*TRAIL 1 2024*

**Kenya Certificate of Secondary Education**

# 232/1 – PHYSICS – Paper 1

# 2024 - 2 hours

# Name………………………………Adm No……

# Class…………… Date…………………………

## INSTRUCTIONS TO THE CANDIDATES:

● *Write your **Name, Admission Number** and **Class** in the spaces provided above.*
● *Answer **all** the questions both in section **A** and **B** in the spaces provided below each question*
● *All workings **must** be clearly shown; marks may be awarded for correct steps even if the answers are wrong.*
● *Let g = 10m/s²*

**For Examiner's Use**

| SECTION | QUESTION | MAXIMUM SCORE | CANDIDATE'S SCORE |
|---------|----------|---------------|-------------------|
| A | 1-10 | 25 | |
| B | 11 | 09 | |
| | 12 | 14 | |
| | 13 | 11 | |
| | 14 | 10 | |
| | 15 | 11 | |
| TOTAL | | 80 | |

This paper consists of 10 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing

### SECTION A 25 MARKS:  Attempt all the questions in this section

1. The figure below shows a piece of metal stuck in a hollow glass pipe. .Explain how temperature change may be used to separate them                                    (2mark)
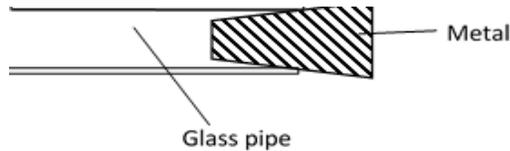


2. Form four students were playing football game during which the ball got deflated. Explain what happened to its density                                    (2marks)

3. Micrometer screw gauge A has a zero error of – **x** mm. Micrometer screw gauge B has a zero error of **x** mm  When used to measure the diameter of a tube the difference between their readings is 0.04mm. If the actual diameter of the tube is 5.56mm determine**x** hence state the reading of micrometer screw gauge A(3 marks)

4. A car of mass 1000kg travelling at a constant velocity of 40m/s collides with a stationary metal block of mass 800kg. The impact takes 3s before the two move together. Determine the impulsive force  (3marks)

5. The figure below shows a drop of water about to fall from a pipette and after falling. Explain why the shapes of the drop are different                                    (2 marks)

6. Figure shows a liquid manometer. The gas pressure is 755mmHg and that of the surround is 760mmHg. The height h is 80mm. Determine the density of the liquid. (Take density of mercury = 13600kgm$^{-3}$ and g =10Nkg$^{-1}$)    (3 marks)

**Gas**

h

**Liquid**
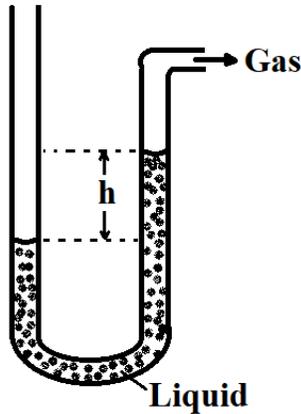
7. A student balances a V - shaped uniform wire on a tight string as shown in A and B. With reason state the one which is easier to do   (2marks)

String

A

B

String

8. The figure below shows a Bunsen burner. Explain how air is drawn into the burner when the gas tap is opened.        (2marks)

Nozzle

Air

Gas tap
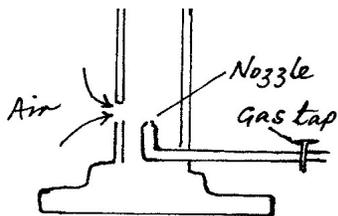
9. The figure shows a uniform metal bar of length 10m and weight W = 200N held at equilibrium by a light chain fixed at the cog and tethered on the floor using a light chain.  Determine the tension of the chain    (3marks)
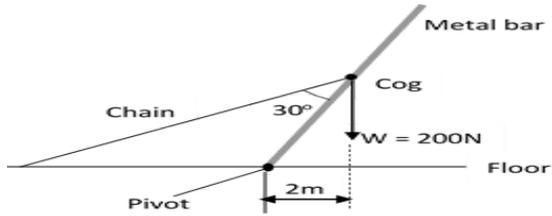
10. A student set up the apparatus as shown below. The boiling tube was heated in the middle as shown
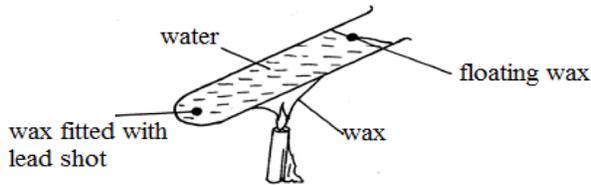


a. State the role of the lead shot in the experiment (1mark)

b. With reason, state the wax that will melt first (2marks)

**SECTION B 55 MARKS:  Attempt all the questions in this section**

11. Marble A is projected horizontally from the top of a cliff at a velocity of 50m/s. The height of the cliff from its foot is 31.25m. At the same time another marble B is projected horizontally from the same point. The figure below shows the trajectories taken by the marbles
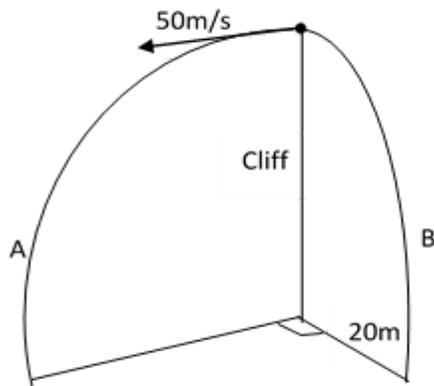


Determine

    a. The distance of marble A from the foot of the cliff as it hits the ground
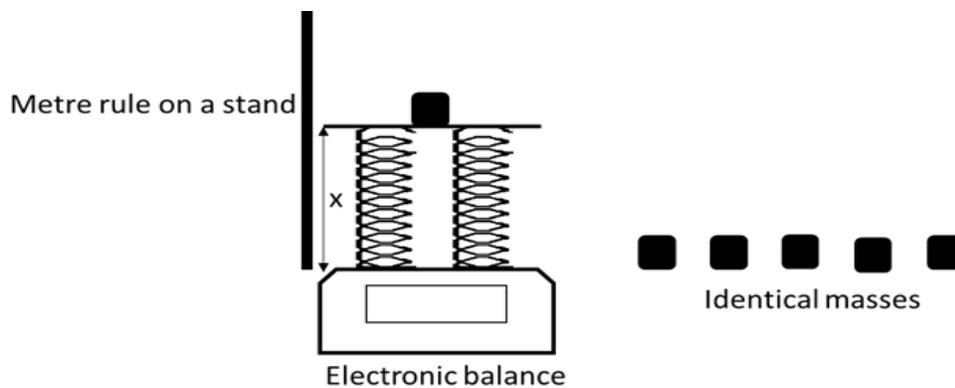
(3marks)

b. Vertical velocity of marble A as it hits the ground      (2marks)
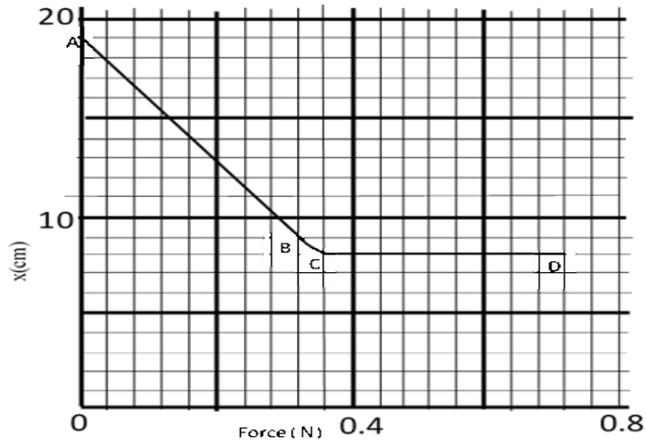
c. Horizontal velocity of marble B as it hits the ground   (2marks)

d. The shortest distance between the marbles upon hitting the ground  (2marks)

12. The figure below shows two identical light springsand other apparatus used in an experiment

Metre rule on a stand

x

Identical masses

Electronic balance

After the data was collected the following graph was obtained

a. State two measurements taken in the experiment  (2mark)

b. Explain how the measurements can be used to come up with the graph (2marks)

c. Explain the graph in sections
    i.      AB                                                      (2marks)

    ii.     CD                                                      (2marks)

d. Determine the spring constant of each spring                     (3marks)

e. Determine the work done in section CD                           (2marks)

f.  On the same axes sketch the graph expected when the experiment is repeated using one of the springs only                                                                (1mark)

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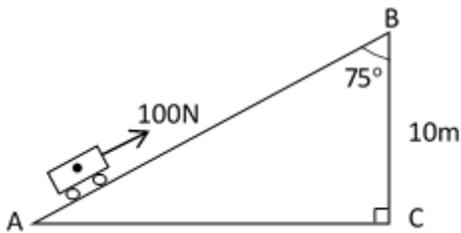


(i)      Determined the work done on the trolley against the gravitational force in moving from **A** to **B**.                                                              (2 marks)

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

(iii)    Determine the percentage of the work input that goes to waste        (3 marks)

(iii)     Determine the frictional force.            (1 mark)




(v)     Determine the mechanical advantage of the system.            (1 mark)




(vi)  Find the velocity ratio                                            (1 mark)


14. a. The figure below shows a set-up that can be used to determine the specific heat capacity of a metal block.
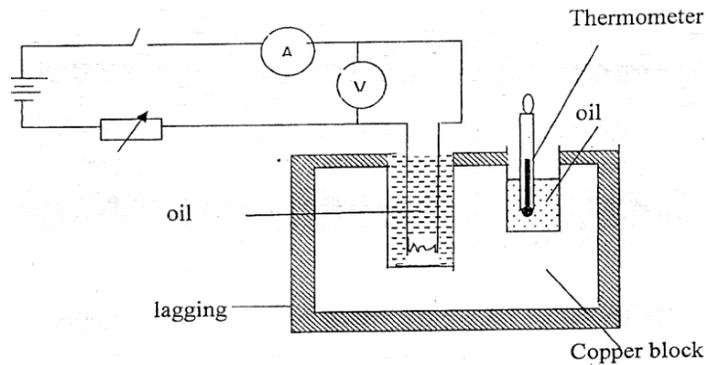


I)     Other than temperature and current, state **two** measurements that should be taken in the experiment to determine the specific heat capacity of the block.(2marks)




II)     Describe how the method can be used to determine the specific heat capacity of the metal block.        (3marks)






III)     State the purpose of oil in the set-up.       (1mark)

(ii)     A well lagged copper can together with a copper stirrer of total heat capacity 60JK$^{-1}$ contains 200g of water at 20$^0$C. Dry steam at 100$^0$C is passed in while the water is stirred until the content reach a temperature of 50$^0$C. Determine the mass of condensed steam. (Specific latent heat of vaporization of water is 2.26 X 10$^6$ J/kg and specific heat capacity of water is 4200 J/kgK)(4marks)

15. a) A uniform metal strip is 3.0cm wide 0.6cm thick and 100cm long. The density of the metal is 2.7g/cm$^3$.
   I.      Determine the weight of the metal strip.         (2marks)
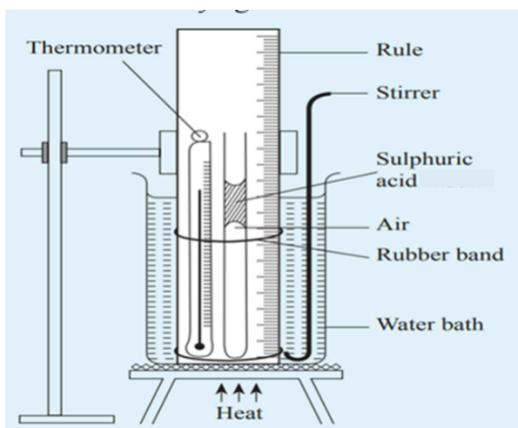
The strip is used to support two masses in equilibrium by applying force F as shown below.
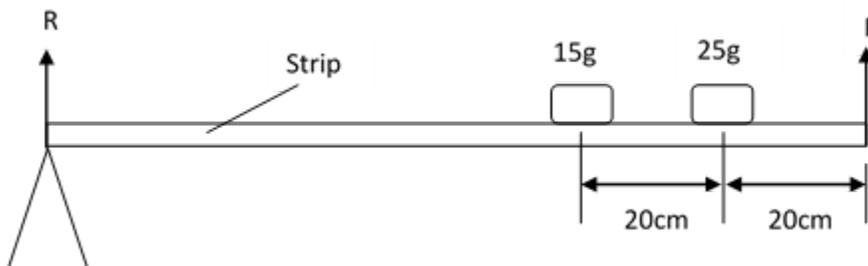


   II.      Determine the value of F                                        (3 marks)

III.    Determine reaction R due to the pivot      (2 marks)

b) The Figure belowshows a set up that may be used to verify a gas law.



I.    State the law being verified                    (1mark)

II.    State two functions of the concentrated Sulphuric acid in the experiment
       (2marks)?

III.    State one assumption in the experiment                    (1mark)

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