**FORM ONE WORK**

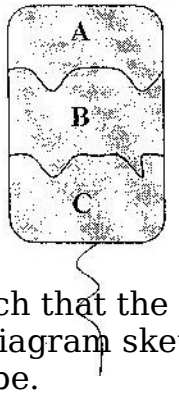
**INTRODUCTION TO PHYSICS**

**TOPIC 2**

**FORCES**

**KASSU Q2**

***2.*** The diagram below shows a wire loop with two threads tied across it. The loop is dipped into a soap solution such that the soap film covers it as shown.




Region B is punctured such that the soap film in that section is broken. On the space alongside the diagram sketch the resulting shape of the wire loop. Give a reason for the shape. (2 mks)

**KISUMU WEST Q6&7**

6. Name **one** force that determines the shape of a liquid drop on a solid surface (1mk)

……

……

7. (a) What is surface tension?

(1mk)

……

……

(b) Figure 3 below shows a funnel dipped into a liquid soap solution.

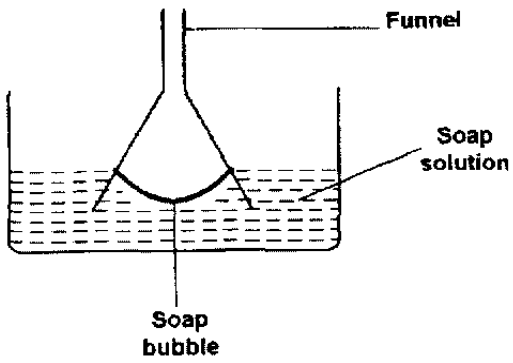


**Fig 3**

Explain what happens to the soap bubble when the funnel is removed.

(1mk)

**LARI Q6**

6. If an umbrella is touched with finger on inner surface when it is raining, it allows the rain water to leak through. Give reason (1mark)

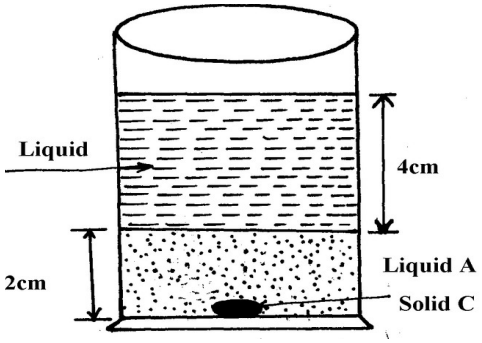
**TOPIC 3**

**PRESSURE**

**KASSU 16(c)**

(b) Two immiscible liquids are poured in an open container to the levels shown in the diagram below.

***Figure 5***




If the densities of the liquids **A** and **B** are 1g/cm$^3$ and 0.8g/cm$^3$ respectively and the atmospheric pressure 760 mmHg, find the total pressure acting upon solid **C** at the bottom of the container. (Take density of mercury to be 13.6g/cm$^3$and g = 10 N/Kg) (3 mks)

**KASSU Q7**

7. (a) Give a reason why water is not suitable as a barometric liquid. (1 mk)

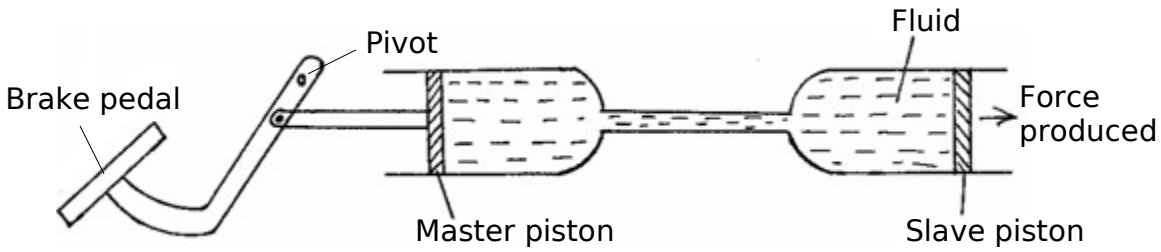
(b)Explain why a lift pump is unable to raise water from a borehole where the level of
water is 20m below the ground level.
(1 mks)

KIRINYAGA Q3

3. State **one** advantage of hydraulic brakes over mechanical brakes.
(1mk)

KIRINYAGA Q10&11

Use the information **below** which represents hydraulic braking system to answer questions **10** and **11**.




10. State **one** property the fluid should have.
(1mk)

_____
_____

11. Explain briefly how the system operates.
(3mks)

KISUMU WEST Q7

. Using the idea of particles, explain why the pressure inside the tyre is increased when it is pumped up.

(2mks)

KISUMU WEST Q12

12. State **two** reasons why mercury is preferred as a barometric liquid and not water (2mks)

KISUMU WEST Q14

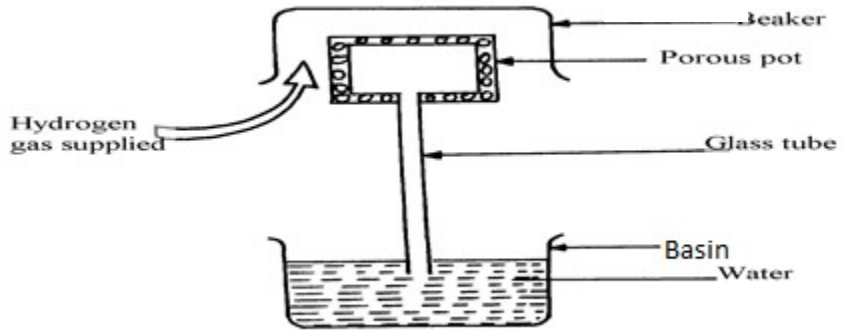
14. Water tanks in houses are erected as high as possible. Explain
(1mk)

**TOPIC 4**

**THE PARTICULATE NATURE OF MATTER.**

**KASSU Q3**

3. The figure below shows an arrangement to demonstrate diffusion through solids:-




The hydrogen gas is supplied for sometimes then stopped and the beaker removed. State and explain what is likely to be observed when the hydrogen gas supply is stopped (3 mks)

KIRINYAGA Q14

14. Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell. (2mks)

**TOPIC 5**

**THERMAL EXPANSION**

**TOPIC 6**

**HEAT TRANSFER**

**KASSU Q4**

2. Figure 2 shows two identical thermometers. Thermometer **A** has a blackened bulb while

thermometer **B** has a silvery bulb. A candle is placed equidistant between the two thermometers

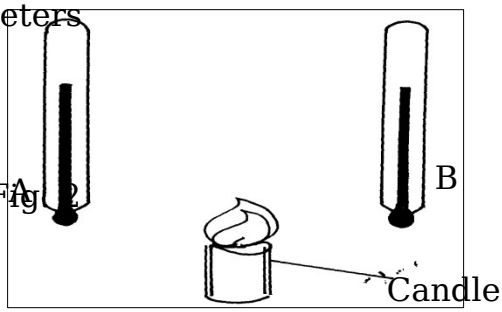
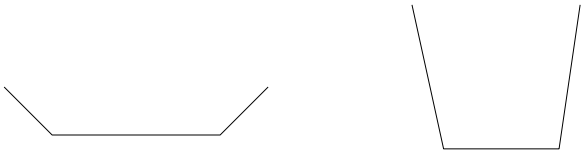



Fig 2

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

KIRINYAGA Q2

2. The figure **below** shows two containers of equal volume but of different diameters.

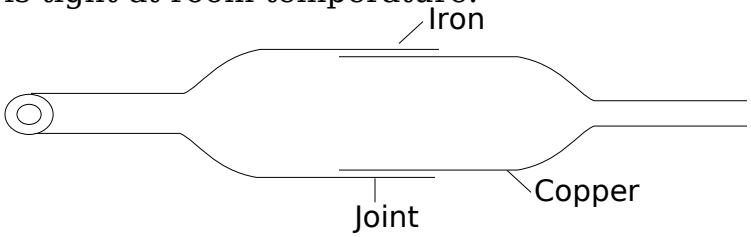


Equal volume of hot water was put in both containers. Explain why it cools faster in the wider container than in the narrower one.

(1mk)

KIRINYAGA Q7

7. The diagram **below** shows a metal tube made of iron and copper. The joint is tight at room temperature.




Explain how you would separate the two by changing the temperature given that copper expands more than iron for some change in temperature.

(2mks)

**KISUMU WEST Q4**

. When a mercury thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain. (2mks)

**KISUMUWEST Q10**

10. Highlight **one** fact which shows that heat from the sun does not reach the earth surface by convection.

(1mk)

**LARI Q2**

2. A student heated an equal amount of water in aluminum containers, by a flame of equal hotness. If, one of the container was bigger than the other, which will take longer time to boil water and why? (2marks)

**LARI Q9**

9. The figure below shows a thermometer used by a doctor to determine the temperature of a patient. Why is it difficult to work with this thermometer? (2marks)




.

**TOPIC 7**

**RECTILINEAR PROPAGATION OF LIGHT AND REFLECTION AT PLANE SURFACES**

**TOPIC 8**

**ELECTROSTATICS 1**

**TOPIC 9**

**CELLS AND SIMPLE CIRCUITS**

**FORM 2 WORK**

**TOPIC 1**

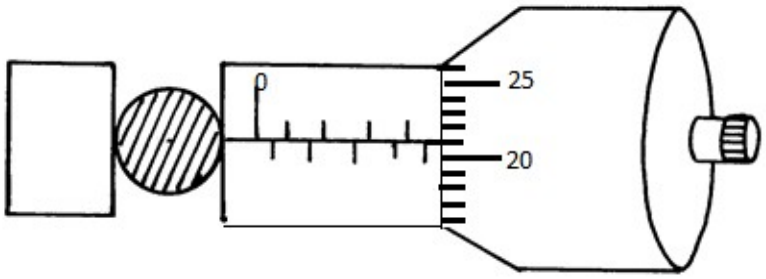
**MAGNETISM AND ELECTROMAGNETISM**

**TOPIC 2**

**MEASUREMENTS II**

Kassu Q1

1. A spherical ball bearing of mass 0.0024 kg is held between the anvil and spindle of a micrometer screw gauge. The reading on the gauge when the jaws are closed without anything in between is 0.11mm. Use this information and the position of the scale in the figure below to answer the questions **(a)** and **(b)** below:




a) What is the diameter of the ball bearing?
( 1 mk)
.....
.....
.....

b) Find the density of the ball bearing correct to 3 significant figures
(2 mks)

KIRINYAGA Q5&6

Use the information below to answer question **5** and **6**:

In an experiment to determine the density of a liquid, the following readings were made.
Mass of empty density bottle = 20g
Mass of bottle filled with water = 70g
Mass of bottle filled with a liquid = 695g



5. Find the density of the liquid, given that density of water is $1000kgm^{-3}$. (3mks)

6. Find the mass of the liquid.
(3mks)

KIRINYAGA Q8

8. State **one** assumption made when estimating the size of an oil molecule in the oil drop experiment.
(1mk)

KISUMU WEST Q1

1. The figure below shows a vernier caliper scale.

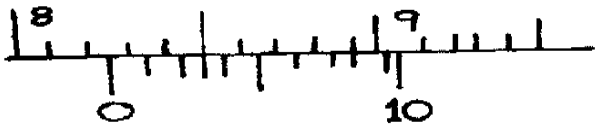
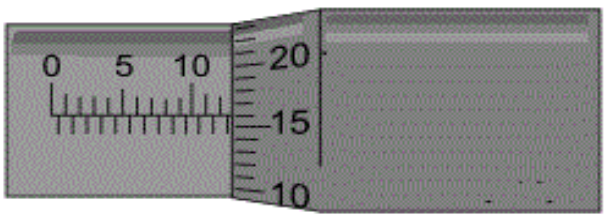



Fig. 1

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

LARI Q1

1. The diagram below shows a section of a micrometer screw gauge.

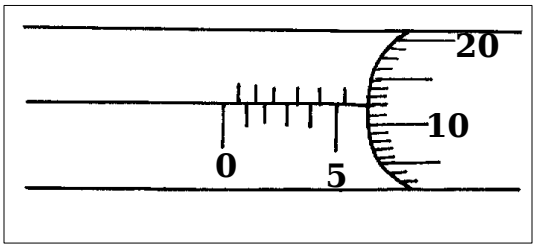


The micrometer screw gauge is used to measure the diameter of a marble. What is the diameter of the marble if micrometer screw gauge has an error of -0.02 (2 marks)

MUHORONI Q1

1. Figure 1 shows a magnified portion of the scale of a micrometer screw gauge used to measure the diameter of spherical object.

**Fig.1**



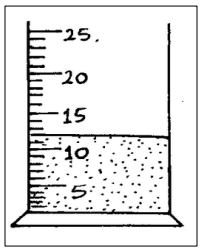

What is the diameter of the object

(1mk)

MUHRONI Q2

2. Figure 2 shows water placed in a measuring cylinder calibrated in $cm^3$

**Fig.2**




An object of mass 50.1g and density 16.7 $g/cm^3$ is lowered gently in the water. Indicate on the diagram the new level

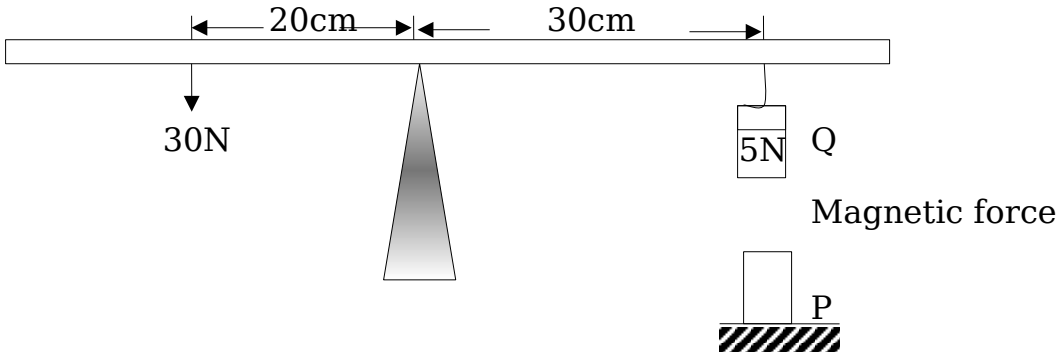
(1mk)

**TOPIC 3**

**TURNING EFFECT OF A FORCE**

**KASSU Q6**

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




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

……

……

……

……

b) Given that the lower end of Q is North pole, state polarity of the end of P facing Q.

( 1 mk)

**KISUMU WEST Q13**

13. Figure 5 below shows a uniform meter rule balancing when a mass of 200g is hung at one end. Determine the tension **T** in the string (2mks)

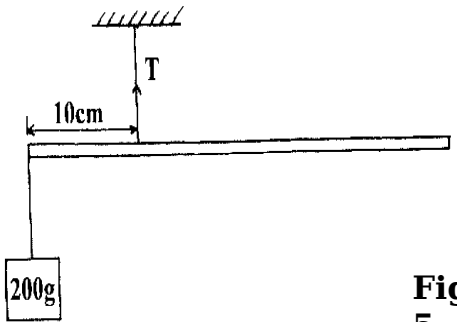
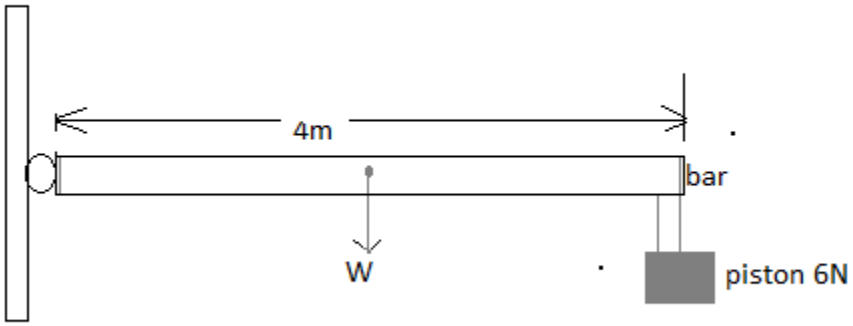



**Figure 5**

**LARI Q8**

8. A piston supports a uniform bar by applying a force of 6.0N as shown below so that it balances horizontally.



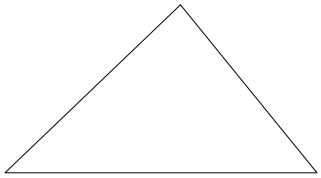

Determine the weight W of the bar. (2marks)

**TOPIC 4**

**EQUILIBRIUM AND CENTRE OF GRAVITY**

**KIRINGAGA Q1**

1. The figure **below** shows a uniform triangular lamina.



Locate the centre of gravity of lamina.
(2mks)

**KASSU Q5**

5. Explain why it is dangerous for a bus to carry standing passengers.

( 2 mks)

KISUMU WEST Q3

. The stability of a body can be increased by increasing the base area and lowering its centre of gravity. State **one** way of lowering its centre of gravity. (1mk)

**TOPIC 5**

**REFLECTION AT CURVED SURFACES**

**TOPIC 6**

**MAGNETIC EFFECT OF AN ELECTRIC CURRENT**

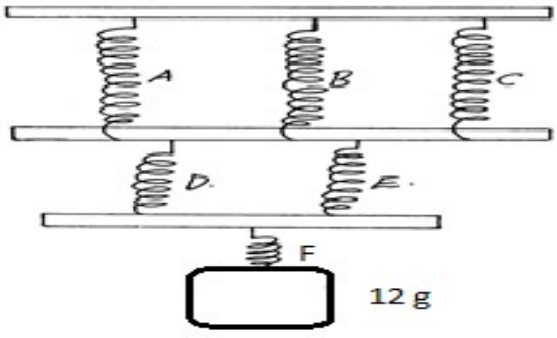
**TOPIC 7**

**HOOKES LAW**

**KASSU Q8**

8. The diagram below shows a mass of 12g hanged on a set of 6 identical springs.

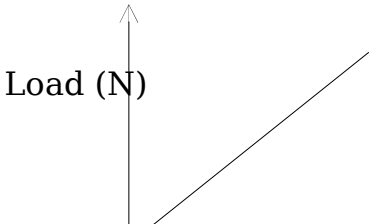
When a mass of 12g was hanged on spring A alone, its extension was 5cm. Find the extension of the combination shown if each spring and each rod has negligible mass (2 mks)




……

KIRINYAGA Q9

9. The figure **below** shows a load-extension graph for various loads hung from a single spring.



On the same axes sketch a graph for a spring double the diameter and half the length of the first one.

(1mk)

**KISUMU WEST Q11**

11. Three identical springs each of spring constant 4.5N/m and weight 0.5 N are used to support a load as shown in figure 4 below.
Determine the total extension of the system
(2mks)

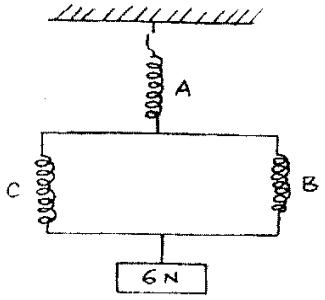


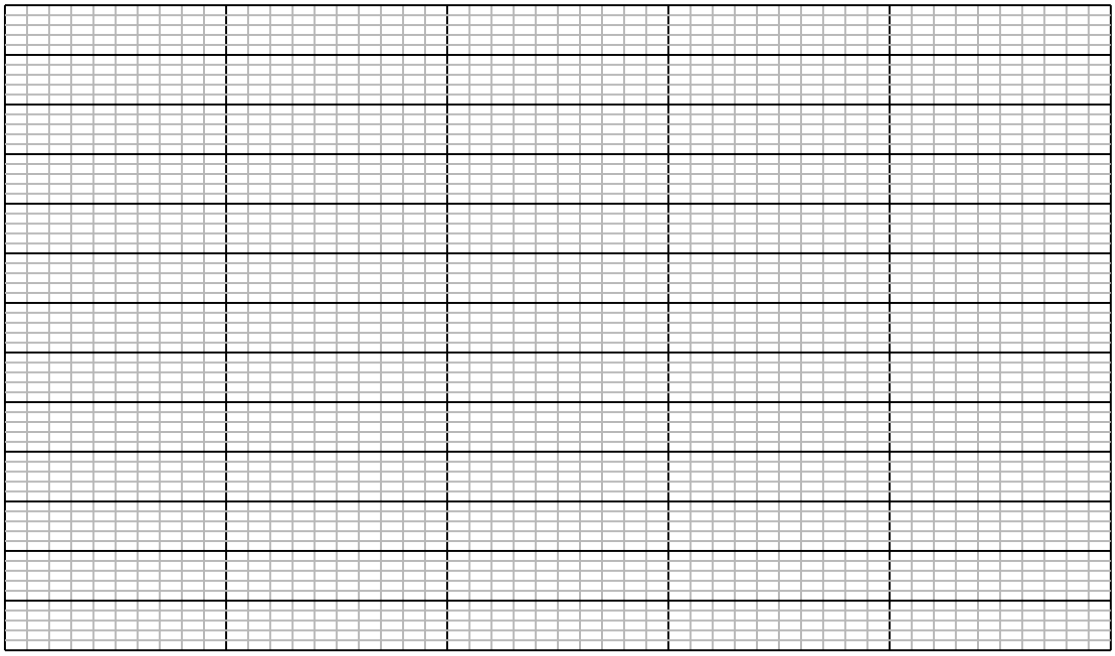

**Figure 4**

LARI Q12

12. The table below shows values obtained of compression of a spring as the load was applied on the top of the spring.

| Load (N) | 0 | 2.5 | 5.0 | 7.5 | 10.0 | 12.5 | 15.0 | 17.5 | 19.0 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|
| Compression (cm) | 12.2 | 11.1 | 10.0 | 8.9 | 7.8 | 6.7 | 5.6 | 5.2 | 5.2 | 5.2 |

a) Plot the graph of the compression of a spring against load(x axis) applied. (5marks)



b) Calculate the energy stored on the spring when the load of 10N was applied on the spring. (2marks)

c) Use the graph to calculate the spring constant (3marks)

d) Suggest a reason for the shape of the graph between17.5N to 22N 2marks

**TOPIC 8**

**WAVES 1**

**TOPIC 9**

**SOUND**

**TOPIC 10**

**FLUID FLOW**

**KASSU Q9**

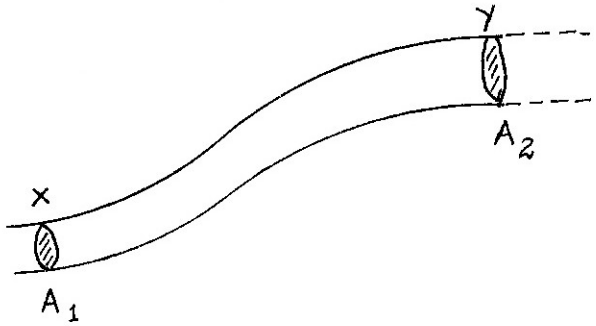
7. Sea water of density **1.04g/cm$^3$** is being pumped into a tank through a pipe of uniform

cross-sectional area of 3.142cm$^2$. If the speed of water in the pipe is 5m/s, determine the
mass flux in S.I unit.

(2 mks)

KIRINYAGA Q13

13. Figure **below** shows a section of a pipe XY. A constant pressure difference maintains a streamline flow of a liquid in the pipe.




If the cross-sectional area $A_1$ at X is less than $A_2$ ay Y, state how the liquid velocity $V_2$ at Y compares with $V_1$ at X.

(1mk)

**LARI Q3**

3. A gas flows at a speed of 5m/s through a pipe of cross-sectional area of 3.6m$^2$. Determine the speed of the gas in a pipe of area 1.8m$^2$. (2marks)

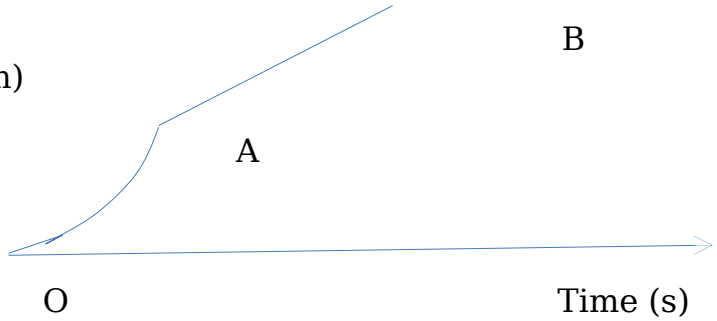
**FORM THREE WORK**

**TOPIC 1**

**LINEAR MOTION**

**KASSU Q10**

7. Below shows a displacement – time graph.




Describe the motion of the body between points:

OA…… ( 1 mk)

AB……( 1 mk)

**KIRINYAGA Q17**

16. The graph represents displacement-time graph for a car moving with uniform acceleration along a straight horizontal road.

From the graph determine:

(i) the velocity of the car at the $20^{th}$ second.
(2mks)



(ii) the velocity at the $50^{th}$ second.
(2mks)

(iii) the acceleration of the car between the 20th second and 50th second. (3mks)

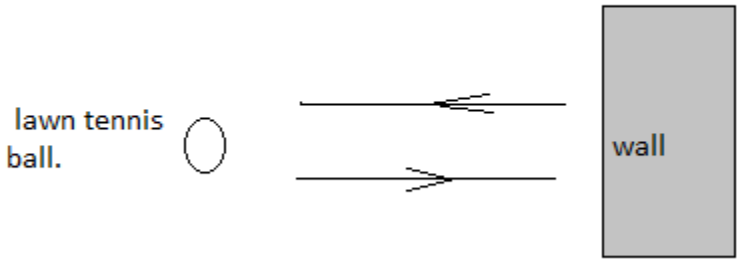
(b) A bullet is fired horizontally from a storey building 15m high. If the initial speed is 350ms$^{-1}$, determine the maximum horizontal distance covered by the bullet. (3mks)

KISUMU WEST Q2

2. A body is projected vertically upwards from the top of a building. Assuming that it lands at the base of the building. Sketch the velocity time graph of the motion. (2mks)

LARI Q14

13(a).A lawn tennis ball is thrown such that it hits a wall perpendicularly at a speed of 6.5m/s as shown in the figure below.



The ball has a mass of 50g and it is in contact with the wall for 0.02s.
(i) What is meant by impulse? (1mark)

(ii) Find how much force is applied to the wall by the ball (3marks)

(iii) How much deceleration does the ball experience? (2marks)

(iv). Determine the change in momentum of the ball. (2marks)

(v) Giving your reasons state the type of collision that the ball undergoes. (2marks)

(b) Basing your argument on Newton's second law, explain why the athletes for high jump land on a thick soft mattress and not on a hard ground. (2marks)

**TOPIC 2**

**REFRACTION OF LIGHT**

**TOPIC 3**

**NEWTON'S LAW OF MOTION**

**KASSU Q16**

15. ( a) (i)State Newton's second law of motion.
(1 mk)
……r……
……
……

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

the ball. (2 mks)

……

……

……

……

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

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

……

……

……

……

(ii) What distance does the block move before coming to rest? (3 mks)

**KISUMU WEST Q9**

9. A trolley of mass 0.5kg moving with a velocity of 1.2ms$^{-1}$ collides inelastically with a second trolley of mass 1.5kg moving in the same 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)

KISUMU WEST Q19

19. (a) Define impulse in terms of momentum
(1mk)

.....

.....

.....

(b) For a particle of mass **m** which is initially moving vertically downward with velocity **u**, obtain an expression for changes in kinetic energy after;

(i) It has moved freely under gravity for time **t**,
(3mks)

.....

.....

.....

.....

.....

.....

(ii) It has moved freely under gravity for a vertical distance **S**
(3mks)

.....

.....

.....

.....

.....
.....

(c) A lead ball is placed on the surface of viscous oil and released.

(i) State the **three** forces acting on the ball as it falls through the oil (2mks)

.....
.....

.....
....

.....
....

(ii) State which forces vary during the fall and explain why the variation. (2mks)

.....
.....

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....

(iii) What is meant by the term terminal velocity of the ball?
(1mk)

.....
....

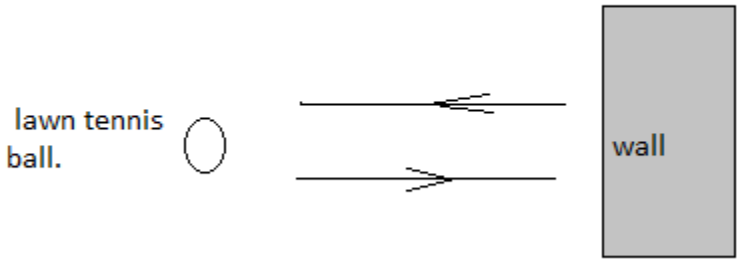
(iv) Sketch a graph showing the variation of the displacement of the ball with time from when it was

released.

(2mks)

**LARI 13**

13(a).A lawn tennis ball is thrown such that it hits a wall perpendicularly at a speed of 6.5m/s as shown in the figure below.




The ball has a mass of 50g and it is in contact with the wall for 0.02s.
(i) What is meant by impulse? (1mark)

(ii) Find how much force is applied to the wall by the ball (3marks)

(iii) How much deceleration does the ball experience? (2marks)

(iv). Determine the change in momentum of the ball. (2marks)

(v) Giving your reasons state the type of collision that the ball undergoes. (2marks)

(b) Basing your argument on Newton's second law, explain why the athletes for high jump land on a thick soft mattress and not on a hard ground. (2marks)

**TOPIC 4**

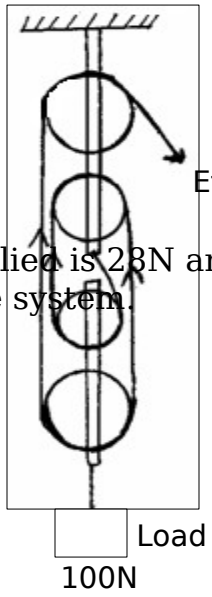
**WORK, ENERGY, POWER AND MACHINES**

**KASSU Q12**

7. A quantity of air occupied 500cm$^3$ at 15$^0$C when the pressure was 76 cmHg. At what temperature would it occupy 460cm$^3$ if the pressure was 85cmHg? (2 mks)

KIRINYAGA Q12

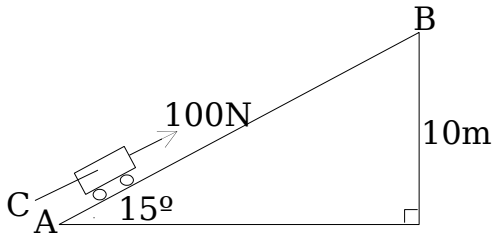
12. Figure **below** shows a pulley system being used to raise a load.




If the effort applied is 28N and the load lifted is 100N, determine the efficiency of the system. (3mks)

**KIRINYAGA Q16**

17. 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.






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

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(ii) Determine the work done by the force in moving the trolley from **A** to **B**. (2mks)

(iii) Determine the efficiency of the system.
(3mks)

(iv) Determine the work done in overcoming the frictional force.
(1mk)

(v) Determine the mechanical advantage of the system.
(3mks)

**KISUMU WEST Q15**

15. (a) What is work as defined in physics?
(1mk)

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(b) A pulley system has two pulleys on the lower block and one pulley on the upper block.
In order to raise the load of 6N, an effort of 2N is applied.

(i) Draw a sketch to show the pulley system.
(3mks)

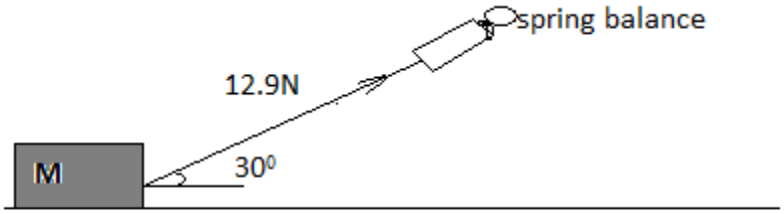
(ii) Determine the efficiency of the pulley system.
(3mks)

(iii) If the lower block weighs 0.4N, determine the frictional force which opposes the motion

(3mks)

**LARI Q7**

7. A spring balance is used by Natalia to pull a toy car M through a distance of 1.6m at an angle of $30^0$ as shown below.




The reading of the spring balance is 12.9N. The spring balance has a positive zero error of 0.5N. Assuming that the surface is smooth, find the work done by Natalia. (3marks)

**LARI Q10**

10. A machine consists of a wheel of radius 40cm and axle of radius 10cm. Determine the efficiency of the machine when used to lift a load of 300N using an effort of 100N. (3marks)

**TOPIC 5**

**CURRENT ELECTRICITY II**

**TOPIC 6**

**WAVES II**

**TOPIC 7**

**ELECTROSTATICS II**

**TOPIC 8**

**HEATING EFFECT OF AN ELECTIC CURRENT**

**TOPIC 9**

**QUANTITY OF HEAT**

**KASSU Q15**

16. (a) State two differences between boiling and evaporation. (2 mk)

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(b) 1200g of a liquid at $10^0$C is poured into a well-logged calorimeter. An electric heater rated 1KW is used to heat the liquid. The graph in fig 4 below shows the variation of temperature of the liquid with time.

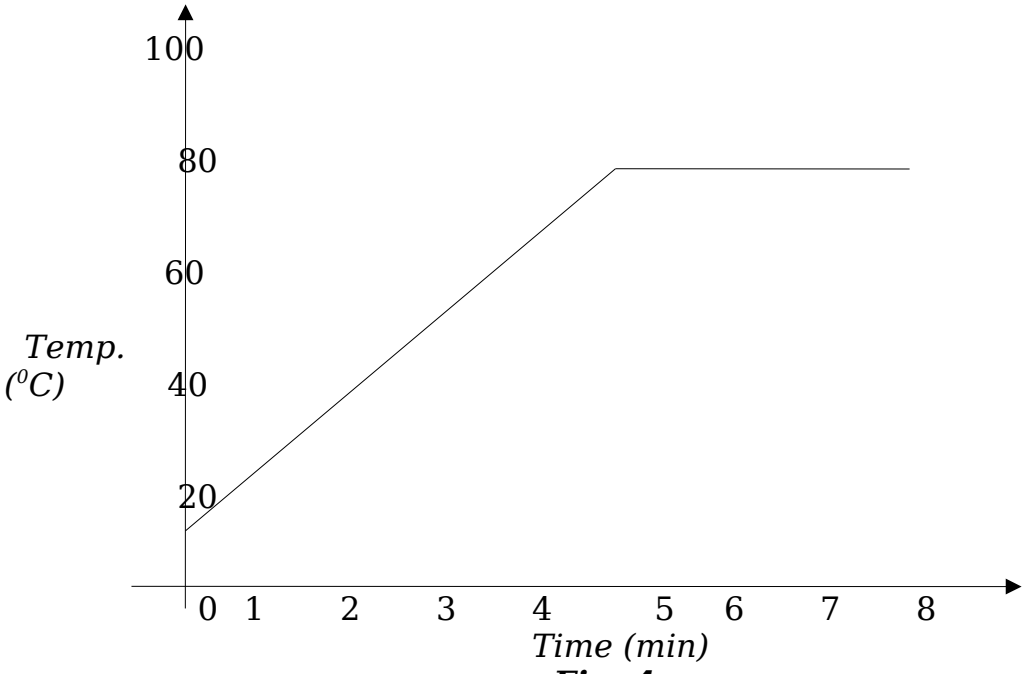



***Fig. 4***

Use the graph to answer the following questions:

(i) What is the boiling point of the liquid? (1 mk)

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(ii) How much heat is given out by the heater to take the liquid to the boiling point? (2 mks)

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(iii) Determine the specific heat capacity of the liquid stating any assumptions made.

(2 mks)

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(iv) If 50g of the liquid vapour was collected by the end of the 8th minute, determine the specific latent heat of vaporization of the liquid. (2 mks)

**KIRINYAGA Q19**

19. (a) What is meant by specific latent heat of vaporization of a substance? (1mk)

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(b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100ºC was passed into water contained in a well-lagged copper calorimeter. The following measurements were made:

- Mass of calorimeter = 55g
- Initial mass of water= 75g

- Final mass of calorimeter + water + condensed steam = 133g
- Final temperature of the mixture = 30ºC

[Specific heat capacity of water = 4200JKg$^{-1}$k$^{-1}$ and specific heat capacity of copper = 390JKg$^{-1}$k$^{-1}$]

Determine the

(i) mass of condensed steam.
(1mk)

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(ii) heat gained by the calorimeter and water if the initial temperature of the calorimeter + water = 20ºC.
(2mks)

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(iii) given that L is the specific latent heat of vaporization of steam,

(I) Write an expression for the heat given out by steam.
(2mks)

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(II) Determine the value of L.
(2mks)

(c) (i) In verifying the Charles' law of gases, the volume and the temperature of a gas are
varied at constant pressure, State the condition necessary for the law to hold. (1mk)

(ii) With an aid of a labeled diagram, describe an experiment to verify Charles' law. (5mks)

**KISUMU WEST Q16**

16. (a) A liquid at $80^0$C in a cup was allowed to cool for 20 minutes.
State **two** factors that
determine the final temperature.
(2mks)

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(b) What is meant by specific latent heat of vaporization?

(1mk)

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(c) In an experiment to determine the specific latent heat of vaporization **L** 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 = 80g

Initial mass of water = 70g

Initial temperature of water = $5^0$C

Final mass of calorimeter + water + condensed steam = 156g

Final temperature of mixture = $30^0$C

*Specific heat capacity of water = 4200JKg$^{-1}$ K$^{-1}$and specific heat capacity for copper = 390J/Kg$^{-1}$K$^{-1}$*

(i) Determine the:

(i) Mass of condensed steam

(2mks)

(ii) Heat gained by the calorimeter and water

(2mks)

(iii) Given that **L**. is the specific latent heat of vaporization of steam;

(i) Write an expression for the heat given out by steam

(1mk)

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(ii) Determine the value of **L**

(3mks)

**LARI Q5**

5. 0.2kg of copper at $80^0$c is put in a well-lagged brass calorimeter of mass 0.1kg containing 0.16kg of sea water at $20^0$c. Calculate the final steady temperature of the mixture. ($c_{copper}$=400Jkg$^{-1}$k$^{-1}$; $c_{brass}$=380Jkg$^{-1}$k$^{-1}$; $c_{seawater}$=3900Jkg$^{-1}$k$^{-1}$) (3marks)

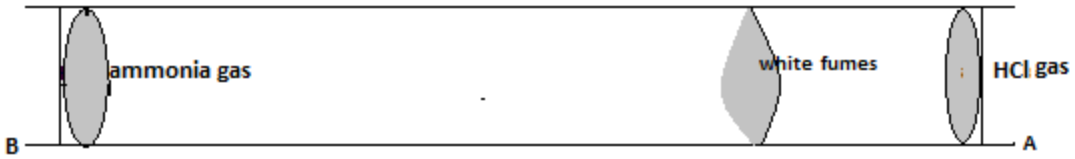
**TOPIC 10**

**THE GAS LAW**

**KASSU Q11**

7. A quantity of air occupied 500cm$^3$ at $15^0$C when the pressure was 76 cmHg. At what temperature would it occupy 460cm$^3$ if the pressure was 85cmHg? (2 mks)
LARI Q4

4. Two pieces of cotton wool were soaked, one with ammonia solution and the other with concentrated hydrochloric acid. They were placed at the end of glass tube as shown below.




In the same test tube indicate with an arrow where the white deposit will be formed if the temperature of end B is lowered and that of end A maintained as before. Give reason of why the white fumes is formed at that point you have indicated. (2marks)

**LARI Q11**

11. A certain mass of hydrogen gas occupies a volume of $1.6m^3$ at a pressure of $1.5x10^5Pa$ and a temperature of $12^0c$. Determine the volume when the temperature is $0^0c$ at a pressure of $1.0x10^3Pa$. (3marks)

**FORM FOUR WORK**

**TOPIC 1**

**THIN LENSES**

**TOPIC 2**

**UNIFORM CIRCULAR MOTION**

**KASSUQ13**

13. (a) An object is released to fall vertically from height of 100m. At the same time another object is projected vertically upward with velocity of 40m/s.

(i) Calculate the time taken before the objects meet

(3mks)

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(ii) At what height do the objects meet? (2mks)

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

(i) The angular velocity (2mk)

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(ii) The angular acceleration (2mks)

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(iii) The tension on the string (2mks)

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The linear velocity (1mk)

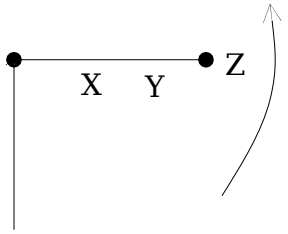
KIRINYAGA Q4

4. A body in a uniform circular motion experiences acceleration despite moving at a constant speed. Explain.
(1mk)

**KIRINYAGA Q15**

15. (a) State what is meant by centripetal acceleration.
(1mk)

(b) The figure shows masses **X**, **Y** and **Z** placed at different points on a turn table. The turn table is rotated at different angular velocities.




(i) State **two** factors that would cause the masses to slide.
(2mks)

(ii) At the time that start sliding off, state the mass with the highest angular velocity,
give reason for your answer.
(2mks)

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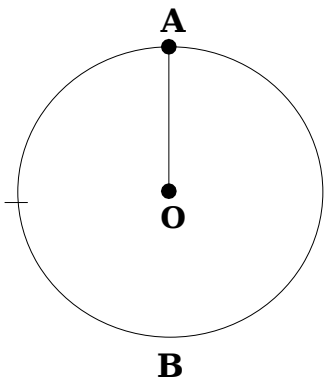
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(c) (i) If the centripetal for is 2N and the mass and radius of the path for mass Y are 100g
and 0,03m respectively. Calculate the angular velocity of the mass when the system
is in equilibrium.
(3mks)

(ii) Indicate on the same diagram the direction of velocity of mass Ƶ at that position.
(1mk)

**KISUMU WEST Q17**

17. (a) The figure 6 below shows a stone of mass 450g rotated in a vertical circle at 3 revolutions per
second. If the string has a length of 1.5m, determine:



**Figure**

(i) The linear velocity

(2mks)

(ii) The tension of the string at position **A**

(3mks)

(b) A stone is whirled with uniform speed in horizontal circle having radius of 10cm. It takes the stone 10 seconds to describe an arc of length 4cm. Determine:

(i) The angular velocity ω

(2mks)

(ii) The period **T**

(3mks)

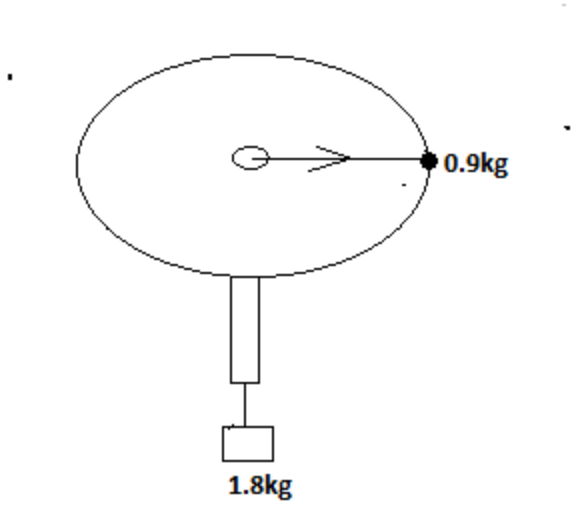
LARI Q15

15(a) A small ball of mass 30g is spinning on a string of length 80cm in a horizontal circle.

(i) Which type of force produces the centripetal force? (1mark)

(ii) Explain why the speed of the ball is constant but the velocity is not. (1mark)

(b) Two masses of 0.9kg and 1.8kg are attached on an inelastic string as shown below.

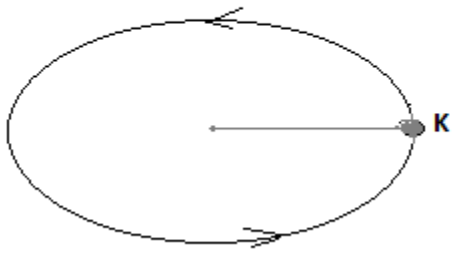



The radius of the circle through which the 0.9kg mass spins is 0.5m. Find the:

(i) Tensional force that will keep the system in circular motion. (2marks)

(iii) Angular velocity at which the 0.9kg mass must spin in order that the 1.8kg mass does not slide downwards. (3marks)

(c) An object k is at the edge of a turntable as shown below.



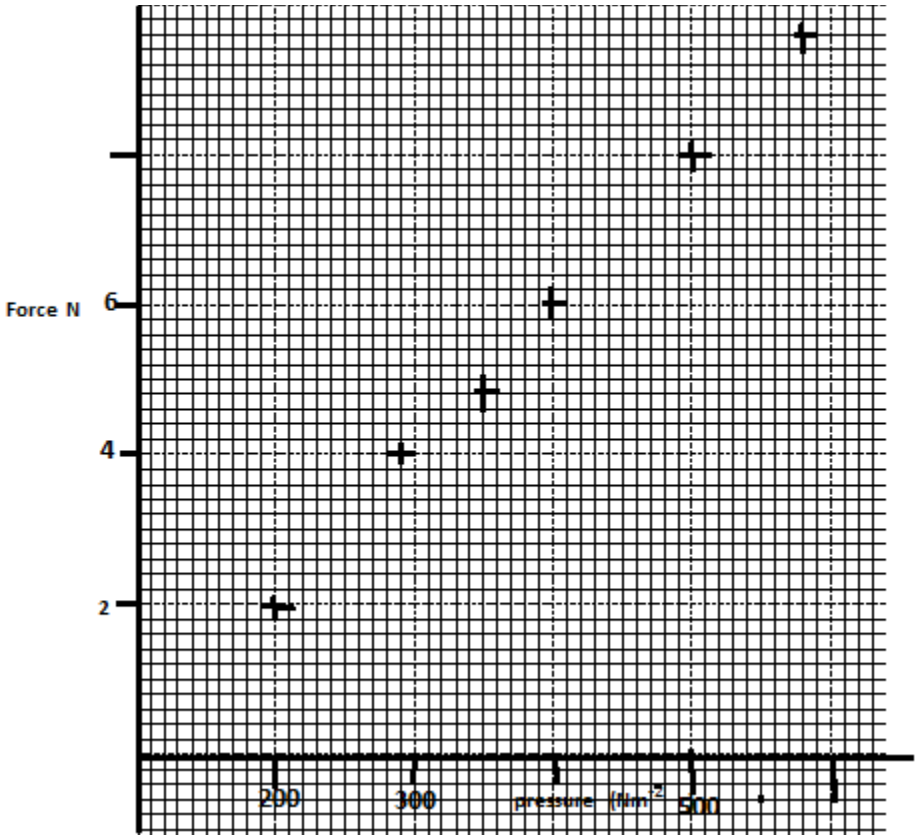

d. The table spins anticlockwise. What factors will affect the force acting on the object? (2marks)

e. An electron of mass $9.1 \times 10^{-31}$kg is spinning around an atom of radius $6.2 \times 10^{-11}$m at a speed of $3.0 \times 10^{8}$m/s.

(i) Determine the force acting on the electron. (2marks)

ii) If the electrostatic force on the electron was suddenly removed, how will the electron move? (1mark)

f. The graph below shows the variation of pressure produced at the end of piston as the force is applied on its.




a) Draw the line of the best fit (1mark)

b) From the graph determine the area of the piston. (3marks)

c) On the same graph draw a line showing the pressure produced when the same force was applied on a wider piston. (1mark)

**TOPIC 3**

**FLOATING AND SINKING**

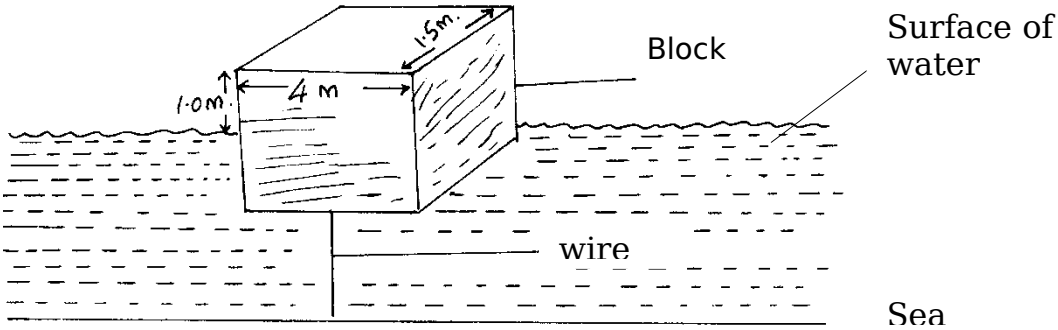
**KASSU Q14**

14. a) State Archimedes' principle. (1mk)

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(c) The figure below shows a rectangular buoy of mass 4000kg tethered to the sea-bed by a wire. The dimensions are 4m x 1.5m x 2.2m.




Calculate the :-

(i) Weight of sea water displaced by the buoy (density of sea water = 1100kg/$m^3$)

(3 mks)

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(ii) Upward force exerted on the buoy by the water.

(1mk)

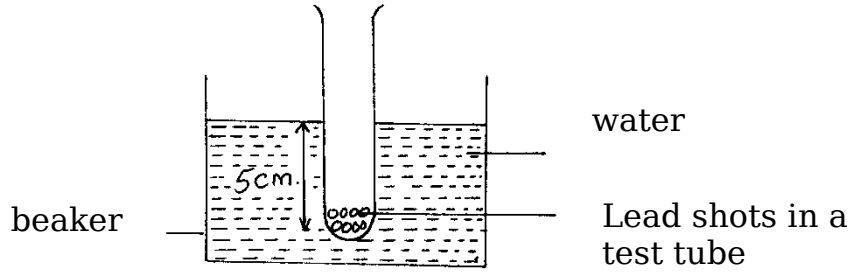
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(iii) Tension in the wire (2mks)

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(c) A test tube of mass 10g and uniform cross-sectional area 4$cm^2$ is partly filled with lead shots and floats vertically in water with 5cm of its length submerged.




Find the:-

(i) Mass of the lead shots. (2mks)

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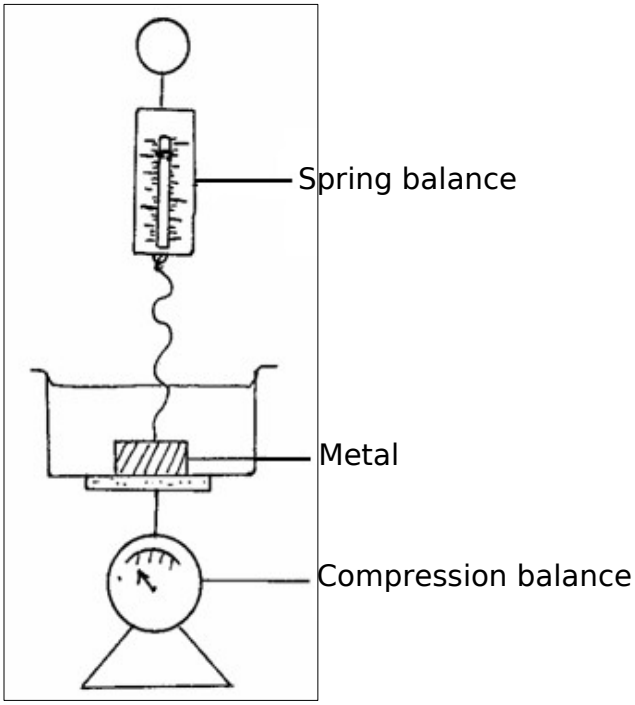
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(ii) Length of the test tube that would be submerged in a liquid of density 0.75g/cm$^3$.

(2mks)

**KIRINYAGA Q18**

18. (a) A cylindrical block of metal of mass 500g and density 5.0 × 10$^3$kg/m$^3$ rests on the bottom of a beaker containing a liquid of density 2.5 × 10$^3$kgm$^{-3}$, standing on a compression balance. The metal is attached to a spring balance by a light inextensible string and to begin with the string is slack as shown in the figure **below**.



The metal is slowly raised by raising the spring balance vertically until the metal is
well above the surface of the liquid. The mass of the beaker and liquid, without the metal is 1.5kg. Determine the readings, in Newton's, that will be recorded on each
of the balances when

(i) the string is slack as shown the diagram.
(3mks)

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(ii) the string is taut with the metal fully immersed in the liquid. (5mks)

(b) The weight of a stone in air is 7.5N. When fully immersed in paraffin of density 0.8g/cm³ its weight is 6.3N. Determine the;

(i) up thrust in the paraffin.
(1mk)

(ii) volume of the stone.
(2mks)

**KISUMU WEST Q17**

18. (a) State the law of floatation
(1mk)

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(b) Figure 7 shows a piece of cork held with a light thread attached to the bottom of a beaker. The beaker is filled with water.

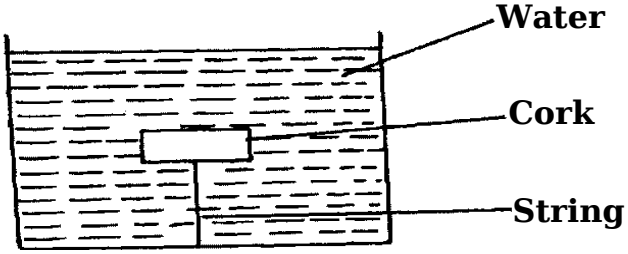



**Figure 7**

(i) Indicate and label on the diagram the forces acting on the cork (3mks)

(ii) Write an expression showing the relationship between the forces (1mk)

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(c) A solid displaces 8.5cm$^3$ of liquid when floating on a certain liquid and 11.5cm$^3$ when fully

submerged in the liquid. The density of the solid is 0.8g/cm$^3$, determine:-

(i) Up thrust on the solid when floating

(3mks)

(ii) Density of the liquid

(2mks)

**MUHORONI Q3**

3. An object is attached to a spring balance and its weight determined in air. It is then gently lowered into a liquid in a beaker. State what will happen to the reading (1mk)

**TOPIC 4**

**ELECTROMAGNETIC (EMS) SPECTRUM**

**TOPIC 5**

**ELECTROMAGNETIC INDUCTION (EM I)**

**TOPIC 6**

**MAIN ELECTRICITY**

**TOPIC 7**

**CATHODE RAYS AND CATHODE RAY TUBE**

**TOPIC 8**

**X-RAYS**

**TOPIC 9**

**PHOTOELECTRIC EFFECT**

**TOPIC 10**

**RADIOACTIVITY**

**TOPIC 11**

**ELECTRONICS**