NAME……ADM NO……...CLASS..…

232/1
Physics
Paper 1
March /April 2015
2 hours

Candidate's Signature…..…….

Date……

MOKASA JOINT EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
Paper 1
2 hours

INSTRUCTIONS TO CANDIDATES

*Write your **name, admission number** and **class** in the spaces provided above.*

***Sign and write the date** of examination 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.*

Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing**.*

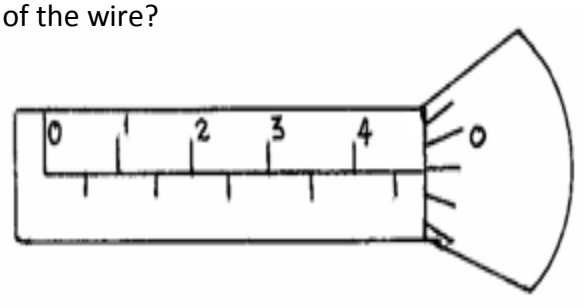
For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 – 8	25	
B	9	09	
	10	12	
	11	10	
	12	10	
	13	07	
	14	07	
	Total Score	80	

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided:

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

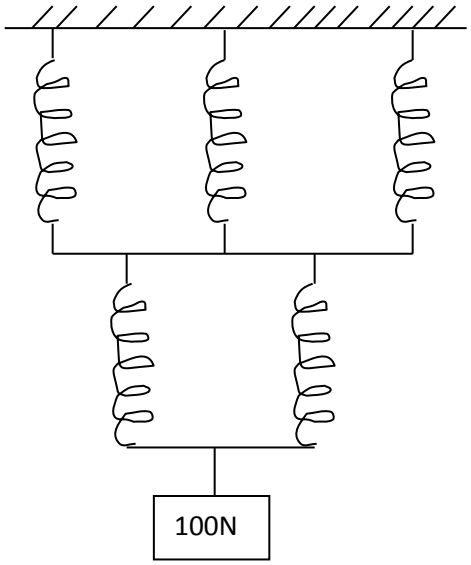


2. (a). State two differences between heat transfer by convection and radiation (2mks)

(b). Give a reason why a thick glass bottle cracks when boiling hot water is suddenly poured inside it (1mk)

3. An aircraft 300m from the ground, travelling horizontally at 400 m/s releases a parcel. Calculate the horizontal distance covered by the parcel from the point of release. (Ignore air resistance) (2mks)

4. A single spring stretches by 2.0 cm when supporting a load of 50N. If in the system below the springs are identical and have negligible weight;



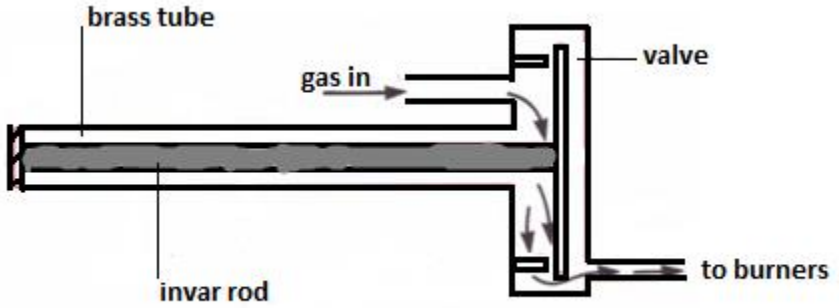
Find:

a) The total extension of the system. (2mks)

b)The total spring constant. (2mks)

5. (a) The distance between the ice point and steam point on a liquid in glass thermometer is 30cm. what temperature is recorded when the mercury thread is 12cm above the ice point? (2mks)

b) The diagram below shows a gas cooker thermostat



Briefly explain how the thermostat works (3mks)

6. The figure below shows a uniform plank AB of length 10m weighing 500N. Two masses measuring 25kg and 60kg are loaded on its ends.

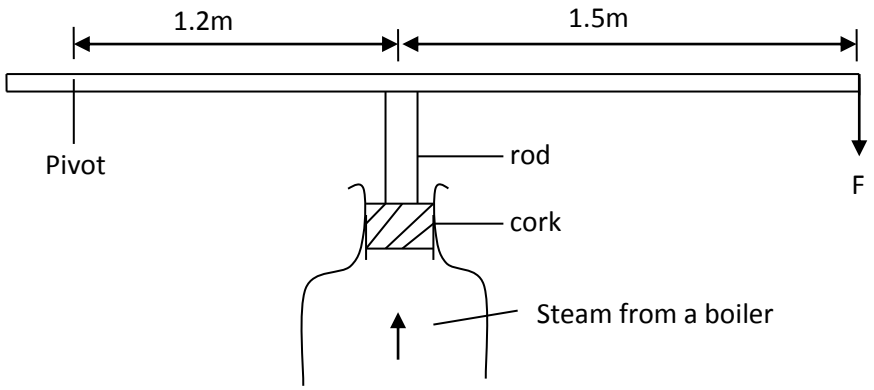
Determine the distance from point A where a support should be placed for the plank to balance horizontally. (3mks)

7. In an experiment to determine the thickness of an oil molecule, an oil drop of volume 3.60×10^{-6} m^3 was observed to form a circular patch of diameter 0.016m on the surface of water covered with lycopodium powder

i). Explain why the oil drop forms a circular patch. (1mks)

ii) Determine the thickness of the oil molecule (2mks)

8. A cork enclosing steam in a boiler is held down by the system shown.



If the area of the cork is 15 cm^2 and a force (F) of 500N is needed to keep the cork in place, determine the pressure of the steam in the boiler. (3mks)

SECTION B

Answer all questions in this section in the spaces provided:

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

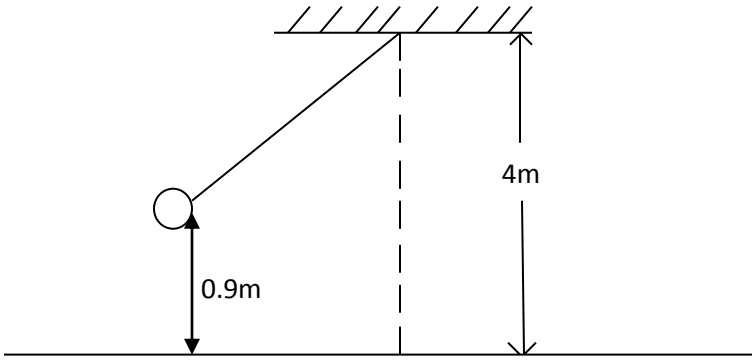
Determine:

i) Work done (1mk)

ii) Power developed by the crane (2mks)

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

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

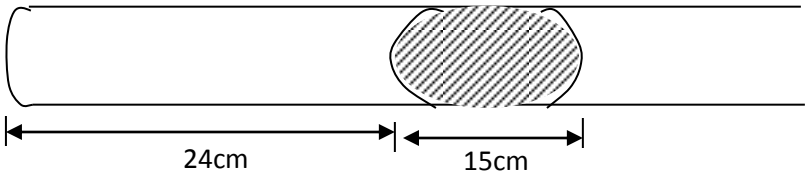


Determine:

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

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

10. (a) A glass capillary contains enclosed air by a thread of mercury 15cm long when the tube is horizontal, the length of the enclosed air column 24cm as shown.



i) What is the length of the enclosed air column when the tube is vertical with the open end uppermost if the atmosphere pressure is 750mmHg? (2mks)

ii) Explain why the mercury does not run out when the tube is vertical with the closed end uppermost. (1mk)

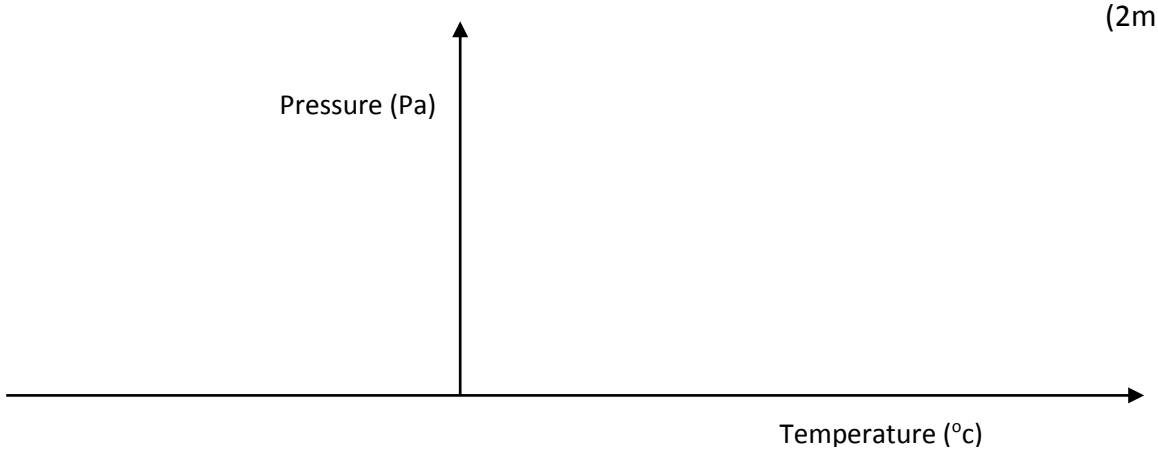
b) Explain why an air bubble increase in volume as it rises from the bottom of a lake to the surface. (1mk)

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

d) A certain mass of hydrogen gas occupies a volume of $1.6m^3$ at a pressure of 1.5×10^5 Pa and a temperature of 22^0c. Determine the volume when the temperature is 0^0c at a pressure of 0.8×10^5 Pa. (3mks)

e) i)State the pressure law (1mk)

ii)On the axis provided, sketch a graph of pressure against temperature on the celcius scale. On the same axis sketch another graph for a gas of a larger volume. (2mks)



11 (a) in a hydraulic press, a force of 200N is applied to a master piston of area $25cm^2$. If the press is designed to produce a force of 5000N, determine the area of the slave piston. (2mks)

(b) The barometric height in a town is 70cmHg. Given that the standard atmospheric pressure is 76cmHg and the density of mercury is $13600kg/m^3$, determine the altitude of the town. (density of air is $1.25kg/m^3$) (3mks)

(c) In an experiment to determine atmospheric pressure, a plastic bottle is partially filled with hot water and the bottle is then tightly corked. After some time the bottle starts to get deformed.

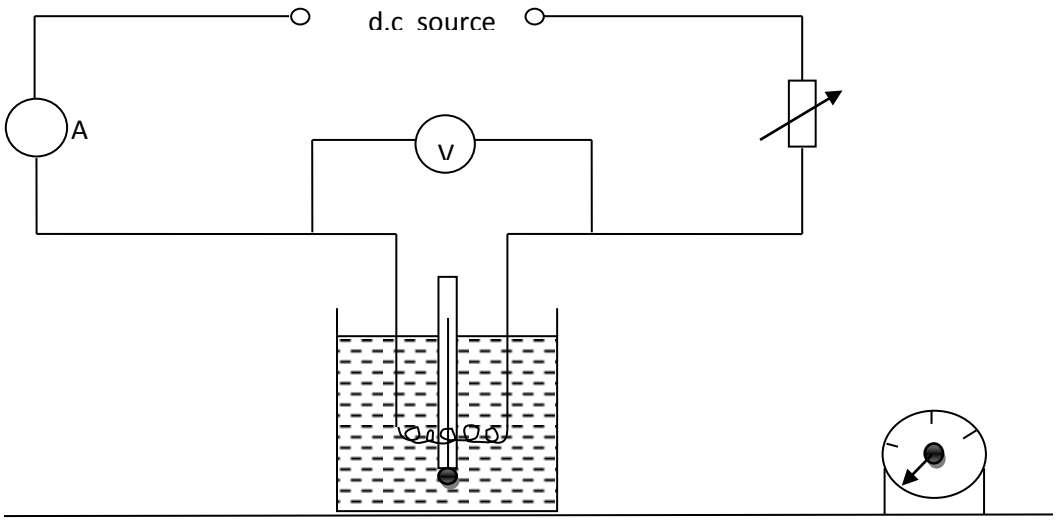
(i) State the purpose of the hot water. (1mk)

(ii) State the reason why the bottle gets deformed. (2mks)

(d) A hole of area 2.0cm^2 at the bottom of a tank 5m deep is closed with a cork. Determine the force on the cork when the tank is filled with sea water of density 1.2g/cm^3. (2mks)

12. (a) Define specific latent heat of vaporization (1mk)

b) The illustration below is used to produce a measured rise in temperature of a liquid using electrical energy.



Explain why;

(i) The liquid will tend to be warmer at the top of the container than at the bottom. (1mk)

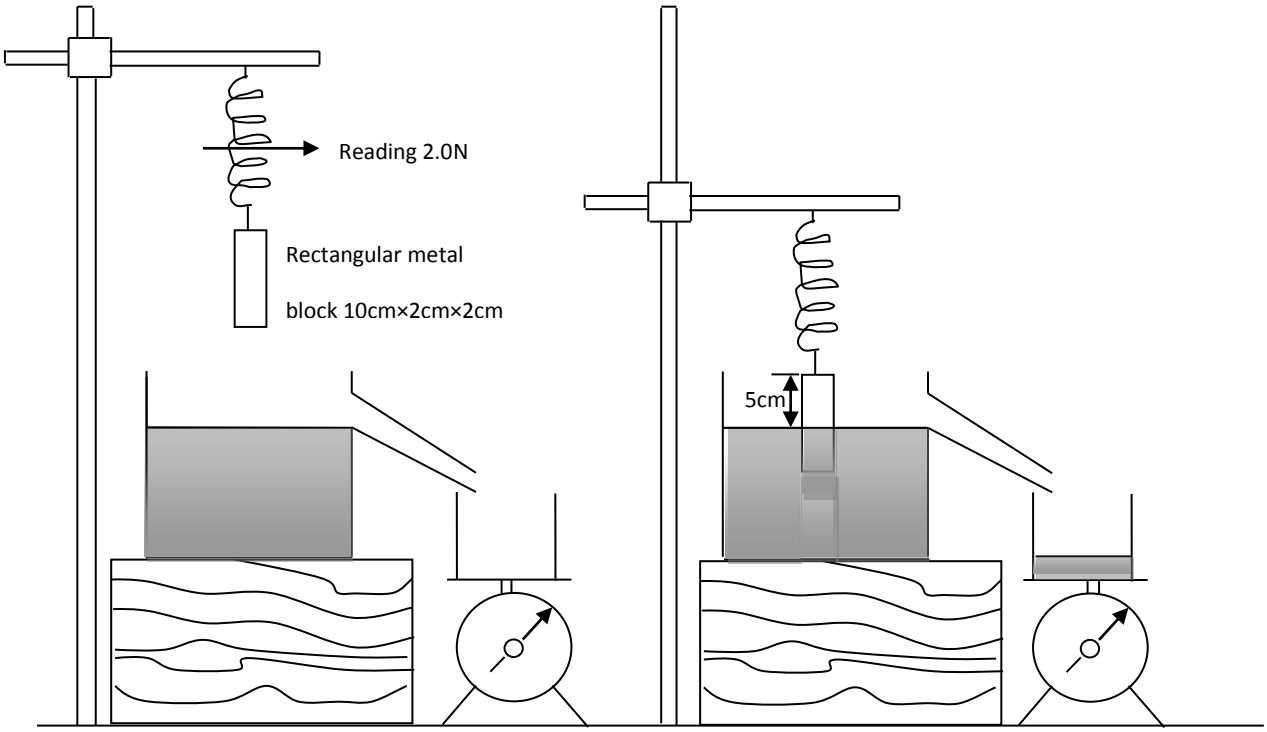
(ii) The temperature will eventually stop rising even though the current is still passing through the heating coil. (1mk)

iii) if the apparatus is used to determine the specific heat capacity of the liquid, the accuracy of the experiment will be increased if the liquid is first cooled to about $5^{o}c$ below room temperature and the current passed until the temperature is about $5^{o}c$ above room temperature. (2mk)

(c). A 50W heating coil is totally immersed in100g of water contained in an insulated flask of negligible heat capacity. The initial temperature of water in the flask is $20^{o}c$.
(i) Determine how long it takes for the water to boil at $100^{o}C$ when the heater is switched on (2mks)

(ii)After the water has been boiling for 15 minutes, it is found that the mass of water in the flask has decreased to 80g. Assuming no external heat losses, calculate a value for the specific latent heat of vaporization of water (3mks)

13. (a) The figure below shows details of an experiment performed by a student and the results taken. (take the density of water as 1.0g/cm^3)



Compression balance reading 4N

i) Calculate the volume of the metal block below the water (1mk)

ii) Calculate the new reading on the compression balance after the block is halfway immersed (2mks)

iii) Calculate the reading you would expect to obtain on the spring balance (2mks)

iv) Give a statement of the principle you have used in part (iii) above (1mk)

b). Explain why the narrow stem of a hydrometer provides greater sensitivity than a wide one (1mk)

14 (a) (i) A car goes round a flat circular bend whose radius is 100m at a constant speed of 30m/s. Calculate its acceleration (2mks)

(ii) if the mass of the car is 1500kg, calculate the frictional force required to provide this acceleration. (2mks)

(b) (i) Calculate the maximum speed at which the car can go round the bend without skidding if the coefficient of friction between the tyres and the ground is 0.5. (2mks)

(ii) Give a reason why the driver of the car has to move through the same bend at a lower speed during a rainy day. (1mk)

NAME……INDEX NUMBER…….…../……..CLASS……

232/2
Physics
Paper 2
March /April 2015
2 hours

Candidate's Signature…….

Date……

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

INSTRUCTIONS TO CANDIDATES

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A	**1 – 8**	**25**	
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	10	**12**	
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	12	**12**	
	13	**07**	
	Total Score	**80**	

SECTION A (25 marks)

1. Describe the changes that can be observed during discharging process of a lead –acid accumulator (2mks)

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2. a) Define power of a lens and give its units (2mks)

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b) An object whose height is 24cm is placed 20cm in front of a diverging lens of focal length 20cm. Determine the image distance (3mks)

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3. a) Give one property of sound waves (1mk)

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b) a person claps his hands at approximately 0.5s intervals in front of a wall 90m away. He notices that each echo produced by the wall coincides with the next clap.

i) Calculate the approximate speed of sound (3mks)

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ii) if the results obtained above were used as a basis for an experimental method to determine the speed of sound, what procedure should be adopted to obtain high accuracy in the timing part of the experiment? (1mk)

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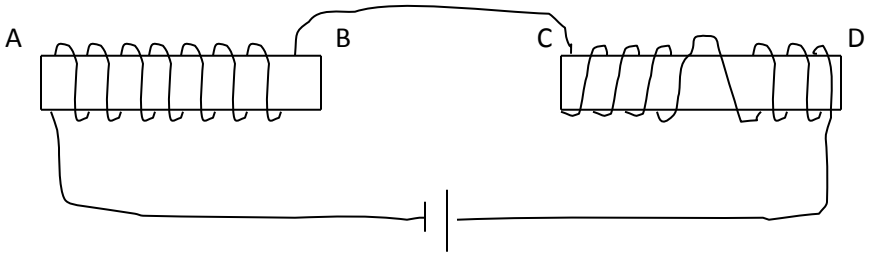
4. Identify the magnetic poles A, B, C and D in the diagram below. (2mks)



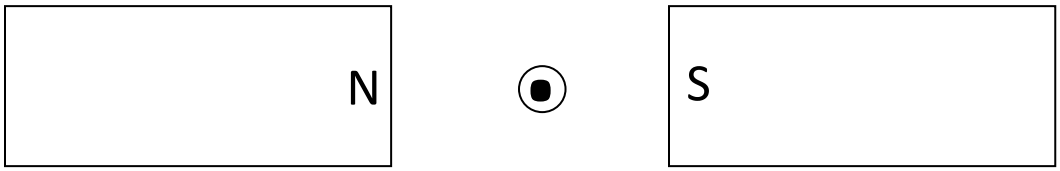
A ……

B ……

C ……

D ……

5. The diagram below shows a current carrying conductor placed in a magnetic field.



i)show on the diagram the direction of force on the conductor (1mk)

ii) if the current through the conductor is reduced, state and explain what happens to the force in (i) above. (2mks)

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6. Gamma, radio, infrared, x-rays are part of the electromagnetic spectrum.

i) Arrange these radiations in order of increasing energy (1mk)

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ii) State how radio waves are detected (1mk)

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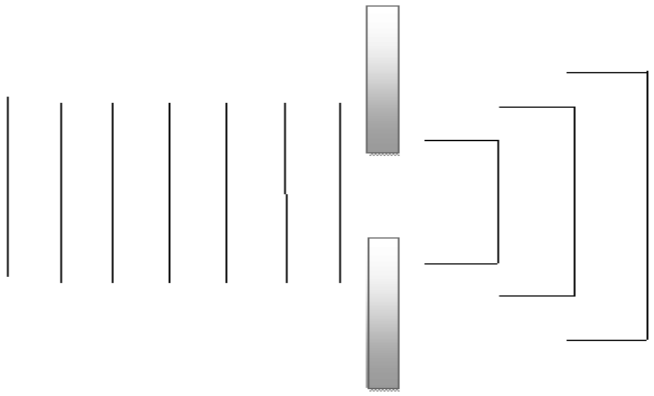
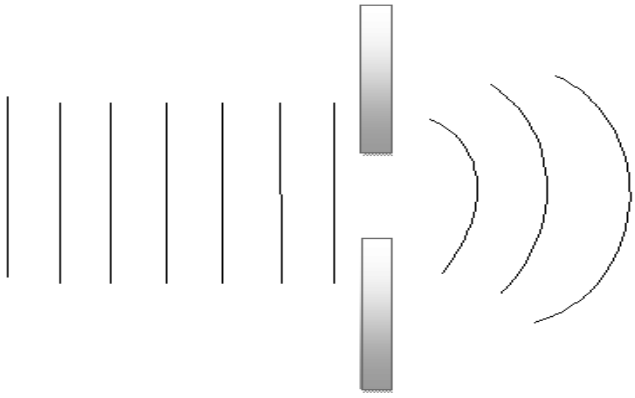
7. The diagram below shows waves being diffracted.



What adjustments should be done to obtain the wave form below? (2mks)



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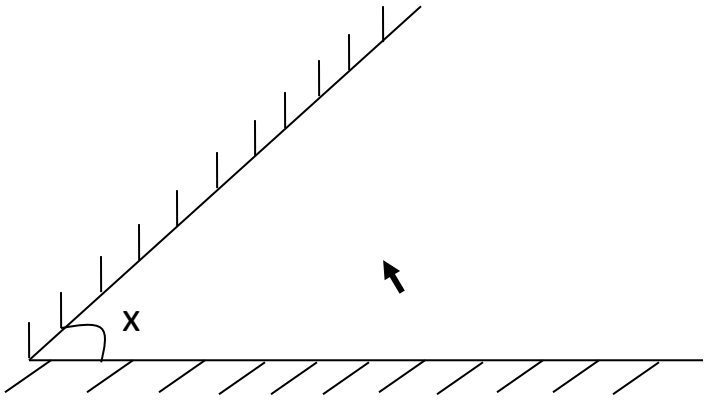
8. The diagram below shows an object placed in front of two mirrors inclined to each other at an angle x



An observer sees five images, determine the value of angle x? (2mks)

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SECTION B (55 marks)

9. a) State Snell's law (1mk)

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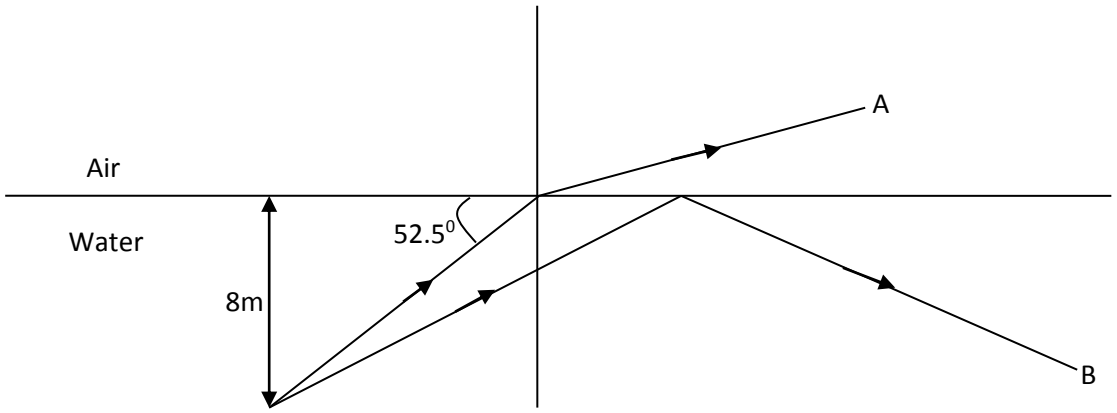
b) The figure below shows a ray of light incident on a water-air interface from a source 8m deep.



i) Ray A is observed to bend as it enters the air. Give a reason why this occurs (1mks)

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ii) If the refractive index of water is 1.35, calculate the angle of refraction of ray A (3mks)

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iii) Find the critical angle of water (3mks)

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iv) Give a reason why ray B is not travelling out of water (1mk)

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v) a fish is placed at the source of light ray. Calculate the maximum area of view on the surface of water (3mks)

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10. a) define local action (1mk)

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b) a charge of 4.8C flows through a lamp every second. Calculate the number of electrons involved per second. (3mks)

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c) Give two differences between a primary and a secondary cell (2mks)

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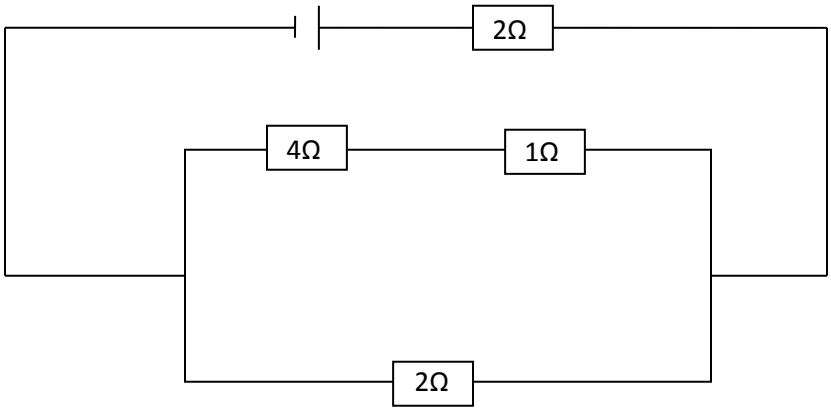
d) The circuit set up shown below makes a current of 1A to flow through the 4Ω resistor



Calculate;

i) The current through the 2Ω resistor (3mks)

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ii) the E.M.F of the cell given that the internal resistance is negligible (3mks)

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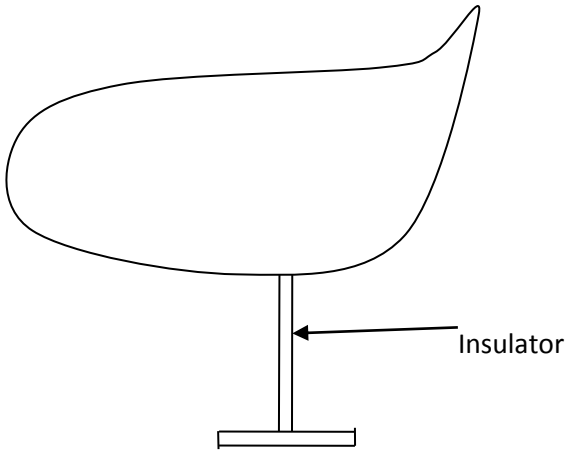
11. Show the charge distribution on the hollow conductor shown below if it is positively charged. (1mk)



b. State three factors affecting capacitance of a parallel plate capacitor. (3mks)

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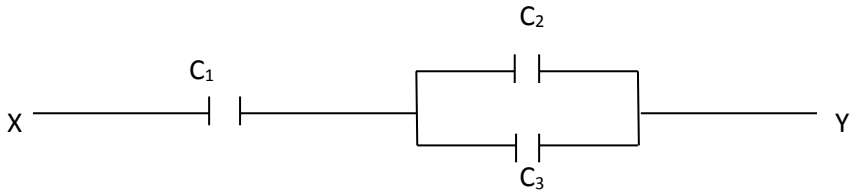
c) The diagram below shows a circuit containing three capacitors.



i) Write an expression for effective capacitance between X and Y. (2mks)

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i) If c_1=6µF, c_2=4.5µF and c_3=5 µF, calculate the charge stored when point XY is connected in series with a battery of 6V (3mks)

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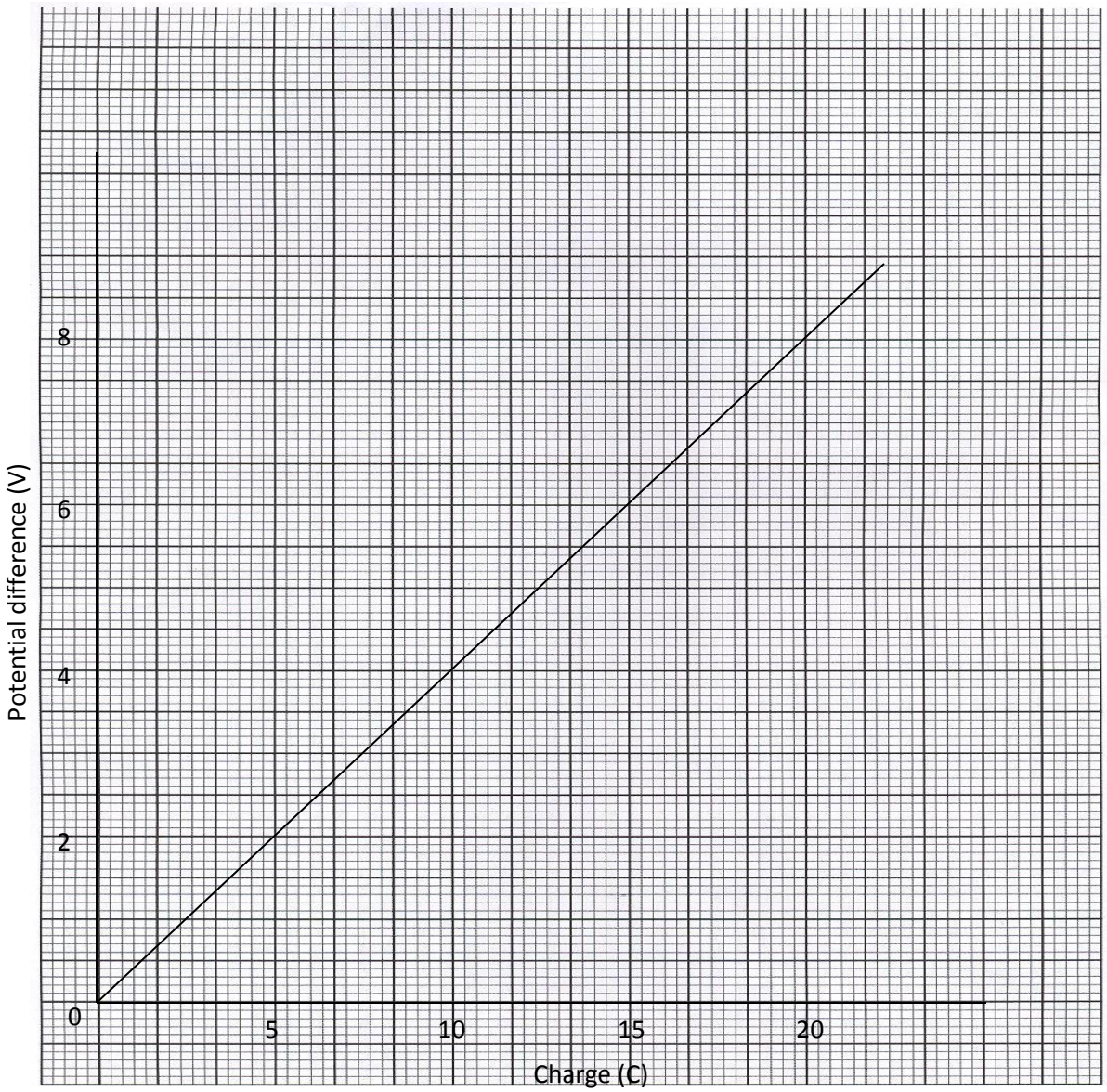
d) The graph below shows the relationship between the voltage drop across a certain capacitor and the charge stored in the capacitor.



From the graph calculate the capacitance of the capacitor. (3mks)

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12. a) State two factors that determine the magnitude of an induced e.m.f in a conductor (2mks)

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(b) A Power station has an input of 30kw at a potential difference of 5kv.A transformer with a secondary coil of 1000 turns is used to step down the voltage to 1000v for transmission along a grid .Assuming there are no power loses in the transformer .calculate.

(i) current in the primary coil (3mks)

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(ii) the number of turns in the primary coil (3mks)

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(iii) The current in the secondary coil (2mks)

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(iv) State which of the coils is thick and why (2mks)

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13. a) Define magnification (1mk)

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b) State two differences between a concave and a convex reflectors (2mks)

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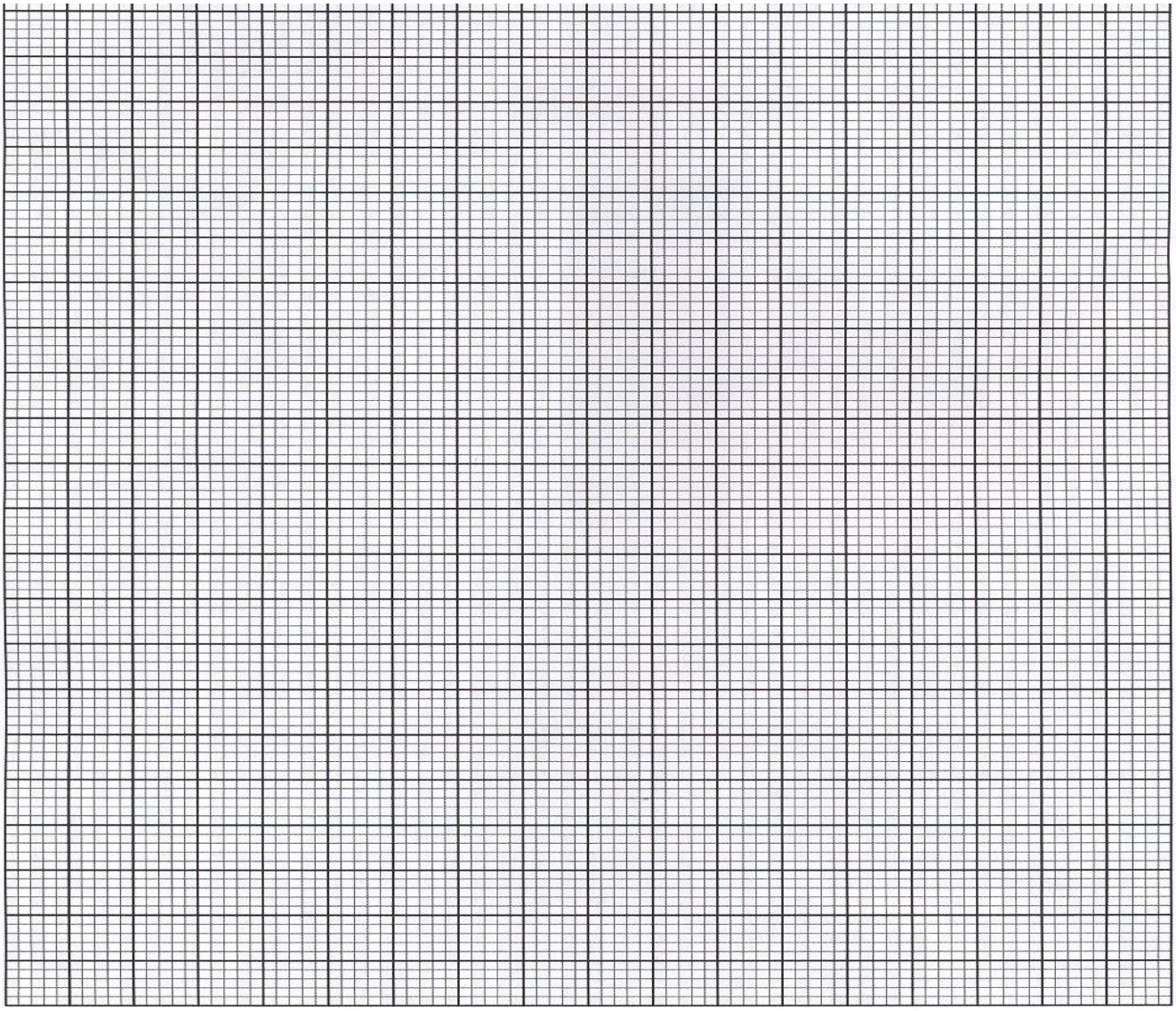
c) a concave mirror of focal length 20 cm forms a real image three times the size of the object. If the object height is 4cm; determine, using graphical method, the:

(i)object distance (3mks)

(ii) The image distance (1mk)



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Name……Index No.....……/……

Class: ..... Candidate's Signature: …….

232/3

PHYSICS

Paper 3

March/April 2015

Time $2\frac{1}{2}$ Hours

MOKASA JOINT EXAMINATIONS 2015

Kenya Certificate of Education (K.C.S.E.)

232/3

PHYSICS PRACTICAL

Instructions to Candidates

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer **all** the questions in the spaces provided.
4. You are supposed to spend the first 15 minutes of the 2¼ Hrs. allowed for this paper reading the whole paper carefully before commencing your work.
5. Candidates are advised to record their observations as soon as they are made. Mathematical tables and silent electronic calculators may be used.

For Examiner's Use only

Question 1

	Table	d	e	F(i	F(ii	Total
Maximum Score	7	5	3	2	3	20
Student score						

Question 2

	Table	O(i	O(i	p	q	Total
Marks	8	5	3	2	2	20
Student score						

Candidates Grand Total	

QUESTION 1

You are provided with the following:

- Two new dry cells
- An ammeter 0 – 1A
- A voltmeter 0 – 5V
- A resistance wire labelled XY on mm scale
- Jockey or crocodile clip
- Cell holder
- Switch
- Six connecting wires at least three with crocodile clips at one end

(a) Set up the circuit as shown in figure 4

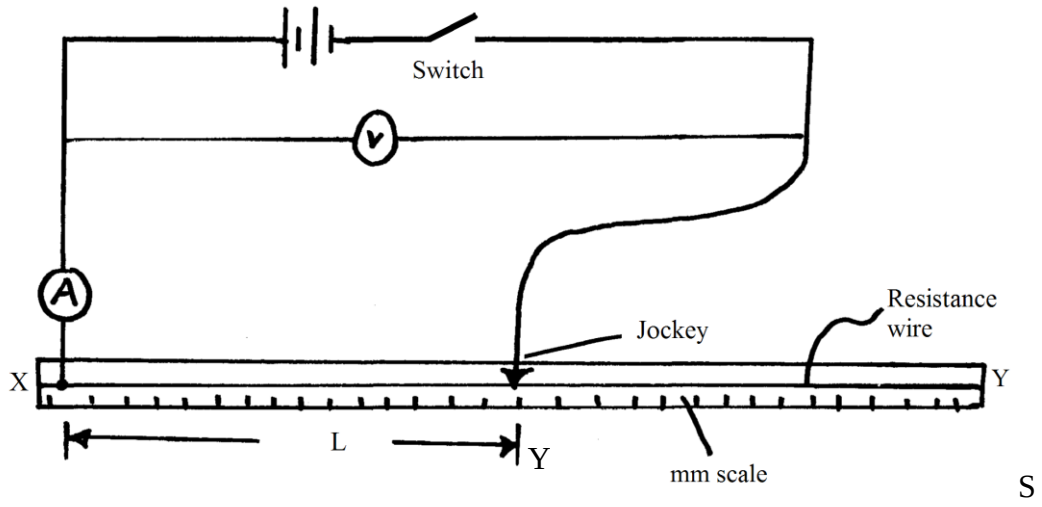


Figure 4

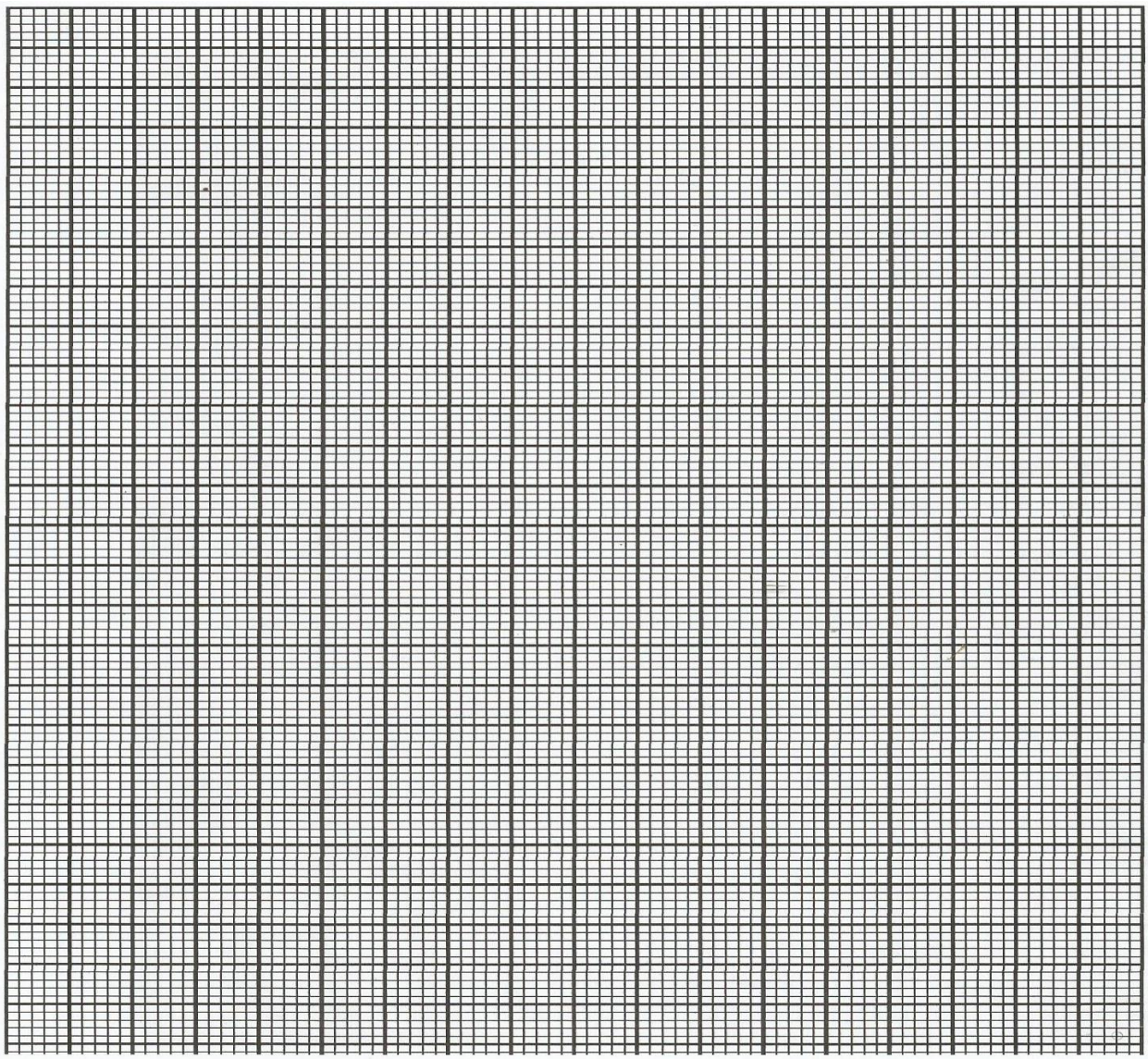
(b) Close the switch and place the jockey in contact with the resistance wire such that the length, L, of the wire XY = 0.20m. Measure and record the current, I, through the wire XY and the p.d., V, across it and enter the results in table 1

(c) Repeat procedure (b) above for the other values of L given. Read and record the corresponding values of I and V.

L (cm)	0.2	0.4	0.5	0.6	0.7	0.9	1.0
p.d. (V)							
I (A)							
R (Ω)							
$\frac{1}{I}$ (A^{-1})							

(7MKS)

(d) Plot a graph of $\frac{1}{I}$ (y axis) against R (5mks)



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

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(f) Given that I and R of the graph are related by the equation $\frac{1}{I} = \frac{R}{E} + \frac{r}{E}$, use your graph to determine the values of :

E = (2mks)

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r = (3mks)

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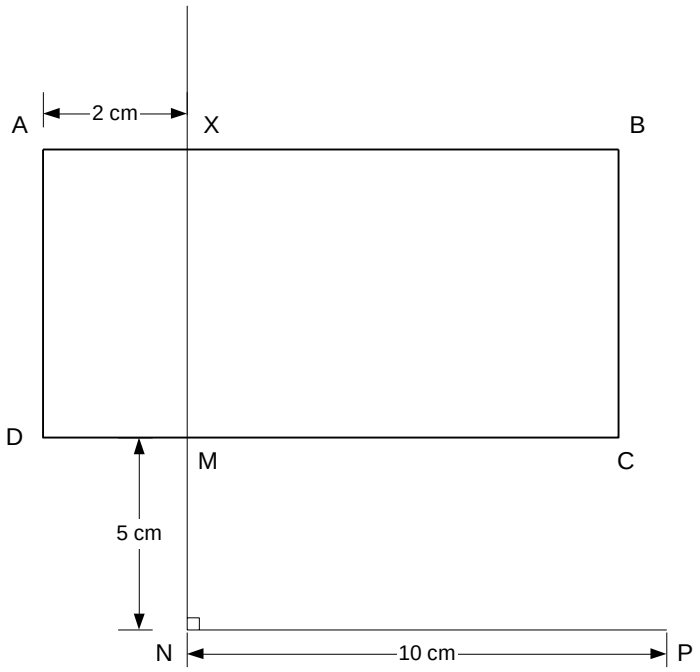
QUESTION 2

You are provided with the following apparatus

- A glass block
- Soft board
- Plain paper
- Four optical pins
- Four thumb pins
- A protractor
- A ruler

a. Fix the plain paper on the soft board using the four thumb pins.
b. Place the glass block on the plain paper (that is fixed on the soft board) Let the glass block rest on the paper from the broader face.
c. Trace the glass block using a pencil.
d. Remove the glass block.

Mark point X on one of the longer side of the traced glass block as shown in the diagram below. Point X should be 2 cm from edge A.



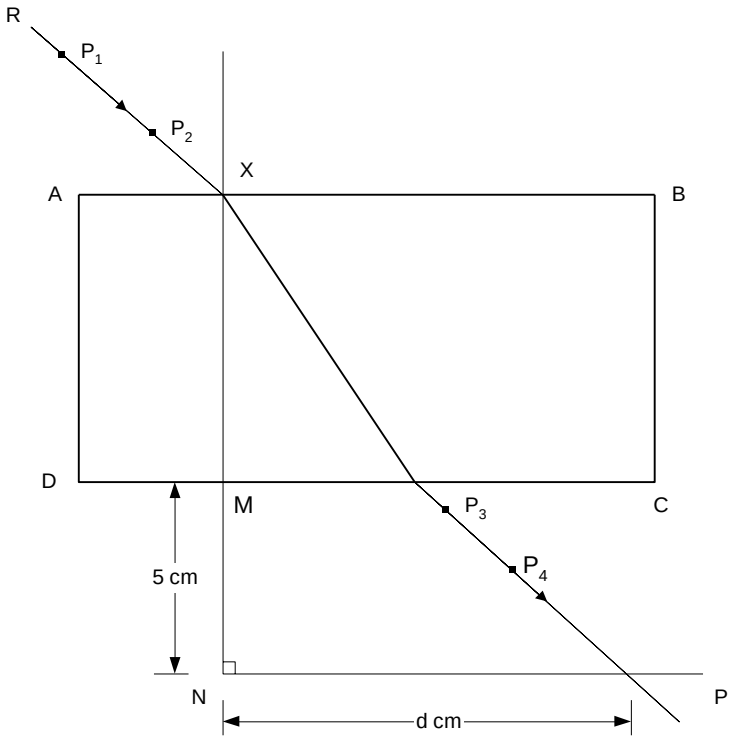
e. Construct a normal at X, to emerge through line DC. Let this normal meet line DC at point M.

f. Mark point N along the emergent normal, 5 cm from M.
g. Construct line NP to meet the normal at N at 90^0. Line NP is 10 cm.
h. Using a protractor, construct an incident ray RX at an angle of incidence **i** = 10^0. Fix two pins P_1 and P_2 along RX.
i. Replace the glass block to the traced figure.

j. View the path of the incident ray RX through the glass block from face DC. Using other two pins P_3 and P_4, fix them to seem to align themselves with images of P_1 and P_2.

k. Remove the glass block and draw the emergent ray through P_3 and P_4.

l. Measure the distance of the emergent ray from point N along line NP as shown in the diagram below.

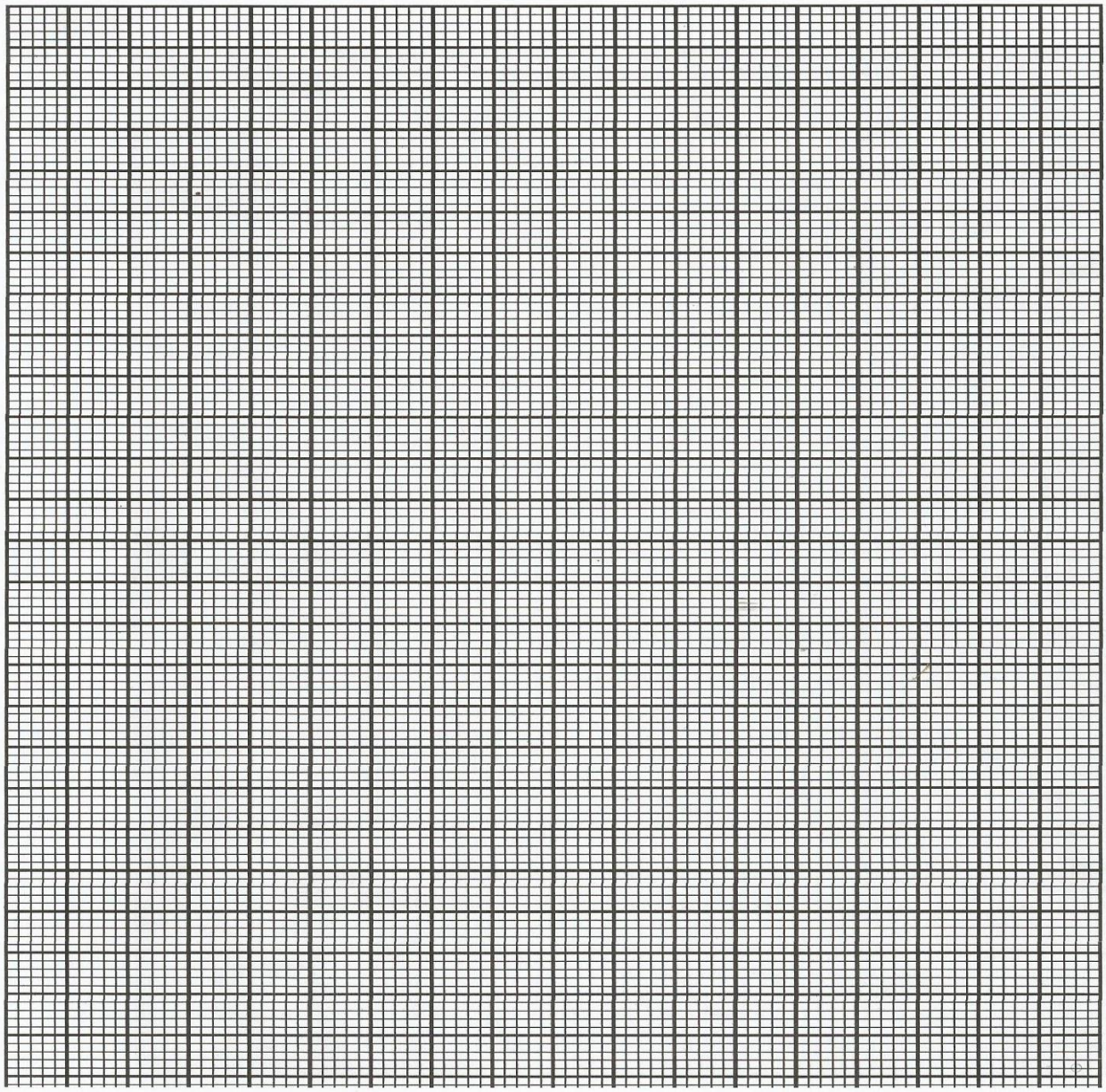


m. Record the corresponding values of d, Sin **i** and Sin^2 **i** in the table below.

n. Repeat the procedure for other values of **i**. (8 marks)

Angle of incidence **i** ^{0}	10	20	30	40	50	60
Distance d (cm)						
Sin **i**						
Sin^2 **i**						

o. (i) On the grid provided, plot the graph of Sin^2 i (vertical axis) against d. (5 marks)



(ii) Calculate the gradient of the graph. (3 marks)

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p) what is the equation of the graph (2mks)

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q) Give the value of d when $i=80^0$ (2mks)

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