NAME…….. INDEX NO…….....

232/1 CANDIDATE'S SIGN……..……...
PHYSICS
PAPER 1 DATE……..……
(THEORY)
TIME: 2 HOURS

CENTRAL KENYA NATIONAL SCHOOLS JOINT EXAM - 2015

Kenya Certificate of Secondary Education
PHYSICS
PAPER 1
(THEORY)
TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATE:

(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.
(e) All working **must** be clearly shown in the spaces provided.
(f) Mathematical tables and electronic calculators **may be** used.

FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidate's Score
A	1 – 13	25	
B	14	11	
	15	9	
	16	7	
	17	9	
	18	9	
Total Score		80	

SECTION A: (25 MARKS)

1. The water level in a burette is 40.6cm³. 50 drops of water each of volume 0.2cm³ are added to the water in the burette. What is the final reading of the burette? (2mks)

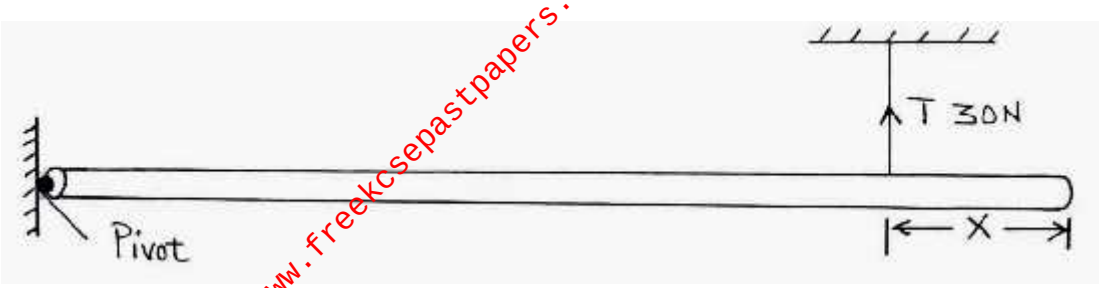
2. State the reason why it may be very difficult to suck a liquid using a drinking straw on the surface of the moon. (1mk)

3. A piece of thick glass removed from hot water and dipped into cold water will crack; while thin glass does not crack. Explain this observation. (1mk)

4. Using particulate nature of matter, explain why a solid expands when heated? (2mks)

5. A metal bench feels colder than a wooden one. When one sits on it on a cold morning even though both are at same temperature. Explain this observation. (2mks)

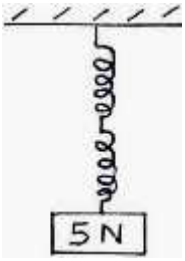
6. The uniform rod of length one metre shown in the figure below is in equilibrium.



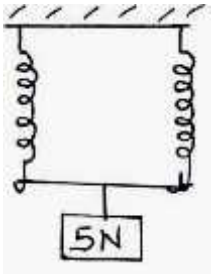
Find the value of χ if the weight of the rod is 40N.

7. The springs in the figure below are identical.

A



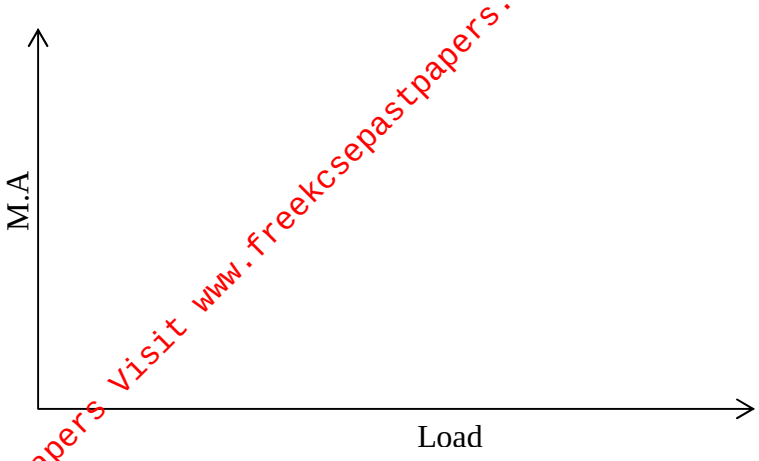
B



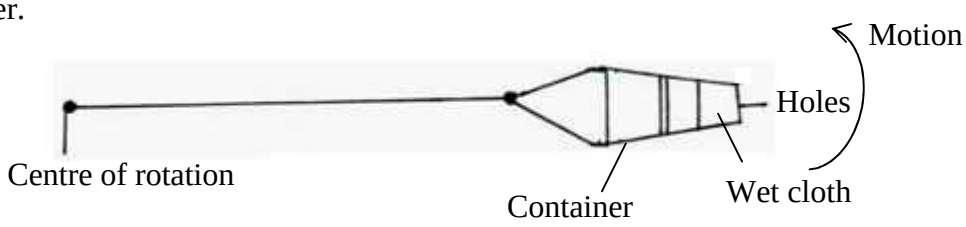
The extension produced in **A** is 4cm. What is the extension in **B**? (3mks)

8. A lawn sprinkler has 20 holes each of cross-sectional area $1.25 \times 10^{-3}cm^2$ and is connected to a horse-pipe of cross-sectional area $2.4cm^2$. If the speed of the water in the horse pipe is 1.5m/s. Calculate the speed at which the water emerges from the holes. (3mks)

9. On the axes provided, sketch a graph of Mechanical Advantage (M.A) against load for a pulley system. (1mk)



10. The figure below shows a container with small holes at the bottom in which wet clothes have been put. When the container is whirled in air at high speed, it is observed that the clothes dry faster.

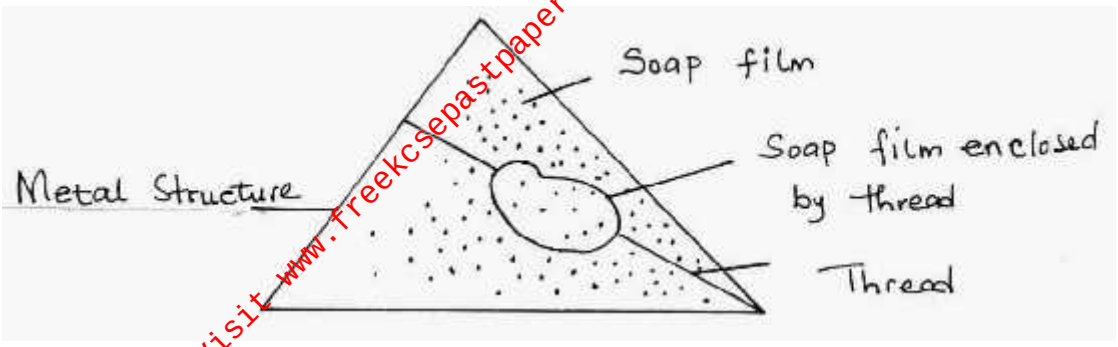


Explain how the rotation of the container causes the clothes to dry so fast. (2mks)

11. A ball rolls off a platform of height 1.8m at a horizontal speed of 15m/s. How far off the edge of the platform does it land? (Take g = 10ms^{-2}). (3mks)

12. State the law that relates the volume of a gas to the temperature of the gas. (1mk)

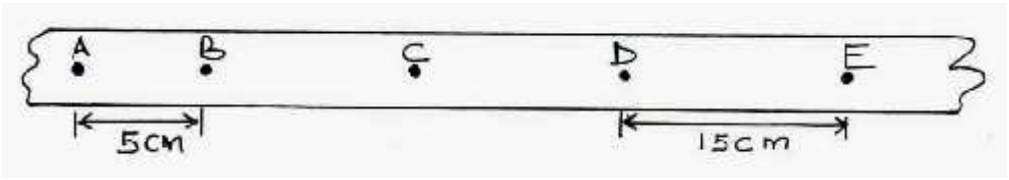
13. The diagram show a metal wire structure with a loop of thread inside after it was dipped into a soap solution.



Sketch the appearance of the thread loop after the film enclosed by the tread is broken. (1mk)

SECTION B: (55 MARKS)

14. The figure below shows a section of a ticker-tape produced by a ticker-timer operating at a frequency of $50H_Z$.



(a) (i) Find the average velocity between **A** and **B**. (2mks)

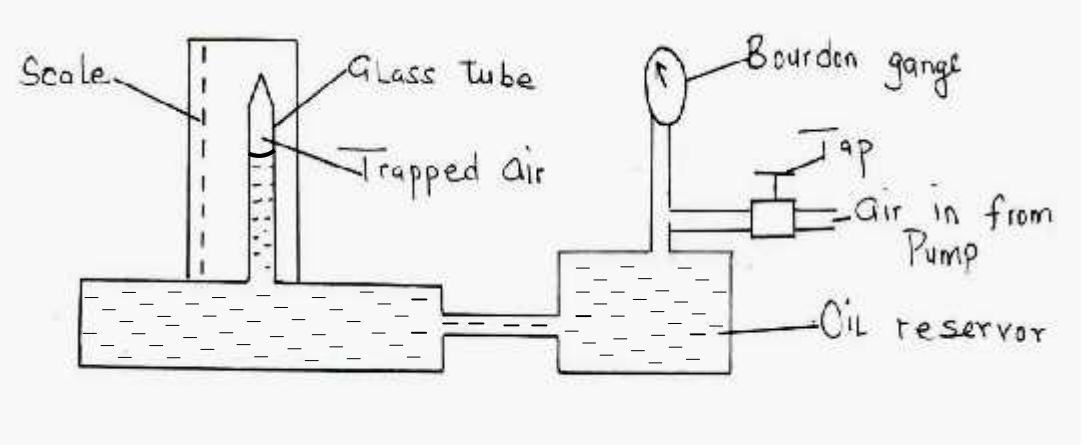
(ii) Find the average velocity between **D** and **E**. (2mks)

(iii) Determine the average acceleration. (2mks)

(b) (i) Explain why bodies in circular motion undergo acceleration even when their speed is constant. (2mks)

(ii) A stone of mass 40g is tied to the end of a string 50cm long and whirled in a vertical circle in 2 revolutions per second. Calculate the maximum tension in the string. (3mks)

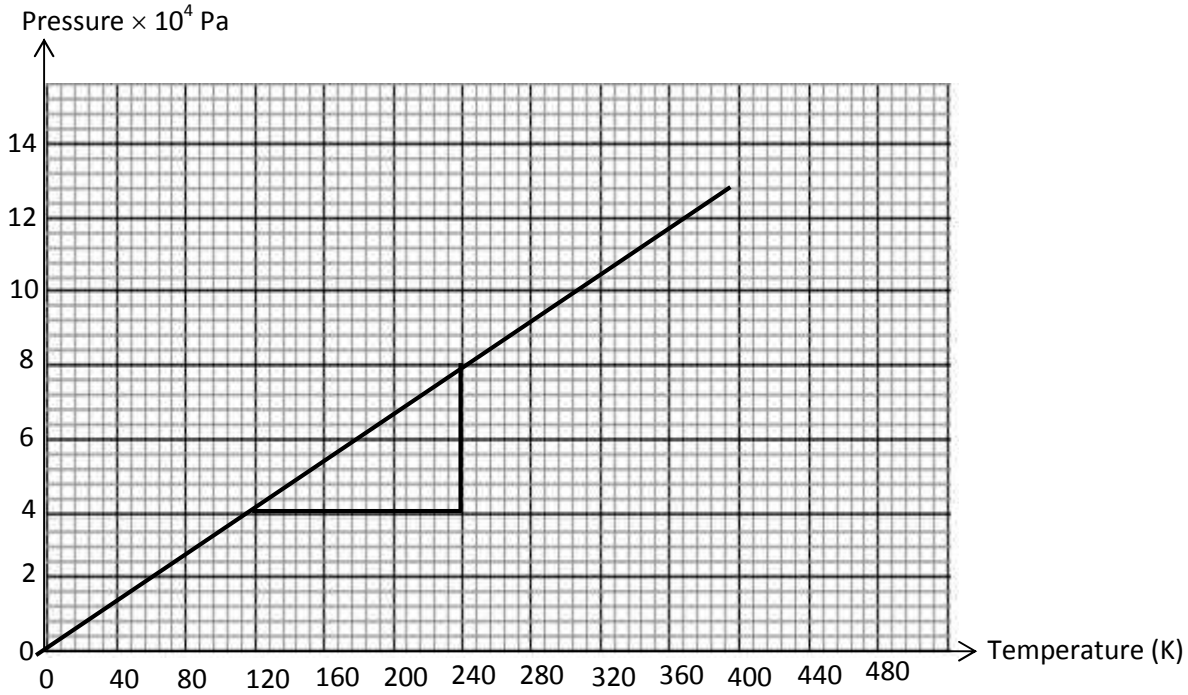
15. (a) (i) The figure below show a set-up that may be used to verify Boyle's Law.



Describe the measurements that should be taken in this experiment. (2mks)

(ii) Explain how the measurements taken would be used to verify Boyle's Law. (3mks)

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



Given that the relationship between the pressure P and temperature T in Kelvin is in the form P = kT + C where k and C are constants.

(i) Determine from the graph the values of k and C. (2mks)

(ii) Why would it be impossible for the pressure of the gas to be reduced to zero in practice? (1mk)

(iii) A gas is put into a container of fixed volume at a pressure of 2.1×10^5Pa and temperature of 50°C. The glass is then heated to a temperature of 400°C. Determine the new value of pressure. (3mks)

16. (a) Distinguish between latent heat of fusion and specific latent of fusion. (1mk)

(b) Figure 8 shows a block of ice. A thin copper wire with two heavy weights hanging from its ends-passes over the block. The copper wire is observed to pass through the block of ice without cutting it in a process known as relegation.

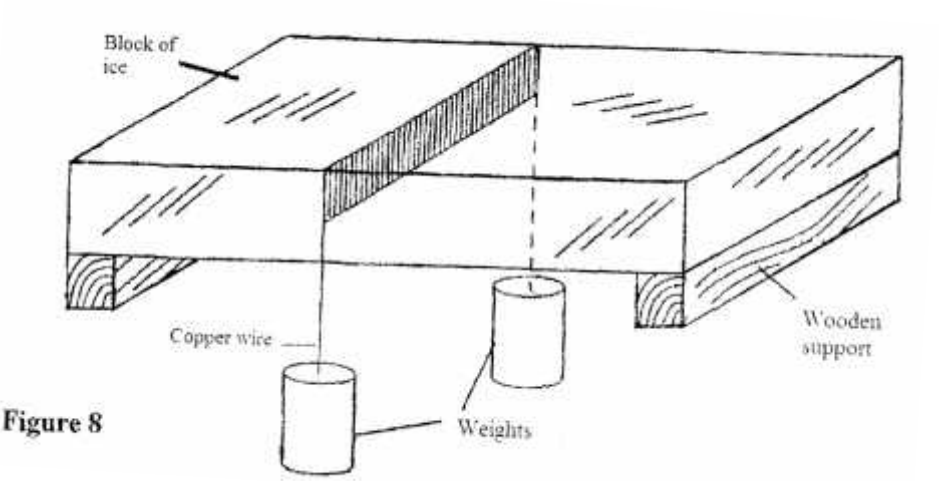


Figure 8

(i) Explain this observation. (3mks)

(ii) What would be the effect of replacing the copper wire with a cotton thread? Explain. (2mks)

(c) Figure 9 shows one method of measuring the specific latent heat of fusion of ice. Two funnels **A** and **B** contain crushed ice at 0°C.

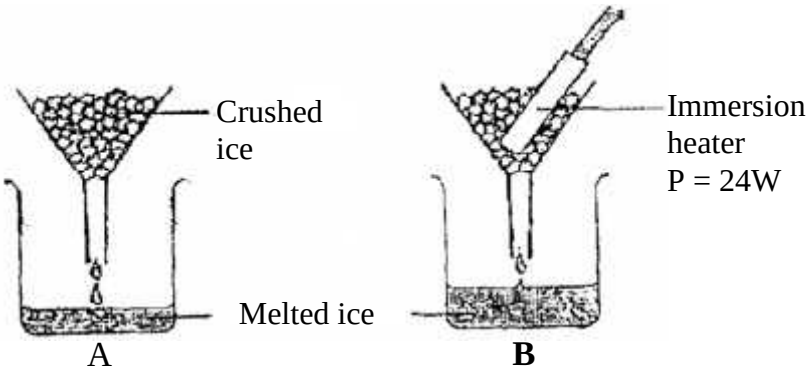


Figure 9

The mass of melted ice from each funnel is measured after 11 minutes. The results are shown below.

Mass of melted ice in A = 24g
Mass of melted ice in B = 63g

(i) What is the reason for setting up funnel A? (1mk)

(ii) Determine the:

I quantity of heat supplied by the heater. (2mks)

II mass of ice melted by the heater. (1mk)

III specific latent heat of fusion of ice. (3mks)

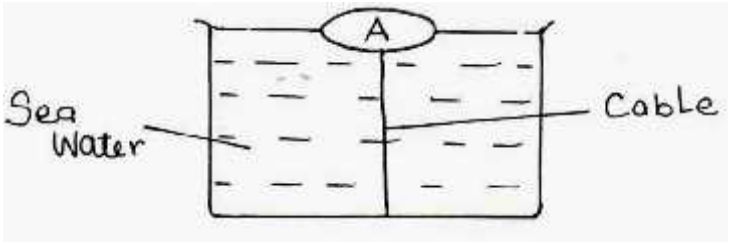
17. (a) (i) State the Archimedes Principle. (1mk)

(ii) An object weighs 1.05N in air and 0.66N when fully immersed in water and 0.73N when fully immersed in a liquid. If the density of water is $1000kgm^{-3}$.
Find the density of the liquid. (3mks)

(b) (i) Define the law of flotation. (1mk)

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

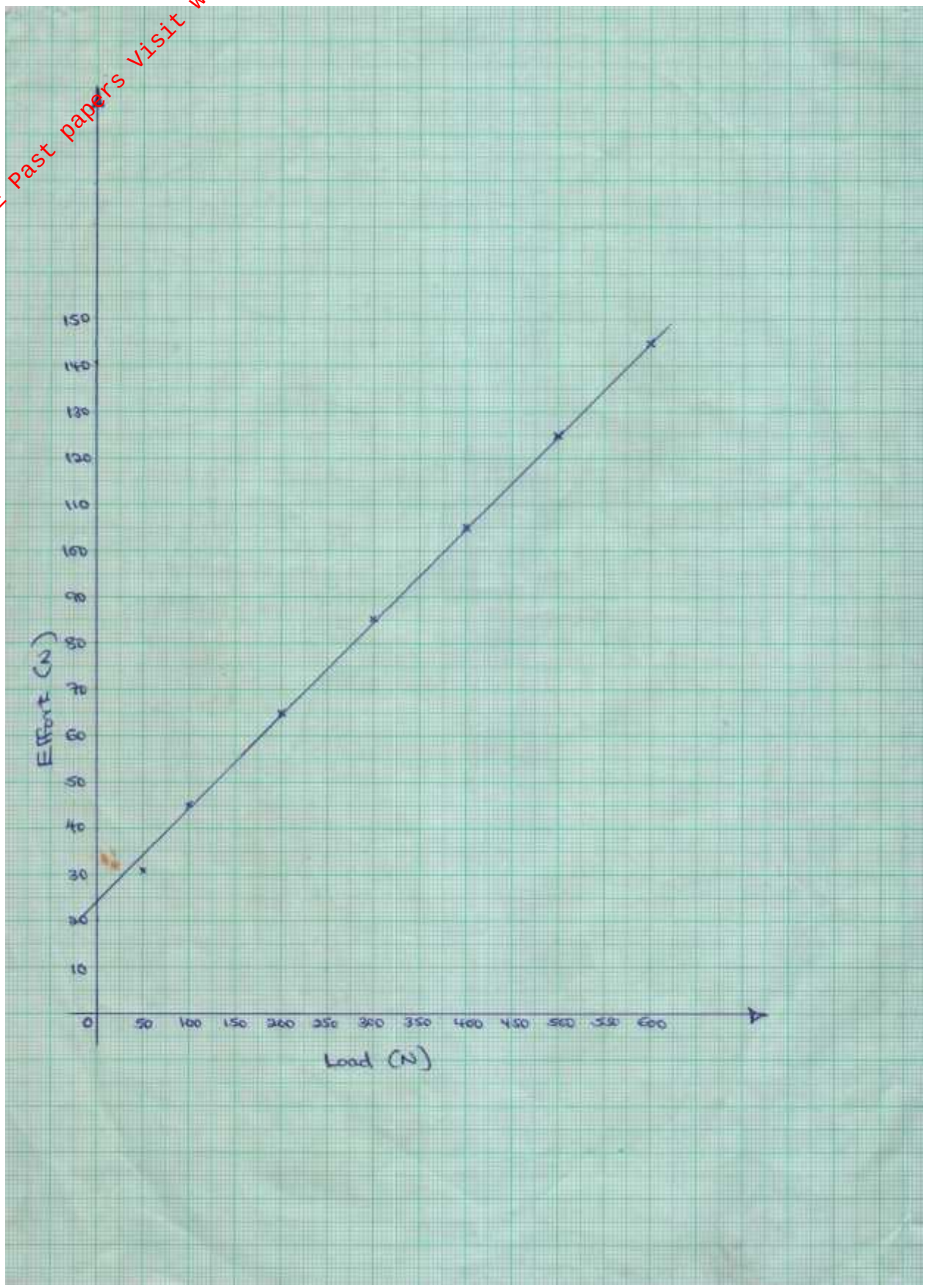
(iii) The figure below shows a buoy, A, volume 45 litres and mass of 9kg. It is held in position in sea water of density $1.03g/cm^3$ by a light cable fixed to the bottom so that $\frac{7}{8}$ of the volume of the buoy is below the surface of sea water.



Determine the tension T in the cable. (3mks)

18. (a) Define mechanical advantage of a machine. (1mk)

(b) In an experiment to investigate the performance of a pulley system with a velocity ratio of 5 and the following graph was plotted.



From the graph above, find:

(i) The effort when the load is 450N. (1mk)

(ii) M.A when the load is 450N. (2mks)

(iii) The efficiency corresponding to the load of 450N. (2mks)

(c) Thendu uses the system in (b) to lift a body of mass 50kg. It rises with a velocity of $0.15ms^{-1}$. Determine the power developed by Thendu. (3mks)

(d) (i) State the law of conservation of linear momentum. (1mk)

(ii) An object of mass 150kg moving at $20ms^{-1}$ collides with a stationary object of mass 90kg. They fuse after collision. Determine their common velocity after collision. (3mks)