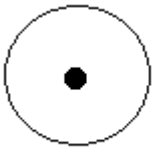


Fig 14



CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 8 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

(f) *Write your Name and Index Number in the spaces provided.*

(g) *Sign and write the date of examination in the spaces provided above.*

(h) *This paper consists two sections A and B.*

(i) *Answer all questions in Section A and B in the spaces provided.*

(j) *Mathematical tables and electronic calculators may be used.*

FOR EXAMINER'S USE ONLY

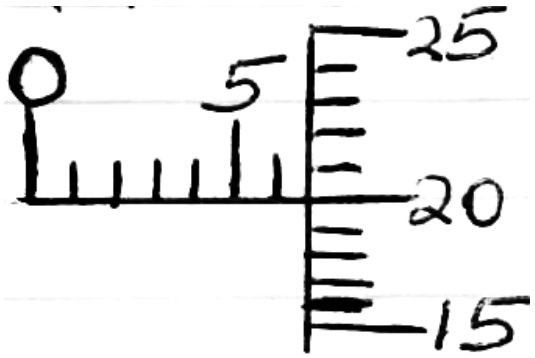
SECTION	QUESTION	MAX. SCORE	CANDIDATE SCORE
A	1 - 12	25	
B	13	12	
	14	11	
	15	12	
	16	13	
	17	07	
TOTAL SCORE		**80**	

SECTION A (25 MARKS)

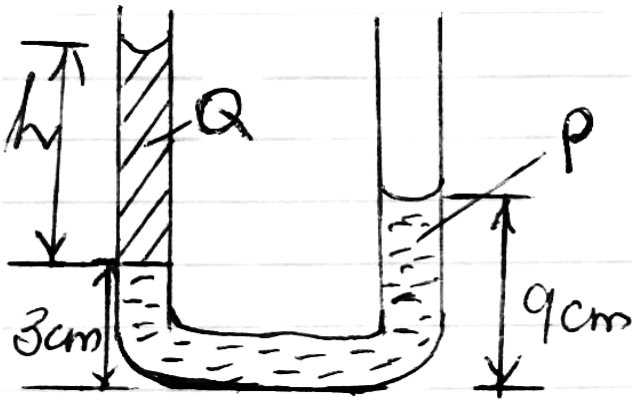
Answer ALL questions in this section in the spaces provided

1. The figure below shows a micrometer screw gauge that has a zero error of +0.02. State the actual reading of the micrometer screw gauge.

(1mk)



2. In the figure below, 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)**



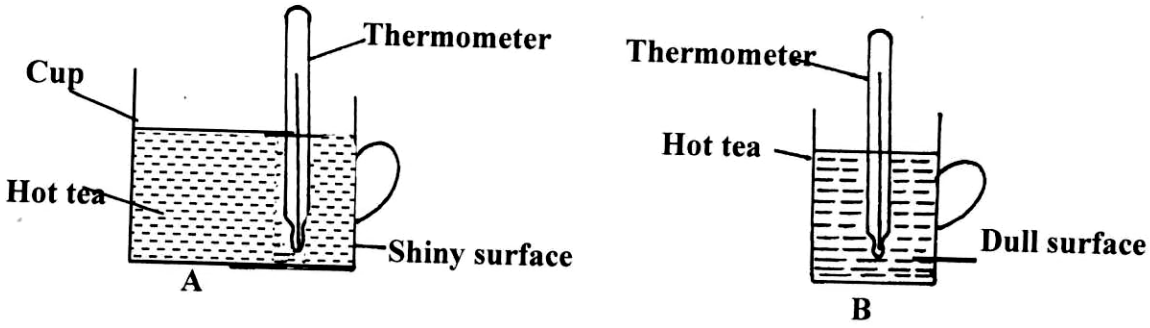
3. A body is acted upon by a force of I0N towards the right hand side and 6N towards the left hand side. What is the resultant force? **(2mks)**

4. The difference between the ice point and steam point on a liquid thermometer is 30cm. What temperature is recorded when the mercury thread is 12cm. **(2mks)**

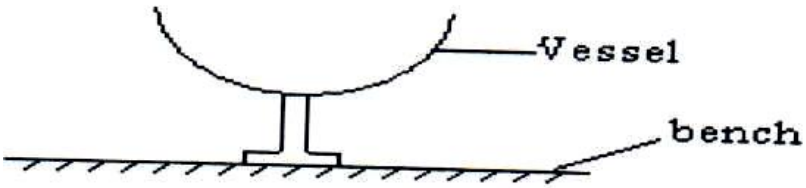
5. Water flows through a horizontal pipe of cross-sectional area of 40cm^2. If the speed at the constriction is 4ms^{-1}, calculate the mass flux (density of water = 1000kg/m^3) **(3mks)**

6. In terms of intermolecular forces, explain the difference between liquid and gaseous state. **(2mks)**

7. The diagram below shows two similar cups of tea containing equal volumes of hot tea at the same level. It was observed that the rate of cooling was the same in the two cups. Explain.
(2mks)



8. The figure below shows a vessel resting on a horizontal bench.



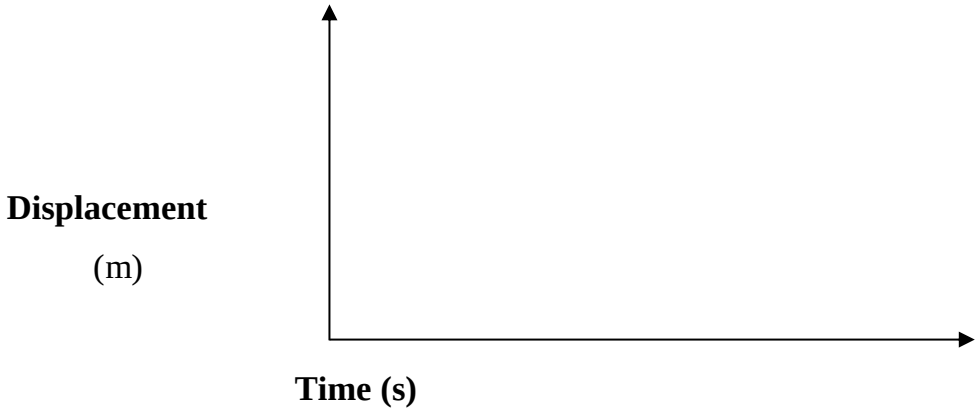
State and explain the effect on the stability of the vessel when it is filled with water. **(2mks)**

9. What does it mean to say the density of water is $1g/cm^3$? **(1mk)**

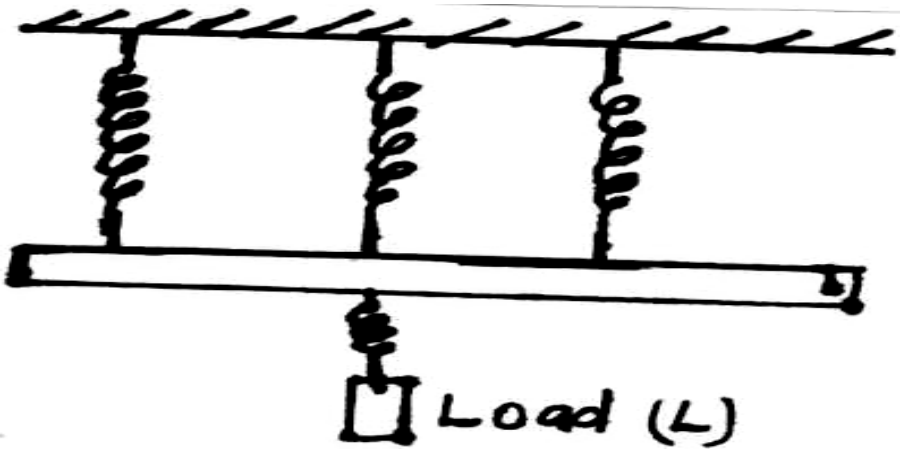
10. State any **two** possible ways of increasing velocity ratio of wheel and axle. **(2mks)**

11. (a) Under what conditions can a feather and a stone released from the same height land on the ground at the same time? **(1mk)**

(b) On the axis below, sketch displacement time graph for an accelerating body. **(1mk)**



12. The figure below shows four equivalent springs with negligible weight, the weight of the rod R is 20N. Given that the spring constant is 5N/m. Calculate the load L which causes an extension of 28m to the system. **(3mks)**



SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided

13. (i) A stone thrown vertically upwards from the base of a mountain with an initial velocity of 100m/s.The stone just stopped as the apex and came back. Another boy projected a stone horizontally from the top of the mountain. Calculate:-

(a) Height of the mountain. **(2mks)**

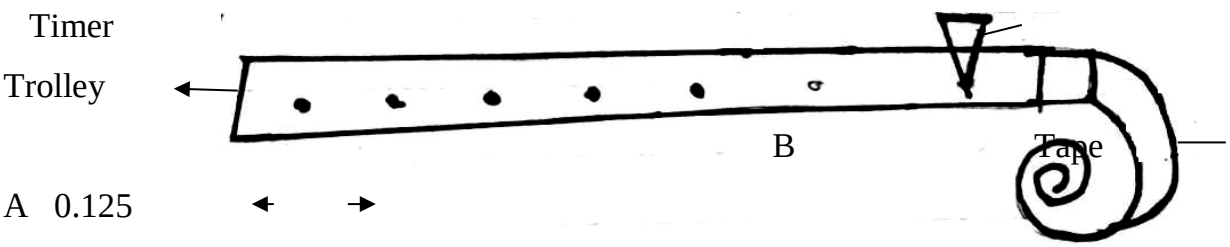
(b) Time taken for the stone to follow the trajectory. **(2mks)**

(c) The range if the horizontal velocity is 20m/s, **(2mks)**

(d) Calculate the impulse of force produced when a table is pulled for 3s by a constant force of 10N towards the right and then for 2s by a constant force of 20N towards the left.

(2mks)

(e) The figure below shows a tape from a trolley accelerating at $5m/s^2$ and the timer is vibrating at 100Hz.



Calculate:

(i) Change in velocity from A to B. **(2mks)**

(ii) The final velocity of the trolley. **(2mks)**

14. (a) Two gear-wheels have 80 teeth and 20 teeth and they lock with each other. They are fastened on axles of equal diameter such that equal weight of 150N attached to the string around the axle will just raise 450N on the other axles.

Calculate:

(i) The mechanical advantage. **(2mks)**

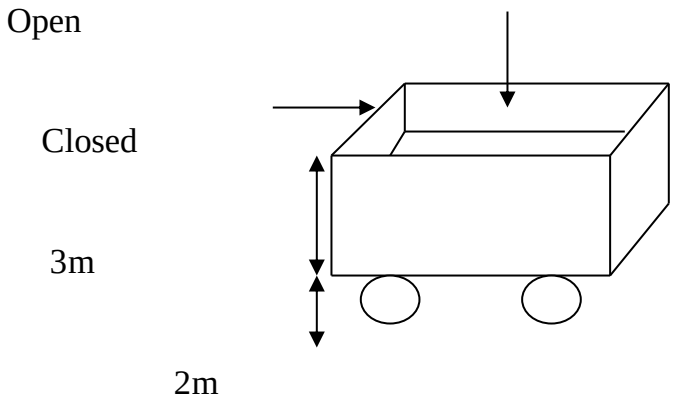
(ii) The velocity ratio. **(2mks)**

(iii) The efficiency of this machine. **(2mks)**

(b) **(i)** A Loudspeaker is a transducer. Explain. **(1mk)**

(ii) Explain the energy change that occur when a man climbs the mountain. **(1mk)**

(c) Calculate the total power in lifting 0.2kg of metal cane containing 2000cm^3 of ice onto a lorry as shown below within 4s. (SIQ = 0.9g/cm^3) **(3mks)**



15. (a) What is meant by specific latent heat of Vaporization? **(1mk)**

(a) In an experiment to determine the specific latent heat of vaporization of water, steam at 100^{0}C 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
Initial temperature of water	=	5^{0}C
Final mass of water + Calorimeter + condensed steam	=	123g
Final temperature of mixture	=	30^{0}C

Specific heat capacity of water = $4200JKg^{-1}k^{-1}$

Specific heat capacity of copper = $390\ JKg^{-1}k^{-1}$

I. Determine the:-

(i) Mass of condensed steam **(2mks)**

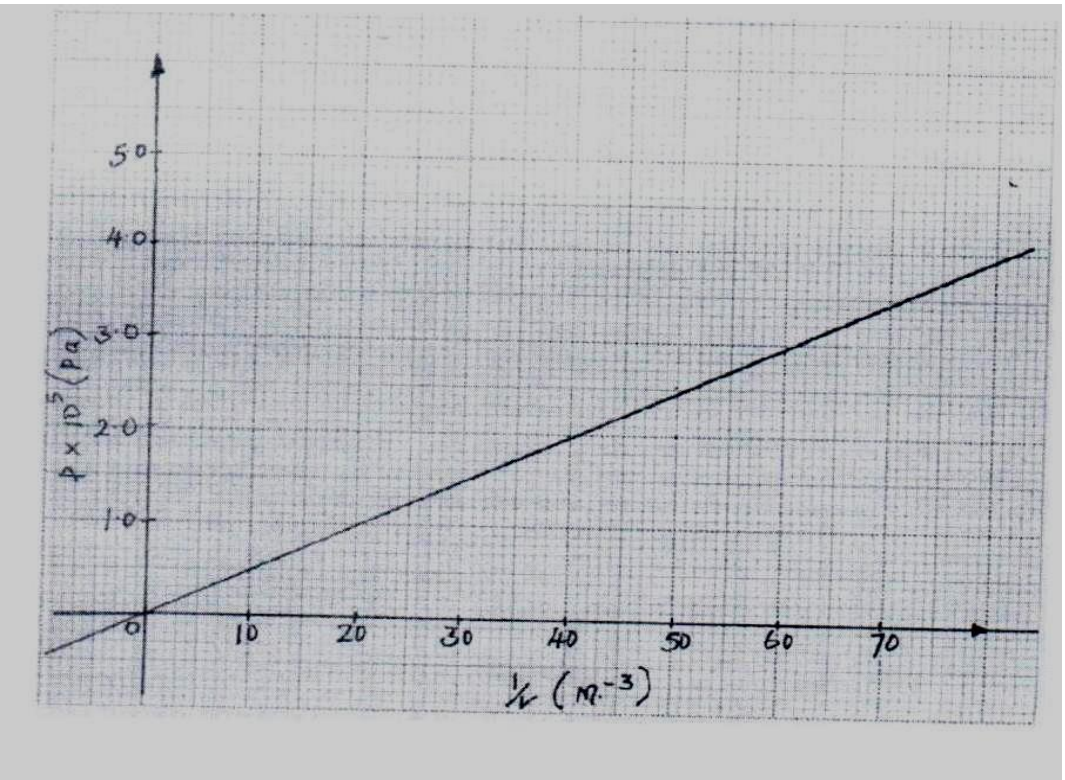
(ii) Heat gained by water and calorimeter. **(2mks)**

II. Given that L is the specific latent of heat of vaporization of steam:

(i) Write an expression for the heat given out by steam. **(1mk)**

(ii) Determine the value of L. **(2mks)**

(b) The pressure P1 of a fixed mass of gas at constant temperature, T = 300K is varied continuously as depicted in the graph below.



From the graph:

(i) Determine the volume of the gas when the pressure read 2.5×10^5Pa.
(2mks)

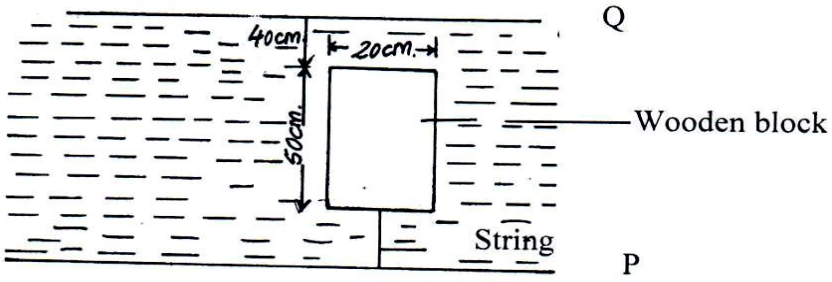
(ii) Given that pV = 2RT where R is a constant, use the graph to determine R.
(2mks)

16. (a) State the law of floatation.

(1mk)

(b) A block of wood of mass 80kg floats in water with 0.6 of its volume in water. Calculate the number of rods each 20g that can be placed on the block so that its top is level with the surface of water. **(4mks)**

(c) The diagram in figure 9 below shows a wooden block of dimensions 50cm by 40cm by 20cm held in position by a string attached to the bottom of a swimming pool. The density of the block is 600kgm^{-3}.

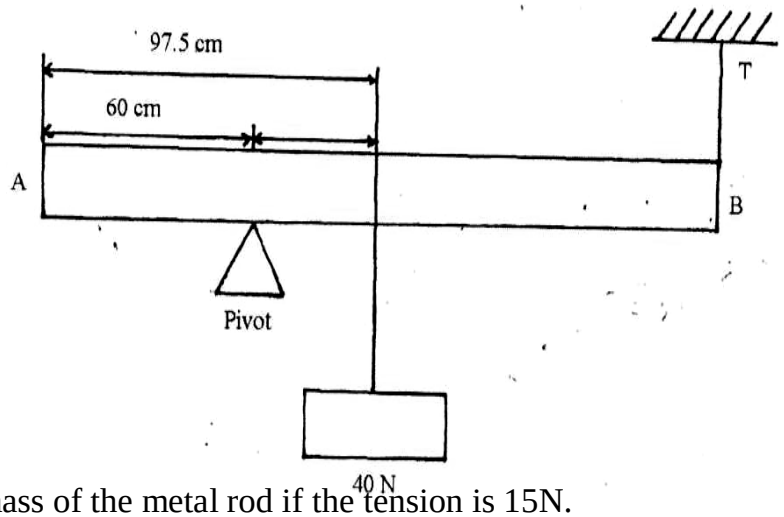


(i) State the **three** forces acting on the block and write an equation linking them when the block is stationary. **(2mks)**

(ii) Calculate the tension on the string. **(3mks)**

(d) The figure below shows a metal rod AB of length 2m horizontally balanced while supported by a pivot and a string.

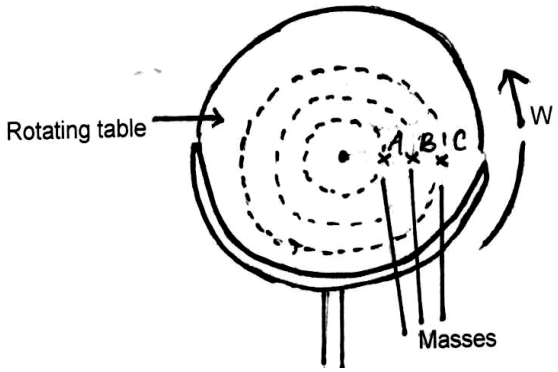
100



Determine the mass of the metal rod if the tension is 15N. **(3mks)**

17. (a) The figure below shows asses A, B and C placed at different points on a rotating table.

The angular velocity W, of the table can be varied



(i) State **two** factors that determine whether a particular mass slides off the table or not. **(2mks)**

(ii) It is found that the masses slide off at angular velocities W_A, W_B and W_C respectively. Arrange the values of W_A, W_B and W_C in decreasing order. **(1mk)**

(b) 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 15cm. If the maximum tension the thread can withstand is 5.6N, determine the maximum angular velocity the table can attain before the thread cuts. **(4mks)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 9 PAPER 1

NAME…… INDEX NO…….

SCHOOL…….... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

(a) Write your Name and Index Number in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided above.
(c) This paper consists two sections A and B.
(d) Answer all questions in Section A and B in the spaces provided below all questions.
(e) silent electronic calculators and KNEC Mathematical tables may be used.

Take g = $10Nkg^{-1}$

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE SCORE
A	1 - 13	25	
B	14	10	
	15	10	
	16	07	
	17	10	
	18	09	
	19	09	
TOTAL SCORE		**80**	

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)**

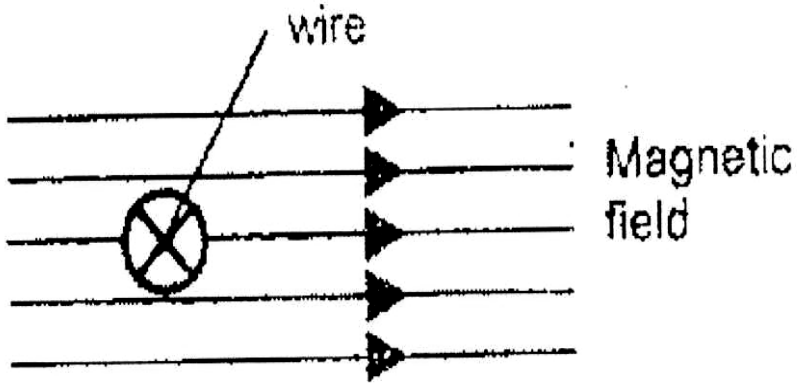


Figure 1.

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.

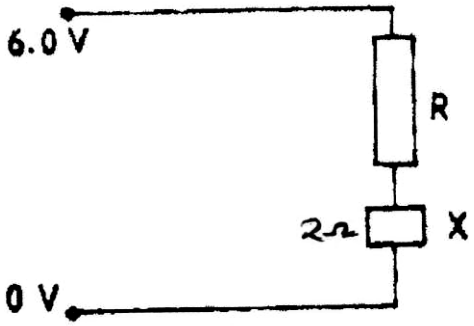


Fig. 2

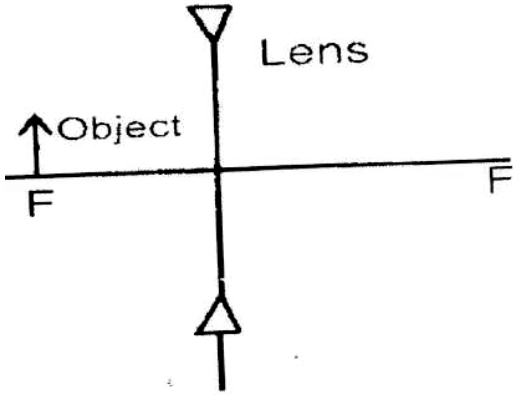
Calculate the value of the resistance R. **(2mks)**

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.

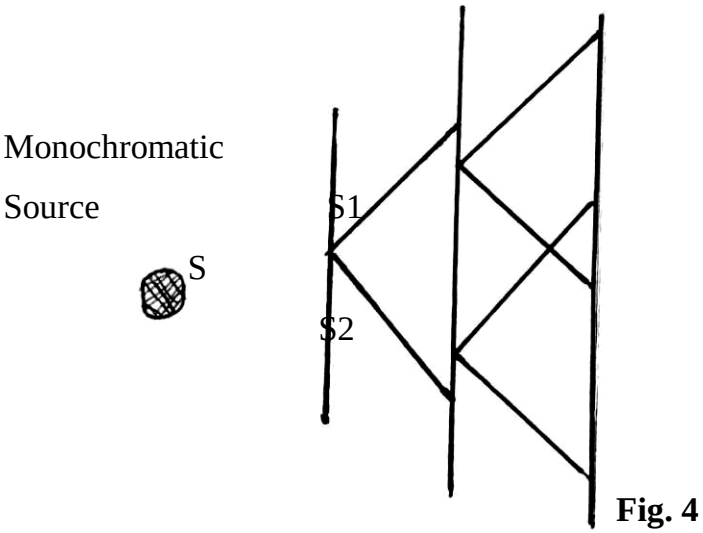


Fig. 4

Double

Slit **Screen**

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.

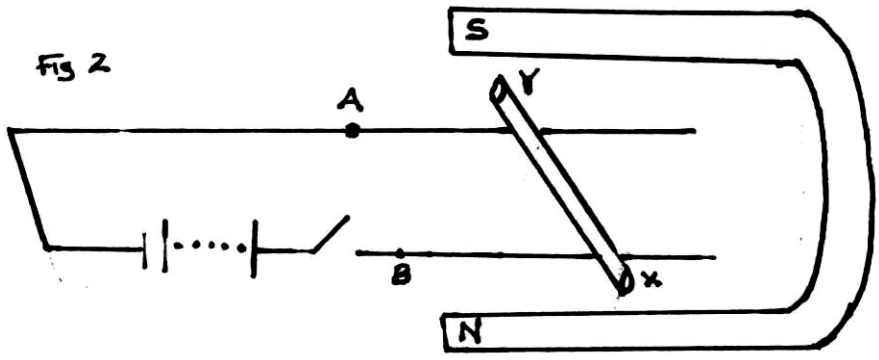


Fig. 5

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.

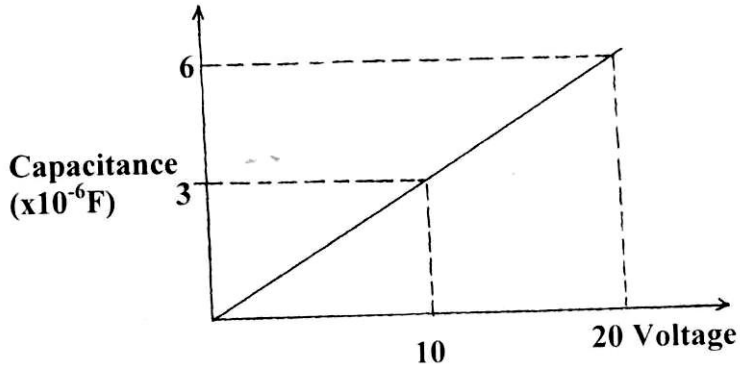


Fig. 6

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)

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

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

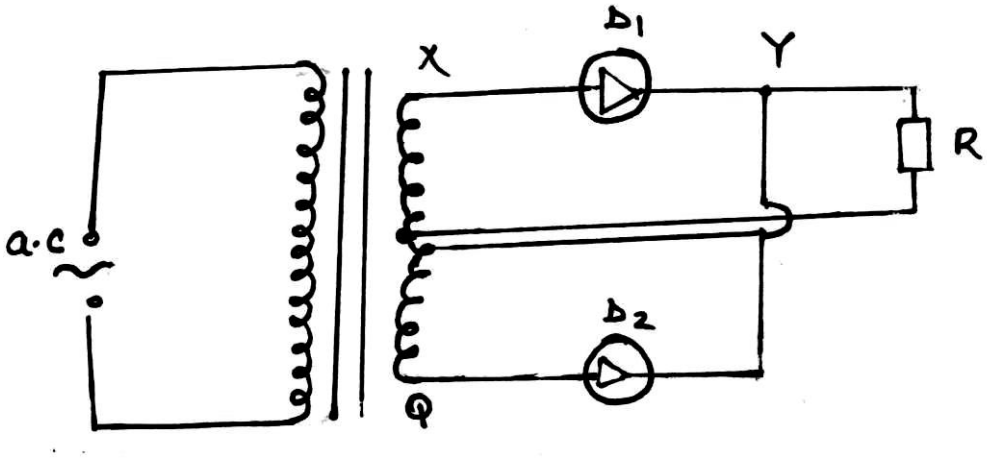


Fig. 7

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

(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.

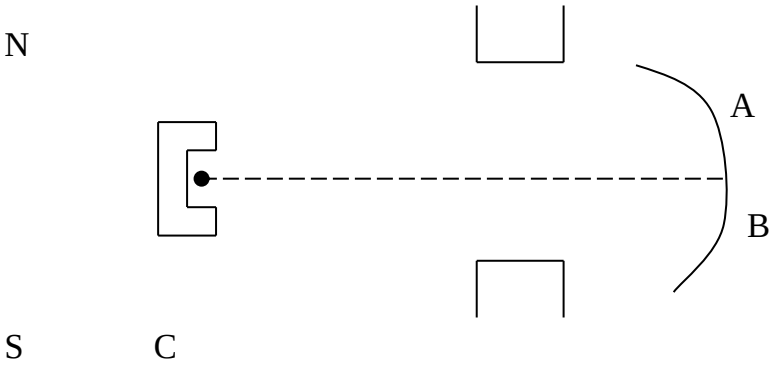


Fig. 8

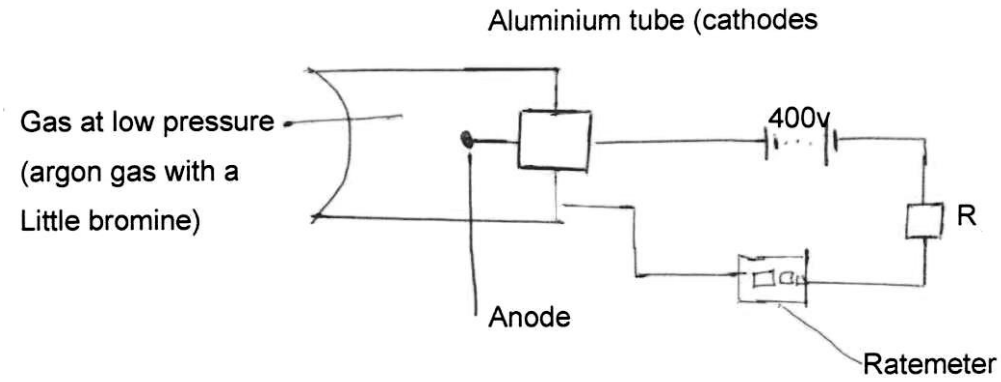
The background radiation at the place is 5 counts per minute. The detectors are placed a positions A, B and C respectively. Results obtained are shown in the table below.

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.

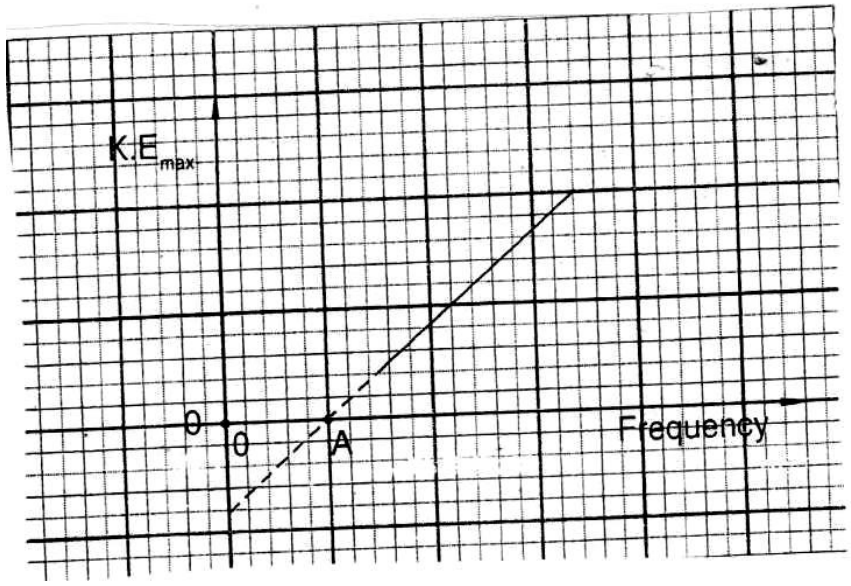


Fig. 10

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

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

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

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

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

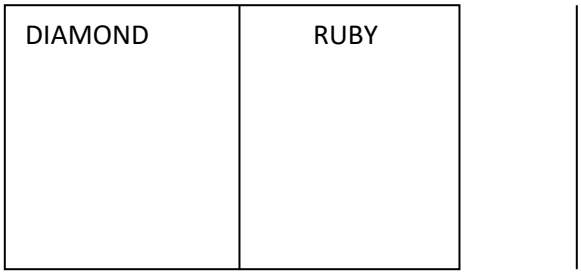
(b) The maximum Kinetic energy of the electrons emitted from a metallic surface is 1.6×10^{-19}J when the incident radiation is 7.5×10^{14}Hz. Calculate the minimum frequency of radiation for which electrons will be emitted.

(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.

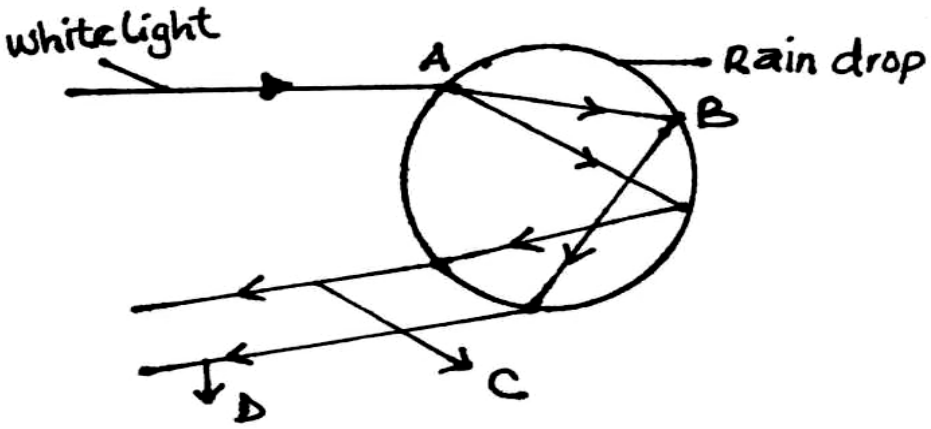


Fig. 12

(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.

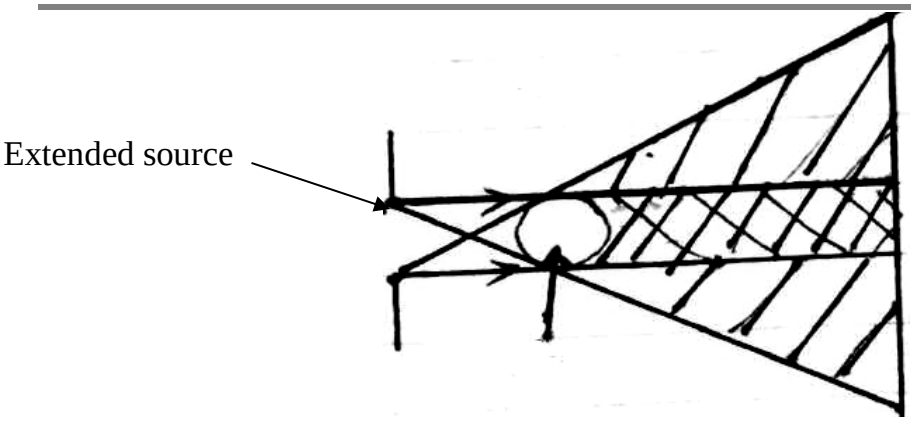


Fig. 13

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,

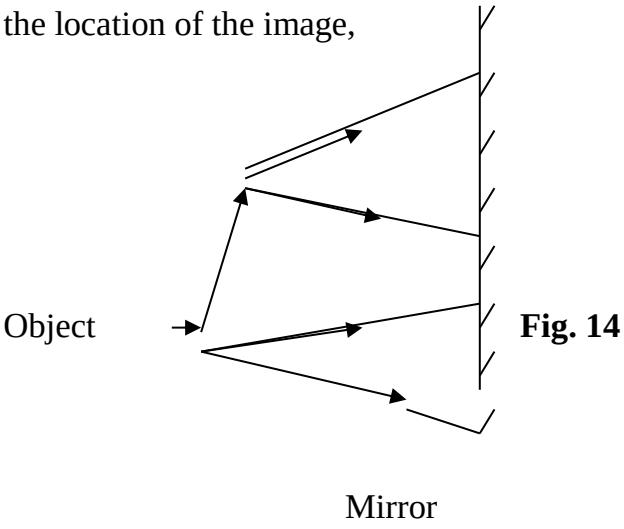
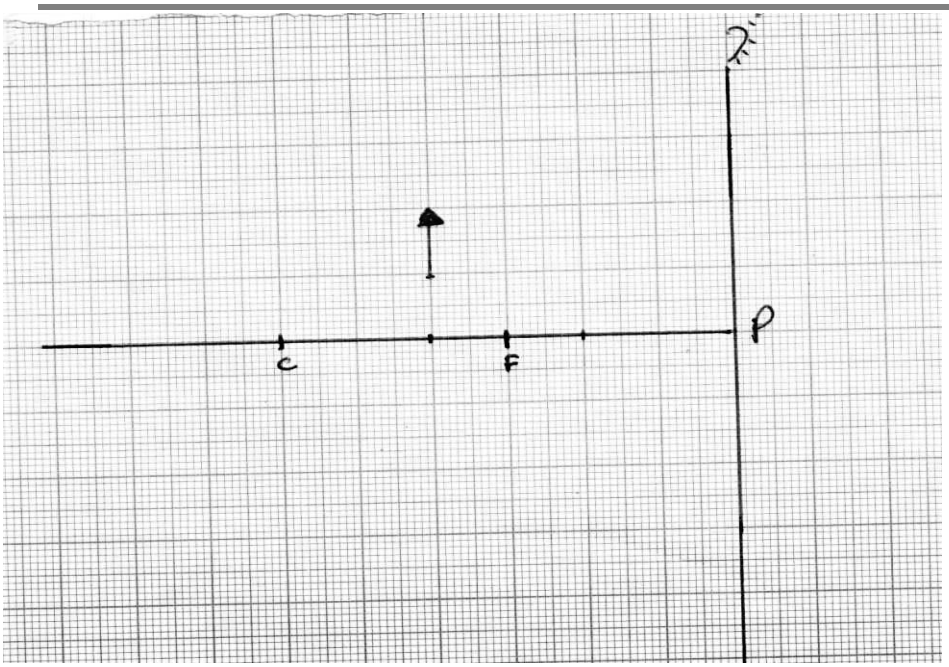


Fig. 14

(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 **one** 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:-

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

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

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

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 9 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1 (THEORY)

2 HOURS

INSTRUCTIONS

- Write your name and admission number in the space provided
- Sign and write the date of the examination in the space provided above
- This paper consists of two sections A and B.
- Answer all the questions in the spaces provided.
- Mathematical tables and silent electronic calculators may be used.

For examiner's use only

SECTION	QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	1-13	25	
B	14	12	
	15	10	
	16	12	
	17	10	
	18	11	
	GRAND TOTAL	80	

SECTION A (25 MARKS)

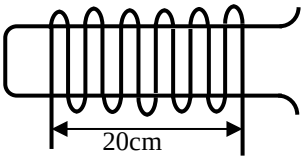
Answer all the questions in this section in the spaces provided.

(Take g=10N/kg or 10m/s^2)

1. The figure1 below shows a wire wound on a test tube. The windings just touch each other. If the total number of complete loops was found to be 15, and the distance covered by the windings on the test tube is 20cm; find the radius of the wire.

(2marks)

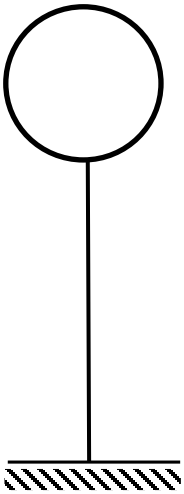
Figure 1



2. A paratrooper flexes his legs when he lands. Explain **(1mark)**

3. A needle may float on clean water but sinks when a detergent is added. Explain. **(1 mark)**

4. The mass of a fabric of a large balloon is 100kg. the balloon is filled with 200 m3 of helium and attached to a cable fixed to the ground as shown below.



Given that the densities of air and helium are 1.3 kg/m^3 and 0.018kg/m^3 respectively, determine the tension in the string**.** **(3 marks)**

5. Water flows in a pipe of diameter 7cm at a speed of 5m/s. The water then gets to the perforated end which has 20 holes of diameter 0.7cm each.Determine the speed of water jets. **(3 marks)**

6. For an enclosed system with a liquid, a force is applied at one point.

a) Briefly explain how force is transmitted to other parts of the system. **(2 marks)**

b) State one application of such a system. **(1 marks)**

7. A 150g mass tied on a string is whirled in a vertical circle of radius 30cm with a uniform speed. At the lowest position the tension in the string is 9.5N.Calculate the velocity of the mass.

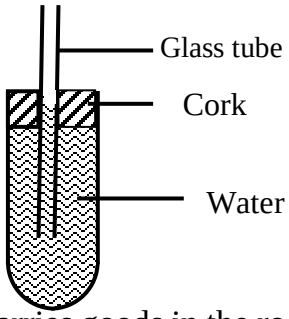
(3 marks)

8. A spring of elastic constant K has its length increased from 4.00m when unloaded to 4.25m when loaded with a 75N weight. Assuming that the elastic limit is not exceeded, determine the value of K. **(2 marks)**

9. The figure 2 below shows a glass tube fitted on to a boiling tube filled with water. State and explain what is observed when the boiling tube is heated.

(2marks)

Figure 2

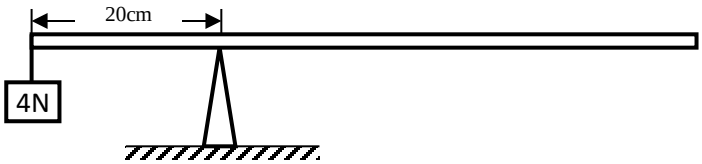


10. A bus that carries goods in the roof carrier is less stable than one that carries goods in the boot. Explain why this is so. **(1 mark)**

11. A rod consists of glass on one part and copper on the other. The rod is wrapped with a piece of paper and then a flame passed below it. It is observed that the paper on the side with glass is charred while that on the side of copper is not. Explain this observation. **(1 mark)**

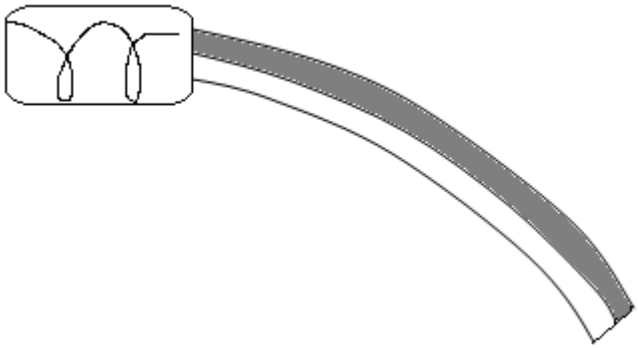
12. The figure 3 below shows a uniform 50cm rod. It is balanced horizontally by a load of 4N on one end. Calculate the weight of the rod. **(2marks)**

fig. 3



13. The figure 4 below shows a bimetallic strip cooled below room temperature. Sketch on the side the bimetallic strip at room temperature. **(1Mark)**

Figure 4.



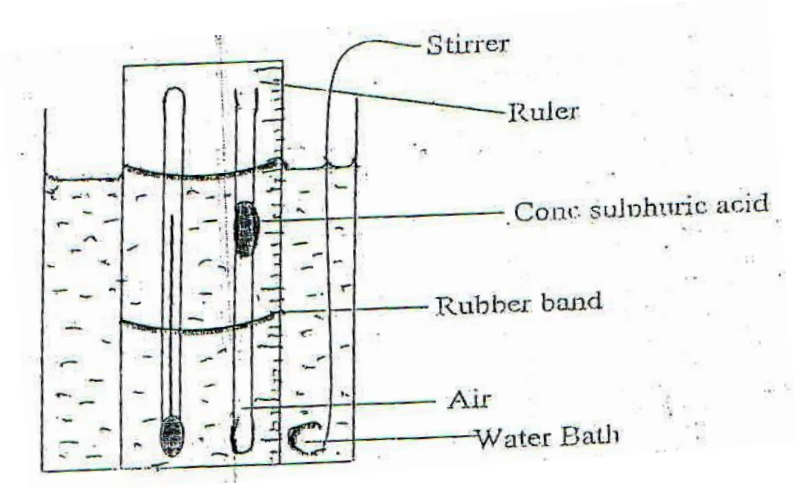
SECTION B (55 Marks)

Answer all questions in this section in the spaces provided.

14. a) Define "absolute zero temperature" for an ideal gas **(1 Mark)**

b) Using kinetic theory, explain Boyle's law for an ideal gas. **(2Marks)**

c) The diagram shows an experiment to investigate the relationship between volume and temperature of a fixed mass of gas at constant pressure.



i) Explain the function of;

(I) Concentrated sulphuric acid **(1 Mark)**

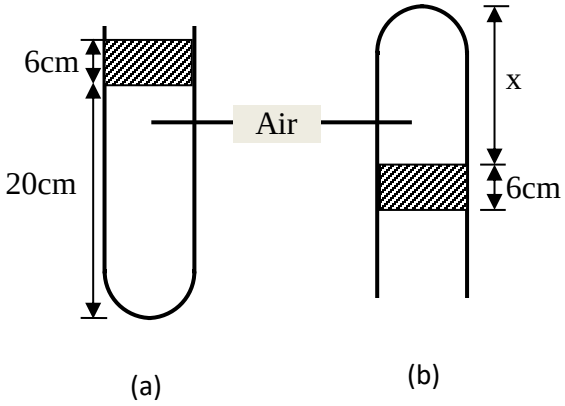
(II) Stirrer **(1 Mark)**

ii). Explain how the set up above can be used to verify Charles law for an ideal gas **(3Marks)**

iii. On the grid below sketch a graph of volume (cm^3) against temperature (^0c). Mark with letterT the absolute zero temperature. **(2 Marks)**

(d)A column of air 20cm long is trapped by mercury thread 6cm long as shown in figure 7 (a) below.

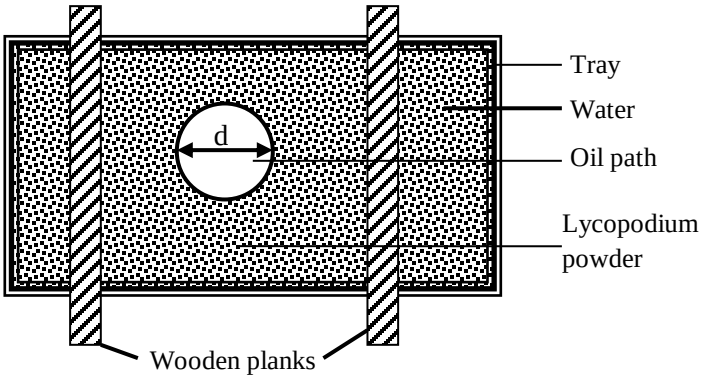
Fig 7



If the tubeis now inverted,determine column X in figure b).Take atmospheric pressure as 76cm of mercury. **(2Marks)**

15. The figure 8 below shows an experimental set up for estimating the diameter of an oil molecule.

Figure 8



a) Describe how the oil patch is formed **(2Marks)**

b) i)In this experiment the diameter 'd' of the oil patch was measured to be 21cm for an oil drop of radius 0.28mm. Determine the diameter of the oil molecule. **(3Marks)**

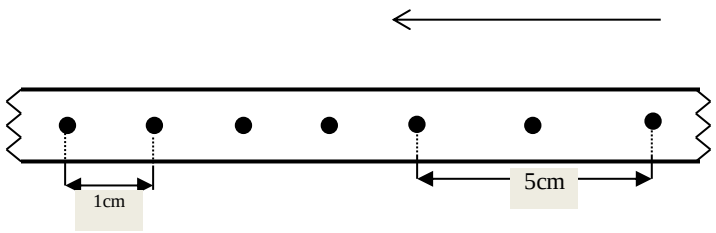
ii)State any two assumptions made in calculating the diameter of the oil molecule. **(2Marks)**

c) What is the role of the lycopodium powder in this experiment? **(1Mark)**

d) Describe one method of determining the diameter of an oil drop. **(2Marks)**

16. The figure 9 below shows the pattern formed on a tape in an experiment to determine the acceleration of a trolley.The frequency of the ticker tape used was 50Hz

Figure 9



Calculate

i) The initial velocity of the trolley **(2Marks)**

ii) The final velocity of the trolley **(2Marks)**

iii) The acceleration of the trolley **(2Marks)**

b) A gun is fired vertically upwards from the top of an open truck moving horizontally at a uniform velocity of 50m/s. The bullet attains a maximum height of 45m.

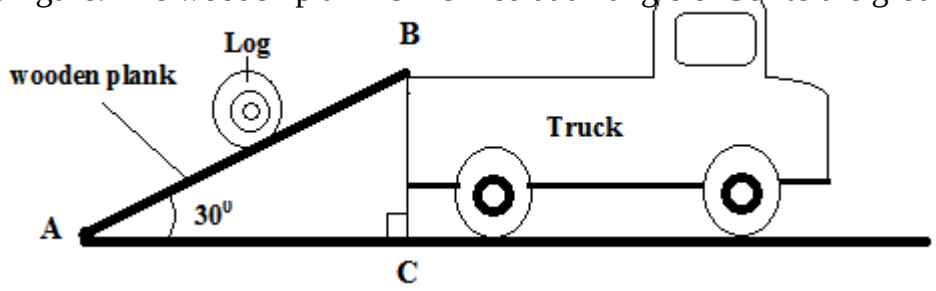
Calculate

i) The time taken by the bullet to reach the maximum height **(3Marks)**

ii) The distance covered by the truck just before the bullet reaches the level from which it was fired. **(3Marks)**

17. A man used a wooden plank to lift a wooden log from the ground to a stationary truck as shown in the figure. The wooden plank is inclined at an angle of 30^0 to the ground.

Figure 10



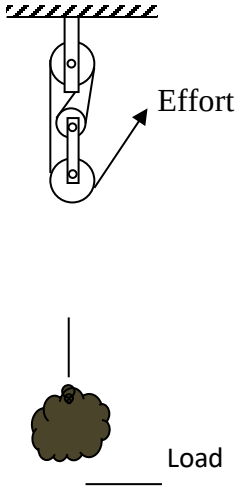
i) Show that the velocity ratio of the system is given as V.R=$\frac{1}{Sin\ 30^0}$ **(3Marks)**

ii) Given that the system is 65% efficient, determine the Mechanical Advantage. **(3 marks)**

iii) Explain why the efficiency of this system cannot be 100%. **(1Mark)**

b) The figure 11 shows a pulley system.

Figure 11



i) State the velocity ratio of the machine. **(1Mark)**

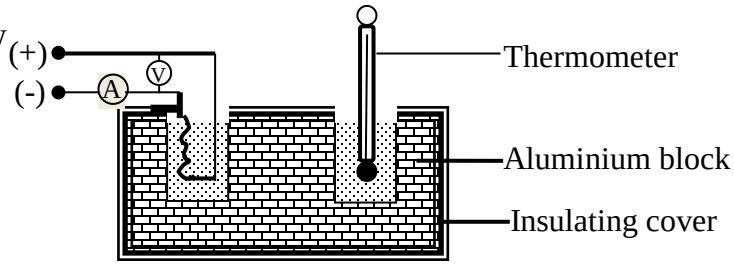
ii) Explain what happens to the Mechanical Advantage of the machine as the load is increased gradually. **(1Mark)**

c) Water drops from a waterfall to the bottom. The temperature of the water is found to be higher at the bottom than at the top.State the energy transformations. **(1Mark)**

18. a) Define "specific heat capacity" of a substance **(1Mark)**

b) In an experiment an aluminium block of mass 2kg was heated using an immersion heater as shown in figure 12 below

Figure 12



The temperature of the block was recorded every minute for exactly five minutes and then the heater was switched off. A graph of temperature in ^{0}c against time in minutes for the experiment is shown below.

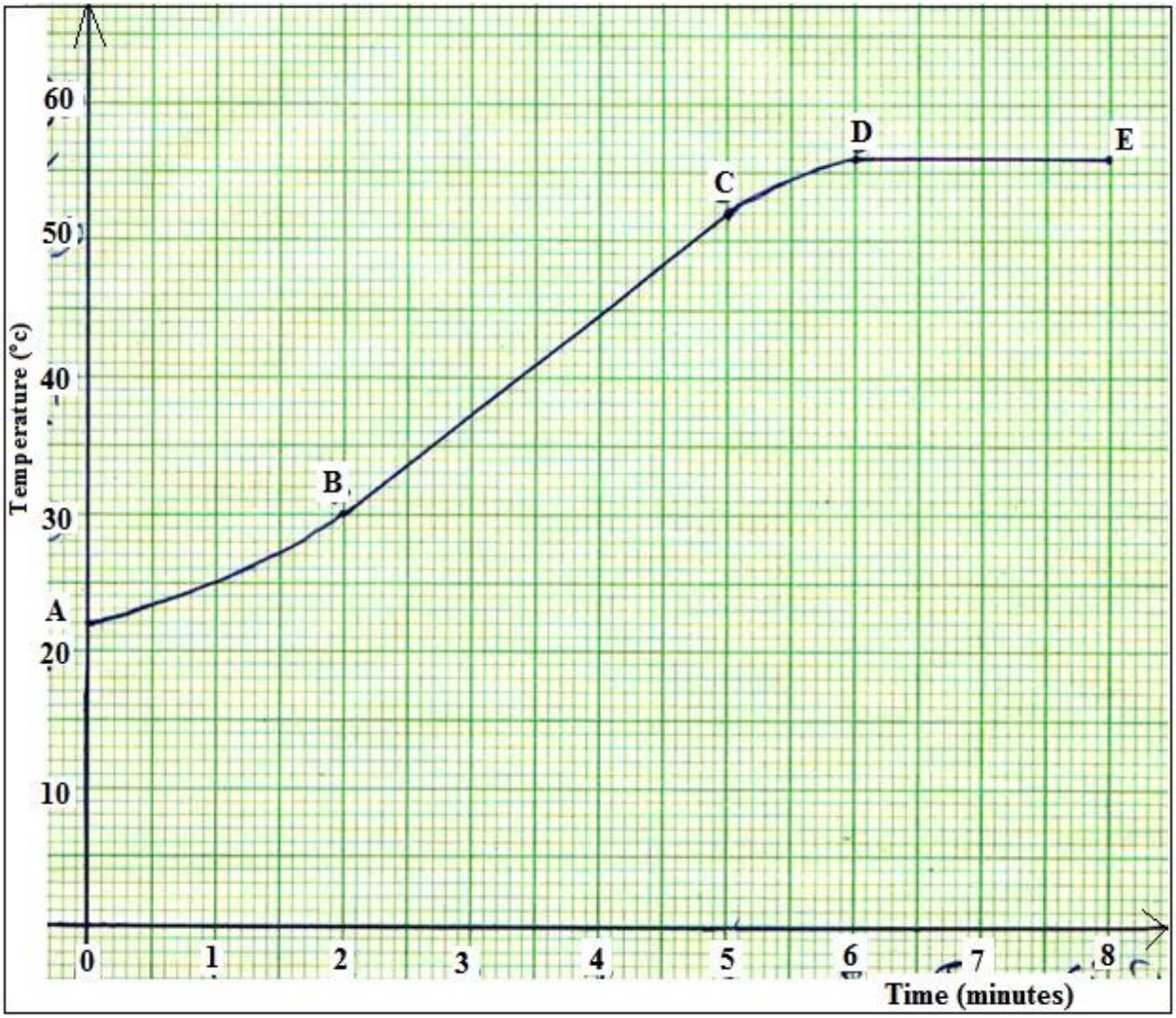


Figure 13

Study the graph above and answer the questions that follow.

Suggest why;

i) The reading in the thermometer rose relatively slowly between point A and B. **(1Mark)**

ii) The temperature continued to rise after the heater was switched off **(1Mark)**

iii) Use the straight portion of the graph (Bto C)to calculate the specific heat capacity of the aluminium given that the voltmeter read 22.00V and ammeter 10A throughout the course of the experiment. **(3Marks)**

c) Explain the two reasons why the value calculated in b) iii) will not be accurate. **(2Marks)**

d) A temperature scale X has an ice point of 40^0 and a steam point of 240^0 .What is the temperature in X^0 when the Celsius temperature is 50^0C. **(3Marks)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 9 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2

TIME: 2 HOURS

Instructions

- ✓ Write your name, index number and name of your school in the spaces provided above.
- ✓ This paper consists of two sections, section I and II. Answer all the questions in both sections.
- ✓ Mathematical tables and silent non – programmable calculators may be used.
- ✓ This paper consist of 12 printed pages. Ensure all the pages are printed.

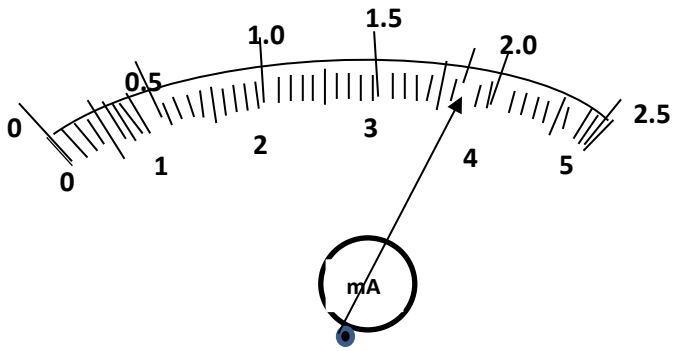
For examiners' use only

section	Question	Maximum score	Candidate's score
I	1 – 11	25	
II	12	11	
	13	11	
	14	11	
	15	12	
	16	10	
Total		80	

Section I (25 marks)

Answer all the questions in this section

1. What is the reading shown by the pointer in the figure below, if the full scale range is;



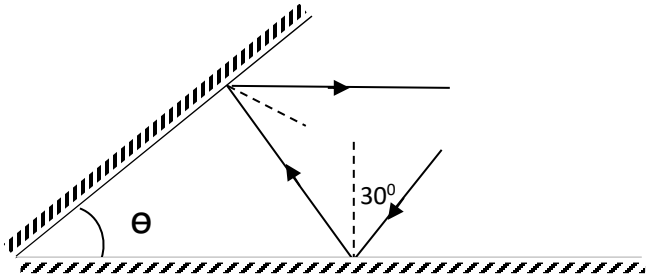
a) 0 - 2.5 **(1 mark)**

……

b) 0 – 5 **(1 mark)**

……

2. The following diagram shows two mirrors inclined at an angle θ to each other. A ray of light is incident on one of the mirrors and finally reflected from the second mirror parallel to the first mirror find the angle between the mirrors **(2 marks)**



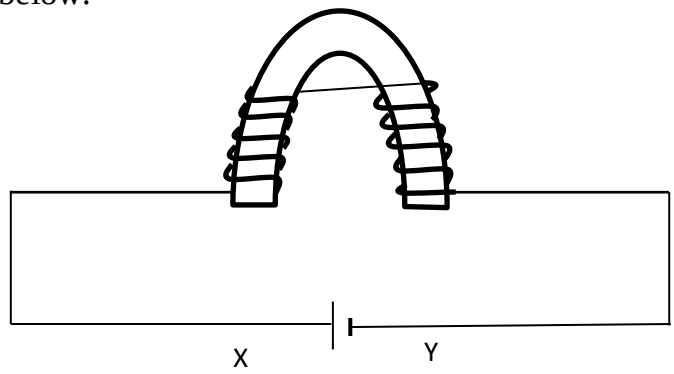
3. It is not possible to charge an electroscope by contact method using a metal rod. Explain (2 marks)

4. A car battery is rated 40 Ah and it is expected to supply a constant current for 120 minutes.

a) What is the strength of the current delivered? **(2 marks)**

b) Explain why eight dry cells in series cannot be used to start a car engine even though they have the same e.m.f. **(1 mark)**

5. A coil of insulated wire is wound around a u – shaped soft iron core X Y and connected to a battery as shown below.

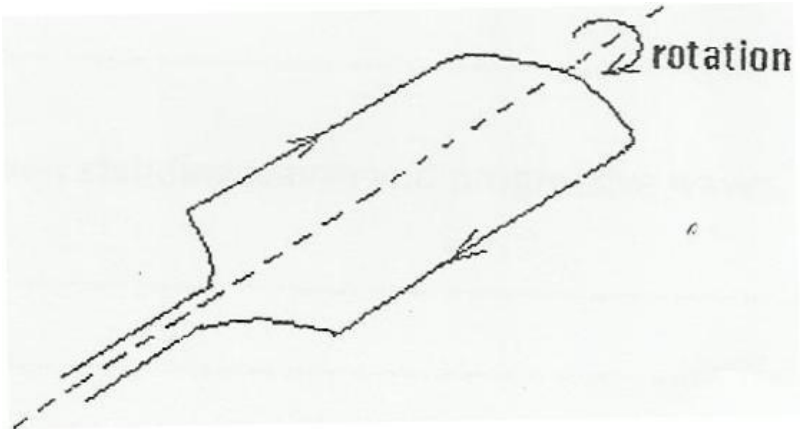


State the polarities of the ends X and Y**.** **(2 marks)**

X ……

Y……

6. The figure below shows a coil carrying a current flowing in the direction shown in a magnetic field.



On the same diagram draw the magnetic field lines across the coil. (1 mark)

7. An object of height 5 cm is placed 25 cm from a convex mirror of focal length 15 cm. determine the image distance and hence state the nature of the image formed. (3 marks)

8. Loudspeaker placed between two wall A and B is sending out constant wave pulses. Determine how far the loudspeaker is from wall B if it is 100m from wall A, and the time between the two echoes received is o.2 seconds (speed of sound is 340m/s)
(3 marks)

9. The following table shows part of the electromagnetic wave spectrum.

Ultraviolet rays	
Microwaves	
X-rays	
Visible light	

(a) On the right column of the table, arrange the waves in the order of decreasing energy. (1 marks)

(b) Give an application of each of the following electromagnetic waves. (2 marks)

i) Ultraviolet rays:

ii) Microwaves:

10. A 4Ω resistor is connected in series to a battery of e.m.f 6V and negligible internal resistance. Determine the power dissipated by the resistor. (2 marks)

11. State any two laboratory safety rules that deal with electrical safety in the lab.(2 marks)

Section II (55 marks)

Answer all the questions in this section.

12. a) Define term focal length as used in thin **lenses** **(1 mark)**

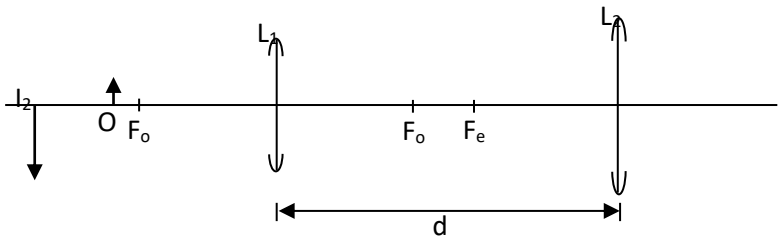
b) Give the functions of the following parts of a lens camera**.** **(3 marks)**

i. Shutter: ……...

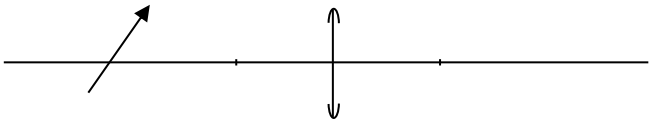
ii. Film: ……

iii. Diaphragm: ……

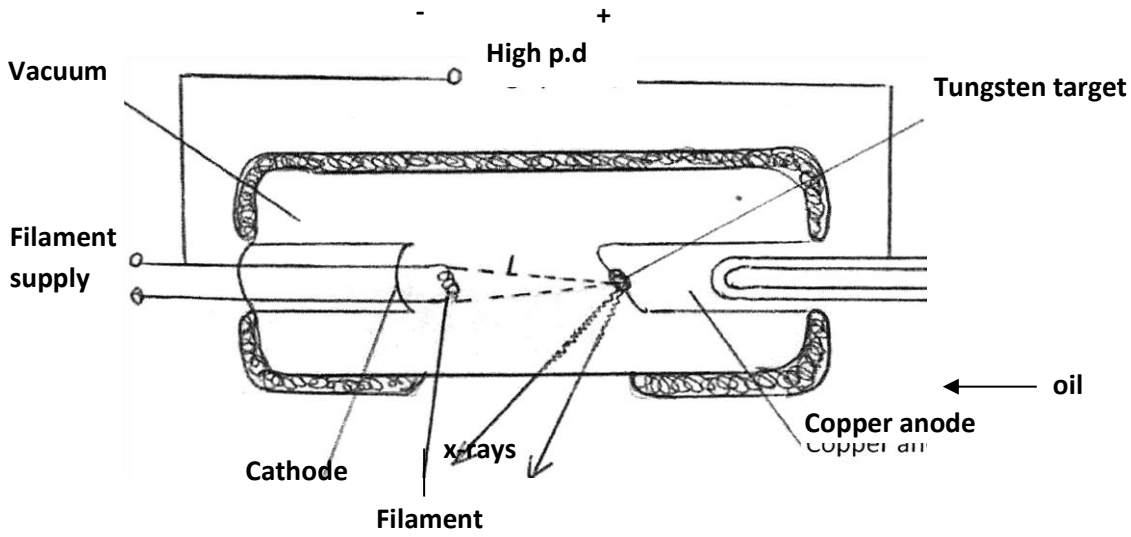
c) A compound microscope with objective lens L_1 of focal length 0.8cm and an eyepiece lens L_2 of focal length 2.5cm is shown in figure below. An object O is placed in front of the objective lens at a distance u_1 of 1.2cm. The system forms a final image I_2 at a distance of 10cm from L_2. Determine the distance of separation of lenses L_1 and L_2. (4 marks)



d) The figure below (figure 9) shows an object placed in front of a convex lens. Complete the ray diagram to show the position of the image. (3 marks)



13. The figure below shows the features of an X-ray tube



(a) (i) What is the purpose of the oil going in and out of the anode (1mk)

(ii) State the property of tungsten that makes it suitable as a target (1mk)

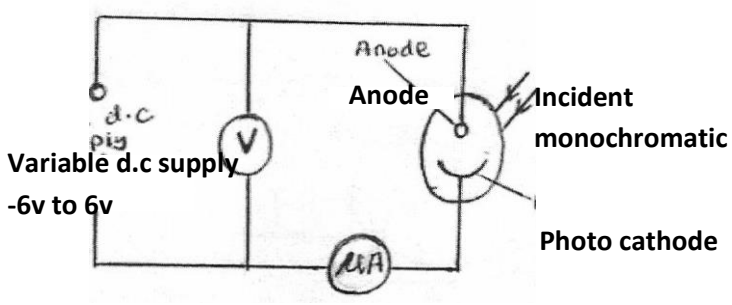
(b)An X-ray tube operates with a potential difference of 100kv and filament current is 20mA. Calculate;

I. The power transferred to the target of X-ray tube **(2mks)**

II. The number of electrons hitting the target per second **(2mks)**

III. The maximum kinetic energy of emitted electrons (*Take charge of an electron=1.6x10^{-19}C, mass of an electron =9.1x10^{-31}kg*) **(2mks)**

(c) The diagram shows monochromatic radiation falling on a photocell connected to a circuit



The incident radiation has a wavelength of $2.15x10^{-7}$m. The metal surface of the photocell has a work function of 2.26 eV.

(i) Calculate the energy in eV of a photon of the incident radiation *(Take $c=3.0x10^{8}m/s$, $h=6.63x10^{-34}Js$ and $e=1.6x10^{-19}C$)* **(3mks)**

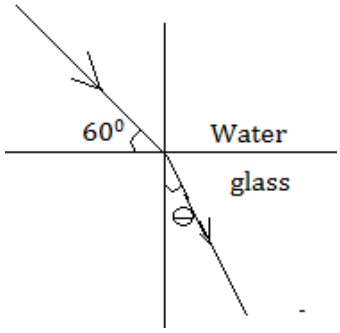
(ii) What is the maximum kinetic energy of the emitted electrons **(2mks)**

(iii) Write down the value of the stopping potential **(1mk)**

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

b) A student prepares to swim to the bottom of a pool to pick a coin on the bed. It is only while under the water that she realizes the presence of a sharp object beside the coin that she had not seen. Explain a possible reason why it was not visible in clear swimming pool water. (1 mark)

c) The figure below shows a ray of light travelling



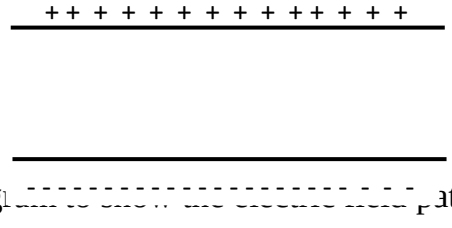
i) Calculate the refractive index of water with respect to glass given the refractive index of glass and water are $^{3}/_{2}$ and $^{4}/_{3}$ respectively. (2 marks)

ii) Calculate the angle Θ (2 marks)

d) Using a well-labeled diagram, describe how optic fibers are used for communication(3 marks)

15. a) Define the term capacitance. (1 mark)

b) The figure below shows two charged plates close to each other



(i) Complete the diagram to show the electric field patterns between the plates (1 mark)

(ii) Without changing the area of overlap, suggest any two ways of increasing the capacitance of a parallel plate capacitor. (2 marks)

c) You have been provided with **THREE** identical capacitors each of capacitance 12 μ F. State and show how you would combine them to get the following effective capacitance

(i) 36μF **(2marks)**

(ii) 4μF **(2marks)**

(iii) 8μF **(2marks)**

16. (a) (i) The following nuclear reaction is part of a radioactive series

$$^{210}_{82}A \xrightarrow{\beta} {}^{210}_{x}B \xrightarrow{r} {}^{210}_{84}C \xrightarrow{s} {}^{206}_{y}D$$

I. Name the radiation represented by **r** and **s** **(1mk)**

r ……

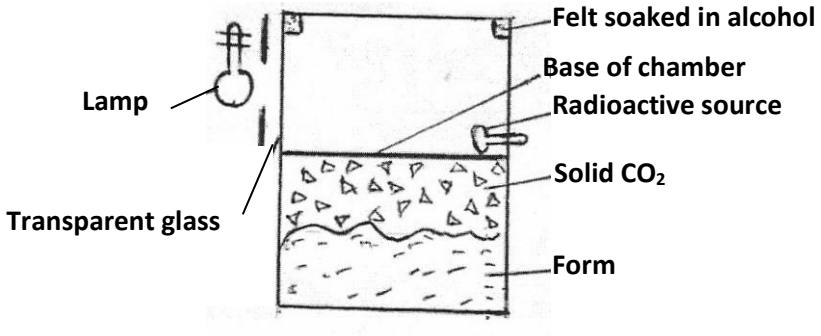
s ……..

II. Determine the number represented by **x** and **y** **(1mk)**

x …….

y …….

(ii) The figure below shows the features of diffusion cloud chamber used for detecting radiations from radioactive sources



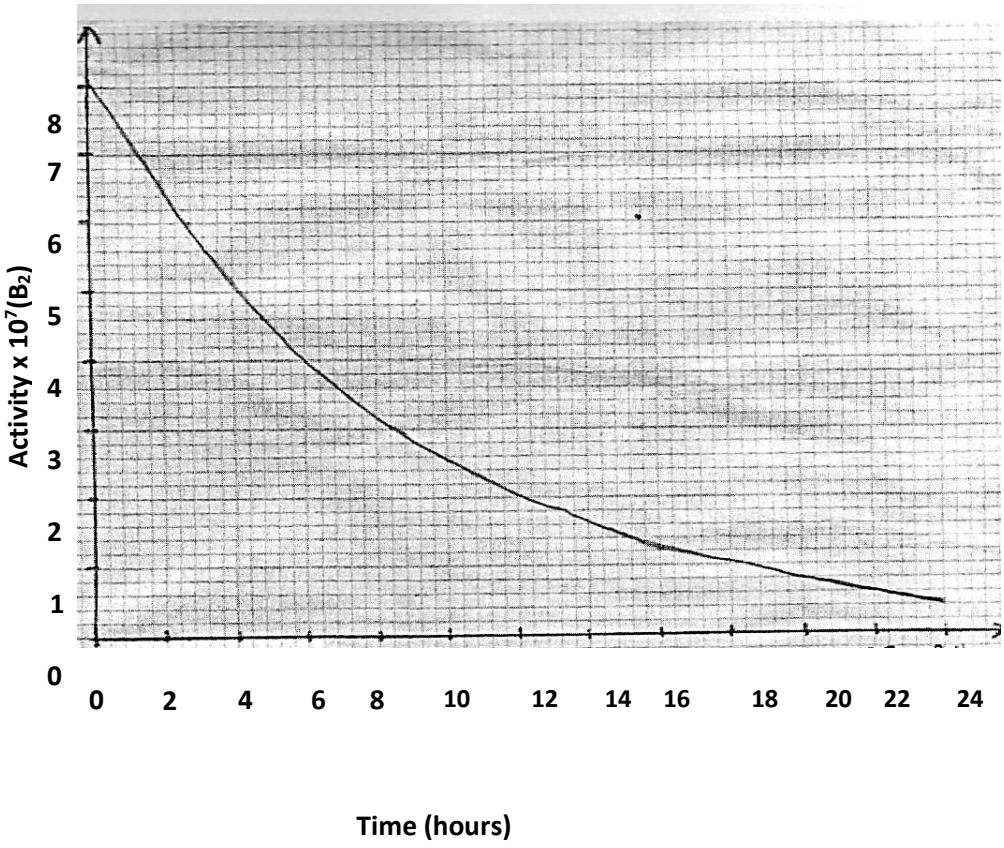
I. State the property of alcohol that makes it suitable for use in the chamber **(1mk)**

II. What is the purpose of the solid CO_2? **(1mk)**

III. Explain how the radiation from the radioactive source is detected in the chamber. **(2mks)**

IV. State one advantage of the cold chamber over a charged gold leaf electroscope when used as detectors of radiation **(1mk)**

(b) The graph below shows how the activity of a sample of the radioisotope technetium which is used extensively in medicine, varies with time



I. Use the graph to determine the half-life. T ½ of technetium **(1mk)**

II. Hence calculate the decay constant for technetium given that $T_{1/2} = \frac{0.6931}{\lambda}$ where λ is the decay constant. **(1mk)**

III. Determine the number of technetium atoms remaining in the sample after 24 hours (1mk)

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 10 PAPER 1

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/1

PHYSICS

PAPER 1 THEORY
2 HOURS

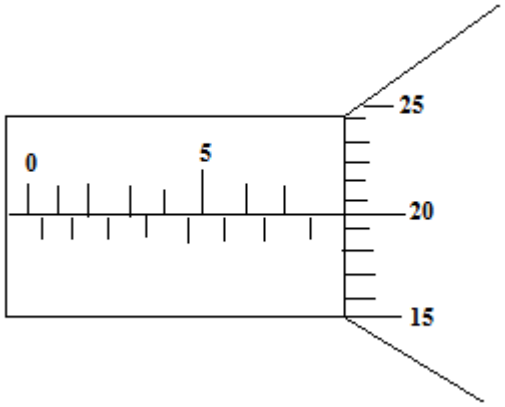
INSTRUCTIONS

Write your name and admission number in the space provided
Sign and write the date of the examination in the space provided above
This paper consists of two sections A and B.
For examiner's use only

SECTION	QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	1-13	25	
B	14	14	
	15	10	
	16	11	
	17	10	
	18	10	
		GRAND TOTAL	80 MARKS

SECTION A (25 MARKS)

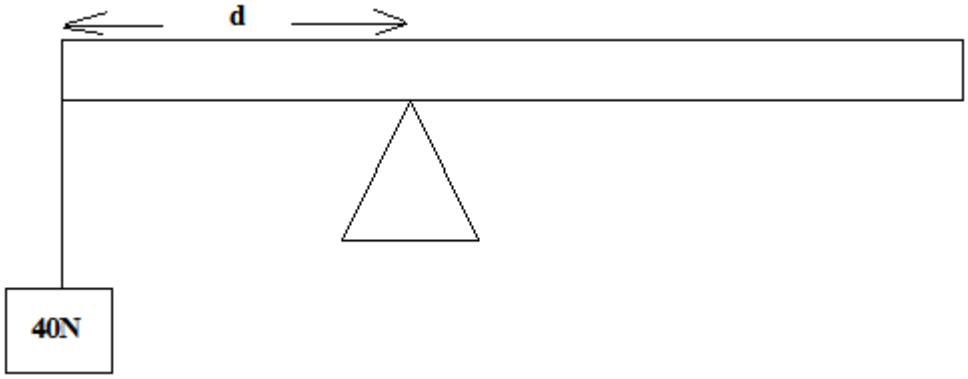
1. The figure below shows a micrometer screw gauge. What is the reading shown on the figure. (2 marks)



2. State pressure law. **(1 mark)**

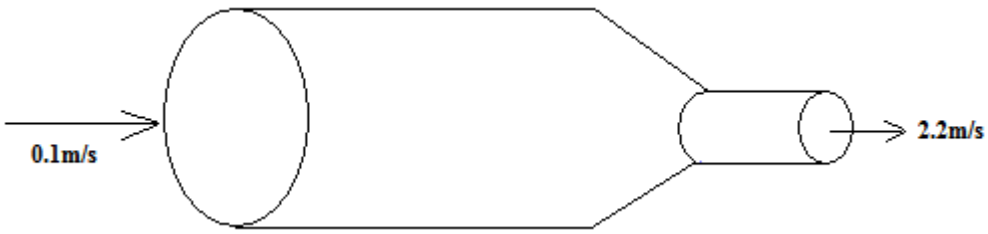
3. State two factors that affect stability of a body. **(2 marks)**

4. The diagram below shows a uniform wooden plank of length 4m and weight 10N. The plank is held at equilibrium by a weight of 40N placed at one end as shown below.



Determine the distance d. **(3 marks)**

5. Figure below shows a non-viscous fluid that is not compressible moving through a pipe of varied cross-sectional area.



If the area of the narrow region is $0.05m^2$, calculate diameter of the wider region. **(3 mks)**

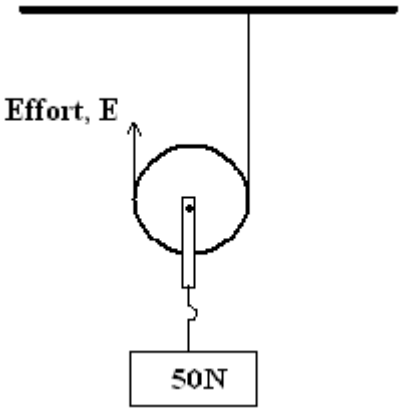
6. State one use of thermal expansion. **(1 mark)**

7. State two factors that affect melting point of a substance. **(2 marks)**

8. A body is projected vertically upwards from the top of a building. If it lands on the base of the building. Sketch the velocity-time graph for motion. **(2 marks)**

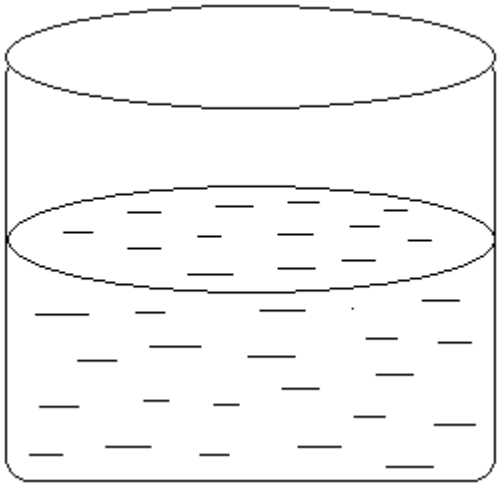
9. State a reason why transfer by radiation is faster than by conduction. **(1 mark)**

10. The pulley system in the figure below supports a load of 50N.



Given that the efficiency of the system is 80% calculate the effort, E. **(3 marks)**

11. The figure below shows a glass container with cross-section area of $50cm^2$.



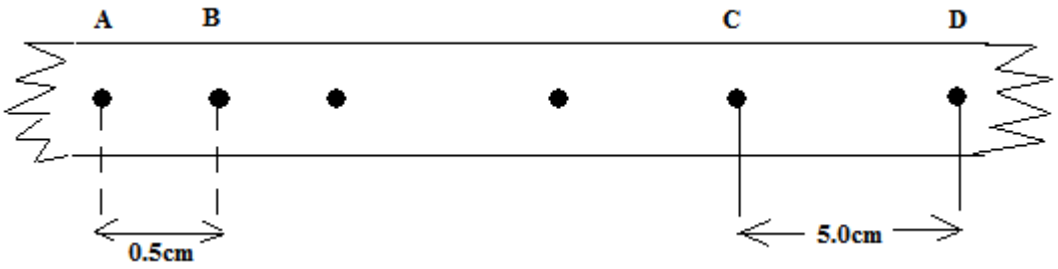
When a wooden block of mass 120g is immersed into the water it floats while fully submerged and the water level rises by 4cm, determine the density of the water **(3 marks)**

12. Define the term momentum. **(1 mark)**

13. What is a pitch of a screw. **(1 mark)**

SECTION B

14. The figure below shows the motion of a trolley on ticker timer. The ticker has a frequency of 100Hz.

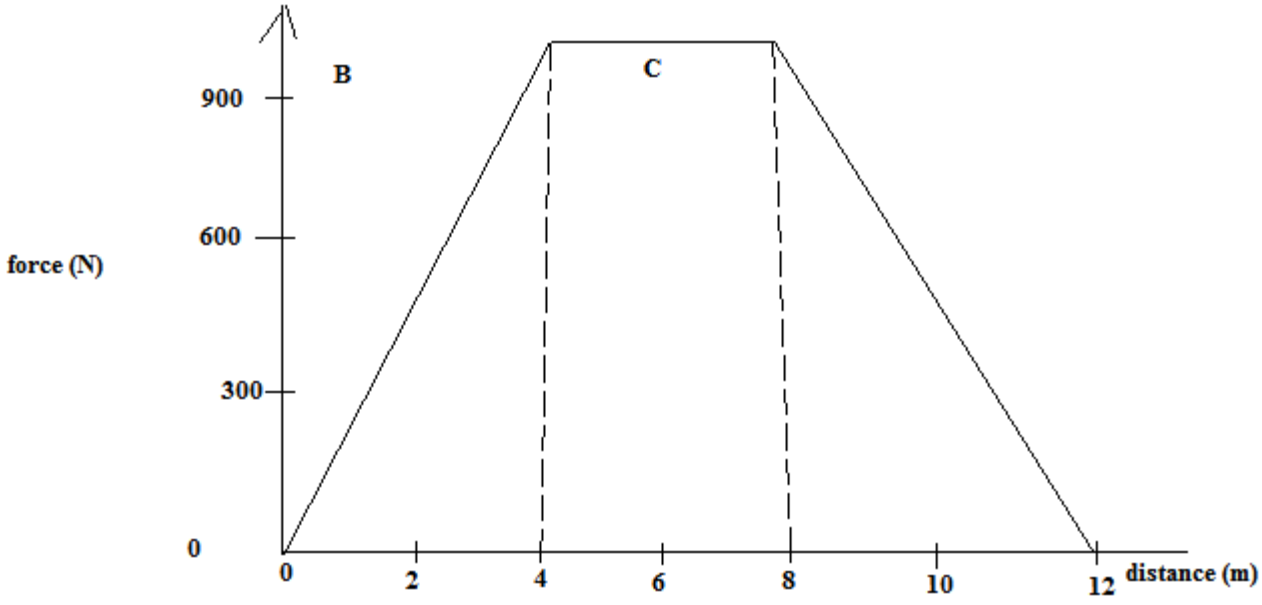


a) i) Calculate the initial velocity between A and B. **(3 marks)**

ii) Calculate the final velocity between C and D. **(3 marks)**

iii) Calculate the acceleration of the trolley during the motion. **(3 marks)**

b) Figure below shows a force-distance graph for a car being towed on a level ground.



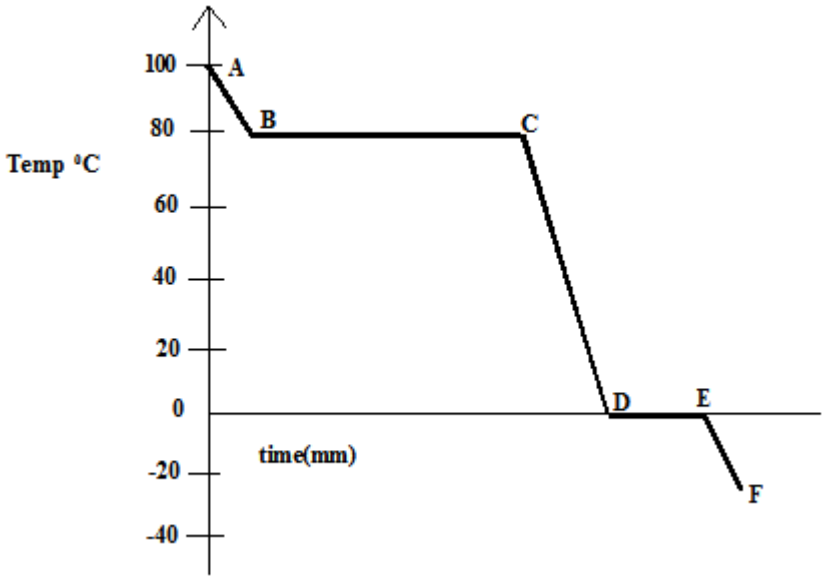
i) Calculate the total work done. **(3 mark**

ii) If the velocity just before reaching point C is 0.6m/s. Calculate the power developed by the engine at this point. **(2 marks)**

15. **a)** **A** metal ball of mass 100g is dipped into boiling water at 100^0C and then placed in a calorimeter containing 80g of water at 20^0C. After stirring, the temperature of the mixture

stabilizes at 23.4^0C. Ignoring the heat gained by the calorimeter, determine the specific heat capacity of the metal. (Specific heat capacity of water = 4200j/Kg K). **(4 marks)**

b) The cooling curve below is for a pure substance.



i) What is the melting point of the substance. **(1 mark)**

ii) State two factors that affect boiling point of a substance.

iii) At what part of the curve is the substance.
Solid only?
Liquid only?
Solid and Liquid? **(3 marks)**

16. a) State Newton's second law of linear motion. **(1 mark)**

b) The legal speed limit on motorways is approximately 30m/s. In an incident on a motorway, a car of mass 900kg leaves a skid mark 75m long when stopping. The maximum deceleration of the car when skidding is approximately $10m/s^2$.

i) Show that before the incidence, the car must have been travelling above the legal speed limit.

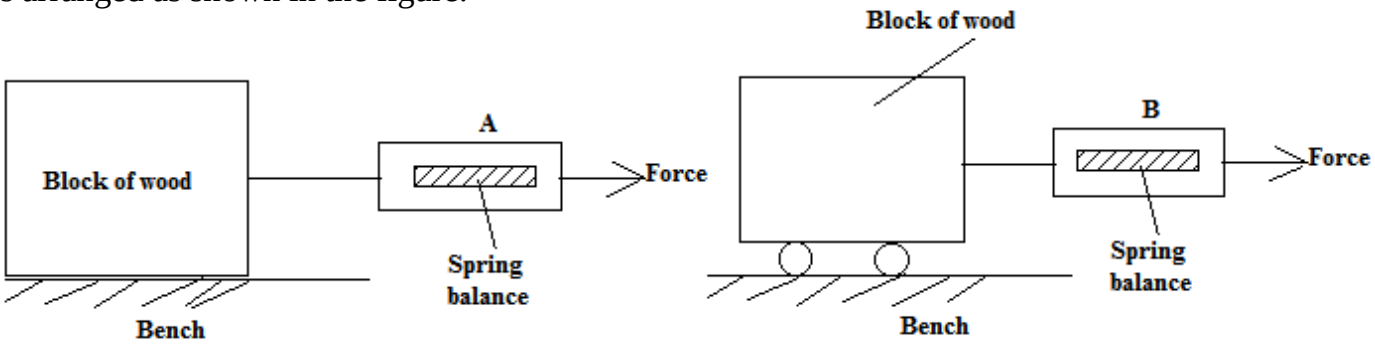
(3 marks)

ii) Calculate for this skid, the maximum average braking force between each of the four tyres and the road. **(3 marks)**

iii) When the motorway is wet, the braking force provided by each wheel is reduced to 50% of the calculated in (ii) above. What is the effect of this reduced breaking force on stopping

distance, explain your answer. Assume that the speed of the car before breaking is the same in both cases. **(2 marks)**

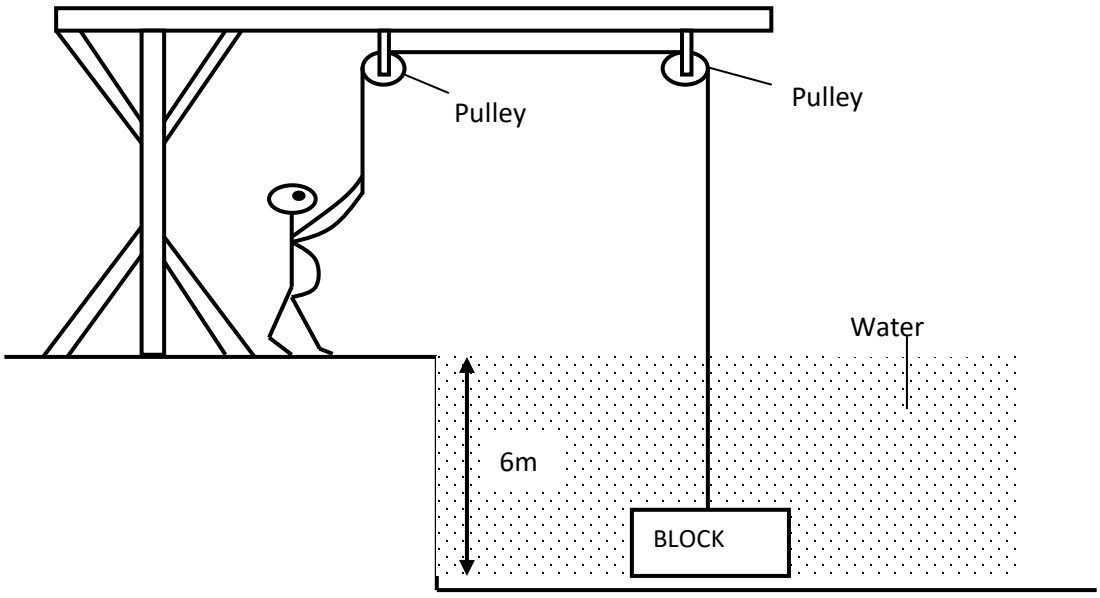
c) A student carried out an experiment to measure static friction using identical wooden blocks arranged as shown in the figure.



State and explain which spring balance will indicate a smaller reading when the block just starts to move. (2 marks)

17. a) Give a reason why people experience nose bleeding when they climb tall mountains. (1 mark)

b) The diagram shows a person raising a concrete block from a river bed by using two pulleys.

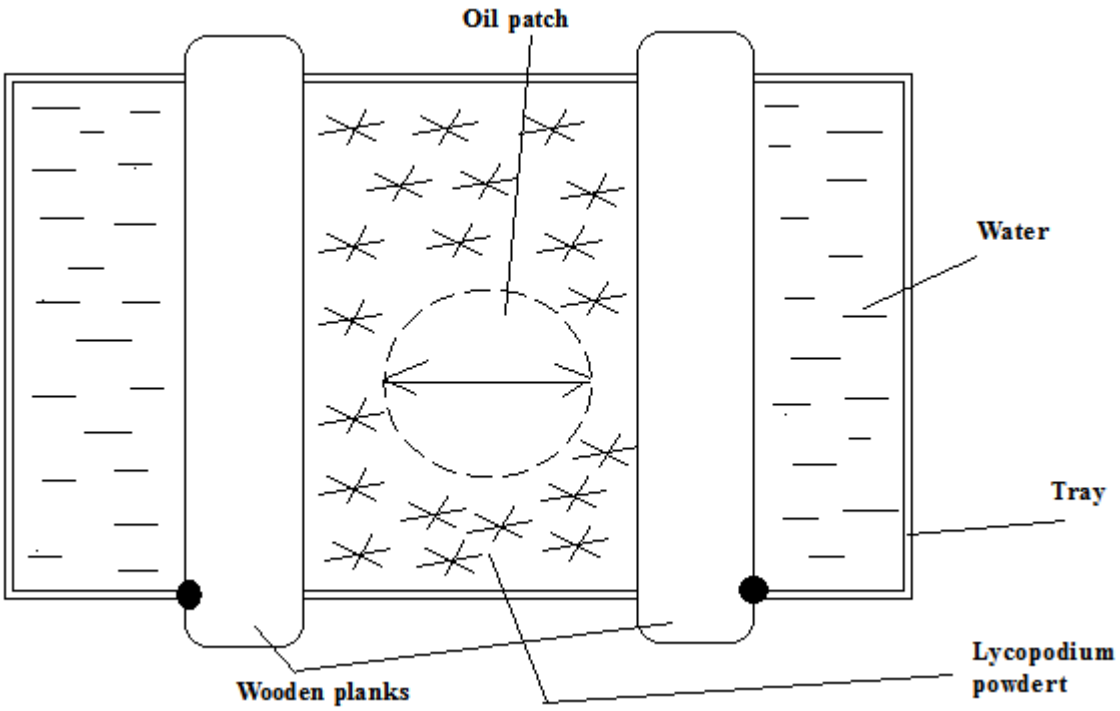


As shown in the diagram, the top of the block is 6.0m below the water surface. The density of water is 1000kg/m^3 and the acceleration of free fall is 10m/s^2. Calculate the water pressure acting on the top of the block. **(3 marks)**

c) The block is raised through water. At one part, the water pressure acting on the top of the block 4.5×10^4 pa. The area of the top of the block is $0.015m^2$. Calculate the downward force exerted by the water on top of the block. **(3 marks)**

d) When the block is clear of the water, it is raised a further 4.0m. The weight of the block is 550N. Calculate the work on the block as it is raised the 4.0m through air. **(3 marks)**

18. The figure below shows part of an experiment set up to estimate the diameter of an oil molecule.



i) Describe how the oil patch is formed. **(2 marks)**

ii) What is the role of the Lycopodiumpowder. **(1 mark)**

b) An oil drop of average diameter 0.7mm spreads out into a roughly circular patch of diameter 73.5cm on the surface of water in a trough.

i) Calculate volume of the drop in mm^3. Take ($\pi = {}^{22}/_{7}$) **(3 marks)**

ii) Calculate the area of the patch in mm^3. **(2 marks)**

iii) Calculate the thickness of the oil molecule and express your answer in standard form. **(2 marks)**

CROSSCOUNTRY MOCKS

PHYSICS

MOCK TRIAL 10 PAPER 2

NAME…… INDEX NO…….

SCHOOL……... SIGN……..

DATE……..

232/2

PHYSICS

PAPER 2 THEORY

2 HOURS

INSTRUCTIONS

Write your name and admission number in the space provided
Sign and write the date of the examination in the space provided above
This paper consists of two sections A and B.
Mathematical tables and electronic calculators may be used.

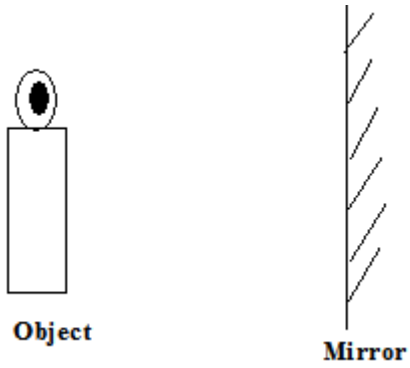
For examiner's use only

SECTION	QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	1-13	25	
B	14	11	
	15	13	
	16	11	
	17	10	
	18	10	
		GRAND TOTAL	80 MARKS

SECTION A (25 Marks)

Answer all the questions in this section in the spaces provided.

1. Locate the position of the image of the object placed in front of a plane mirror shown below. **(2 mks)**



2. Show the magnetic field pattern of the current carrying conductors shown below. (2 mks)

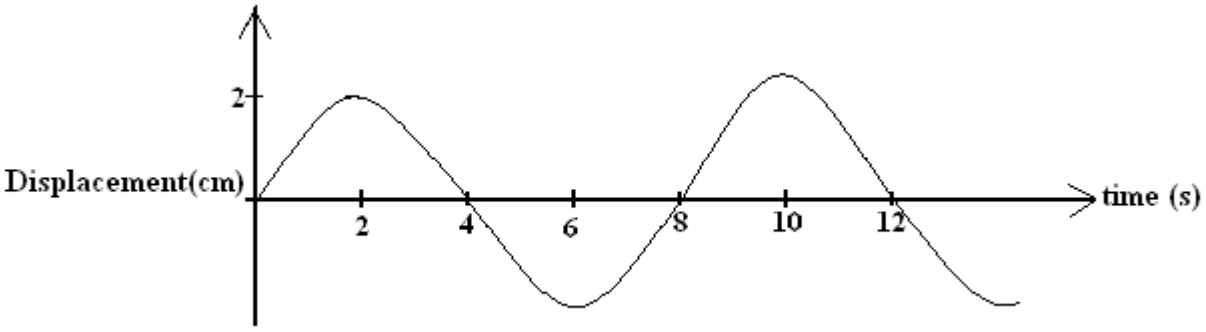


3. State two factors that determine the strength of an electromagnet. **(2 mks)**

4. State two advantages of using a convex mirror as a driving mirror. **(2 mks)**

5. State two factors that affects the resistivity of an electrical conductor. **(2 mks)**

6. The figure below shows a wave in progress.

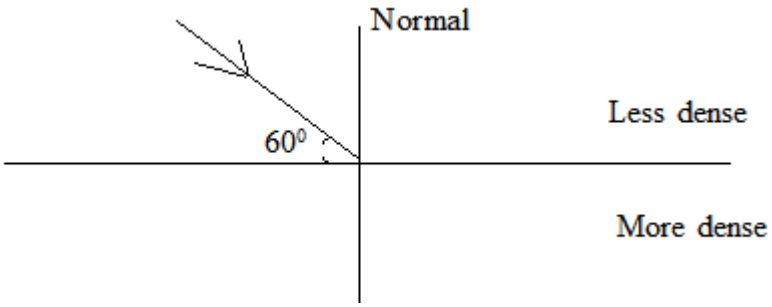


Determine the

a) Amplitude **(1 mark)**

b) Frequency **(2 marks)**

7. The figure below shows light travelling from less dense to more dense medium.



a) Show the direction of the refracted ray. **(1 mark)**

b) If the refractive index of the more dense medium is 1.4, calculate the angle of refraction. **(3 marks)**

8. A current ,I, flowing through a wire of resistance ,R, is increased by seven times. Determine the factor by which the rate of heat production was increased. **(3 marks)**

9. The wavelength of a radio wave is 1km. Determine its frequency if the speed in $3 \times 10^8 ms^{-1}$ (2 marks)

10. State two uses of gold leaf electroscope. **(2 marks)**

11. Give a reason why soft iron is used as a core of the coil of an electric bell. **(1 mark)**

12. State two differences between pinhole camera and the human eye. **(2 marks)**

13. State two types of waves. **(2 marks)**

SECTION B (55 MARKS)

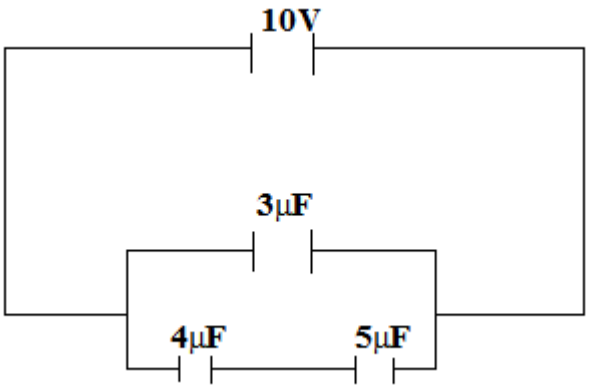
Answer all the questions in this section in the spaces provided.

14. a) Define the following terms.

i) Capacitor **(1 mark)**

ii) Capacitance **(1 mark)**

b) Three capacitors are connected to a 10v battery.



Calculate

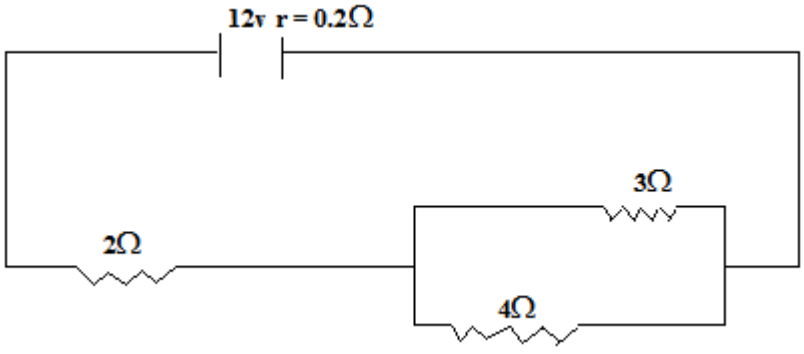
i) the effective capacitance **(3 marks)**

ii) the total charge **(3 marks)**

c) State three factors that determine the capacitance of a capacitor. **(3 marks)**

15. a) Define a resistor. **(1 mark)**

b) The figure below shows three resistors connected to 12v supply of internal resistance of 0.2□.



Calculate

i) the effective resistance. **(3 marks)**

ii) the total current in the circuit. **(2 marks)**

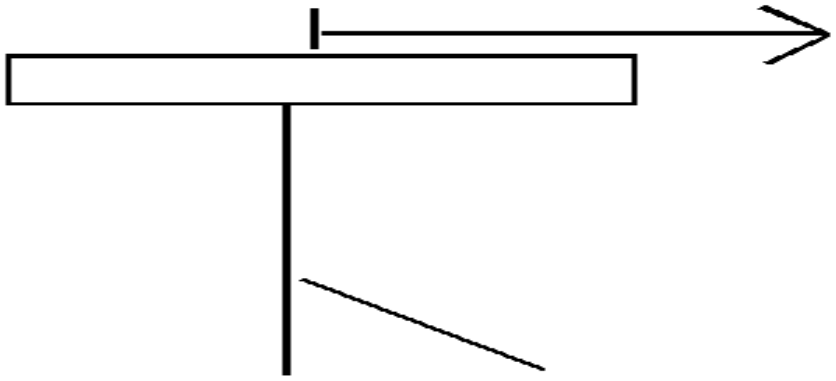
iii) the current through the 4□ □resistance. **(3 marks)**

c) If the current flows for 2 minutes calculate the total energy dissiparted. **(2 marks)**

d) State two applications of resistors in real life situation. **(2 marks)**

16. a) Explain briefly how a material acquires a positive charge. **(3 marks)**

b) A steel pin is placed on the cap of a highly charge electroscope.



State and explain the observation that will be made on the gold leaf. **(2 marks)**

c) State a reason why a candle flame is blown away when a highly charged metal is brought close to it. **(2 marks)**

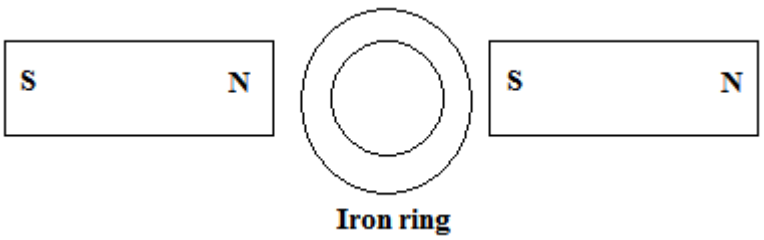
d) Explain briefly why it is not advisable to take shelter on a tree when it is raining. **(2 marks)**

e) State two dangers of electrostatic charges. **(2 marks)**

17. a) State two methods of magnetisation. **(2 marks)**

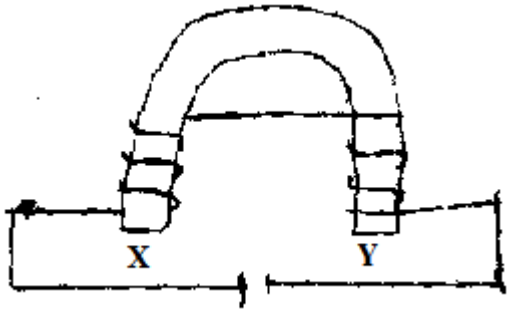
b) Why is repulsion the surest way of identifying a magnet. **(2 marks)**

c) Complete the diagram below to show the magnetic field patterns. **(2 marks)**



d) i) The figure below in a U-shaped iron core. Indicate the polarity at X and Y.

(2 marks)



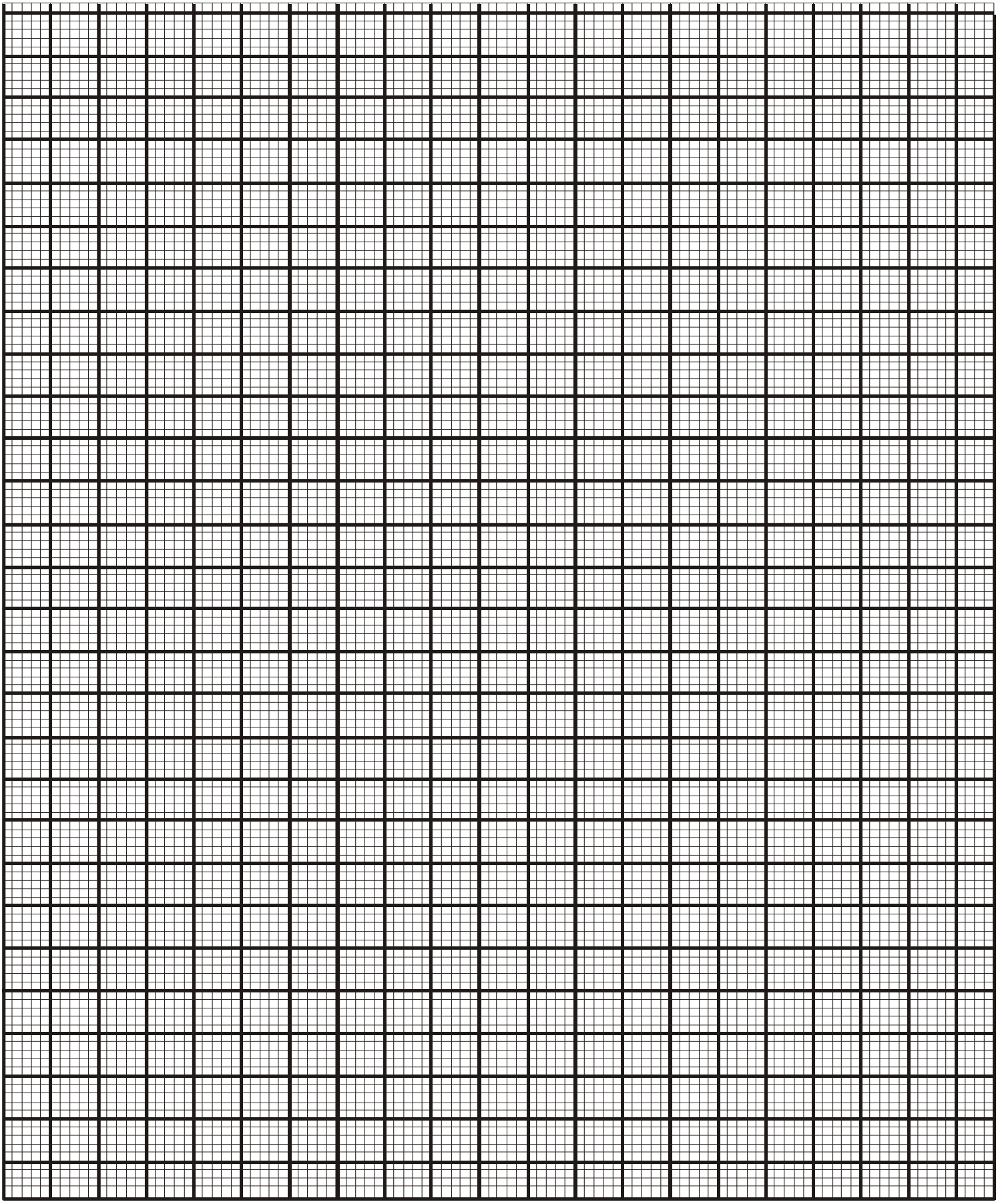
ii) State two applications of such an electromagnet. **(2 marks)**

18. a) A pin is placed at the bottom of a beaker containing a transparent liquid. When viewed from the top the pin appears nearer the surface than it actually is. Explain the observation. **(2 marks)**

b) The table below shows the results obtained from such an experiment.

Apparent depth (cm)	2.21	3.68	5.15	6.62	8.09
Real depth cm	3.0	5.0	7.0	9.0	11.0

i) Plot a graph of real depth against apparent depth. **(5 marks)**



THE END

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