NAME…….. INDEX NO…….....…..……

CANDIDATE'S SIGNATURE……...

DATE……..…….....

232/1
PHYSICS (THEORY)
PAPER 1
JULY/AUGUST 2011
TIME: 2 HRS.

NANDI EAST, NANDI SOUTH AND TINDIRET DISTRICTS JOINT EXAMINATION 2011

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

INSTRUCTIONS TO CANDIDATES:
Write your **Name** and **Index Number** in the spaces provided **above**.
Sign and write the **date** of examination in the spaces provided **above**.
This paper consists of **two** Sections; **I** and **II**.
Answer **ALL** the questions in sections **I** and **II** in the spaces provided after each question.
Mathematical tables and silent non-programmable scientific calculators may be used.
Take the value of g = 9.8N/Kg, density of water = 1000kg/m^3 and density of mercury is 13600kg/m^3.

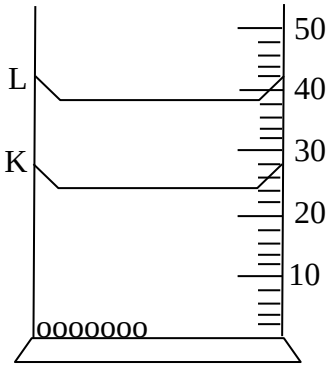
FOR EXAMINER'S USE ONLY:

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

SECTION B: (25 MARKS)

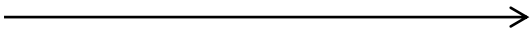
Answer all questions in this section in the spaces provided:

1. Seven glass marbles, each of mass 7.0g, were gently lowered into a 100cm³ measuring cylinder containing water to the level marked K. The water level rose to the level marked L as shown in the figure **1 below**.



Determine the density of the glass marbles. (3mks)

2. Force is normally represented as shown in figure 2 below.



What do the following represent.

(i) Arrow head? (1mk)

_____

(ii) Length of the arrow? (1mk)

_____

3. A drop of blood is dropped on one end of a large basin full of water. Immediately the drop hits the water, a deep red colour is seen at that point. After a while, the colour fades and eventually disappears. Give a reason for this observation. (2mks)

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4. On the figure **3 below**, indicate the height which measure atmospheric pressure. (1mk)

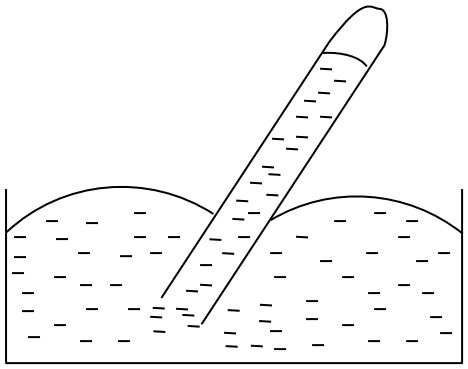

Fig. 3

5. What happens to matter when cooled? (1mk)

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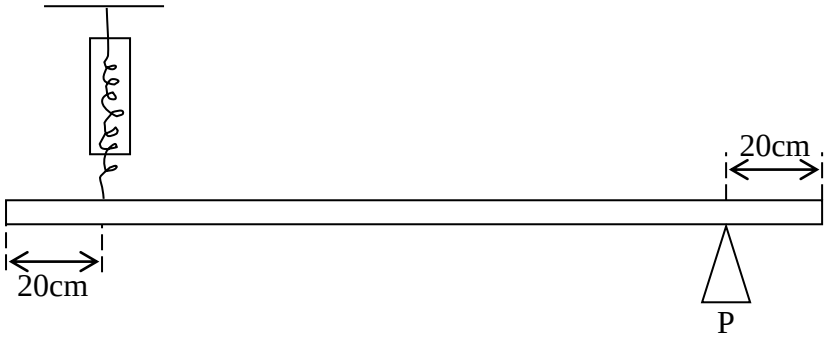
6. Figure 4 shows a uniform burn of length 1.2M pivoted near one end. The bar is kept in equilibrium by a spring balance as shown.



Given that the reading of the spring balance is 0.75N, determine the weight of the bar. (3mks)

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7. Explain why the pressure of the atmosphere on a high point like the peak of Mount Kenya is lower than the corresponding pressure anywhere else in Kenya. (2mks)

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_____

8. Name and explain the feature that make a Bunsen burner stand stable. (1mk)

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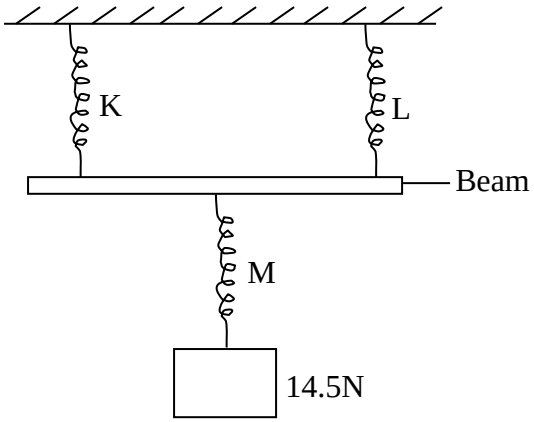
9. Three identical springs **K**, **L** and **M** are used to support 14.5N weight as shown in figure 5.



If the weight of the horizontal beam is 0.5N determine the total extension of the system if the spring constant of each spring is 200N/m. (Assume the springs are weightless). (3mks)

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10. (a) Define work. (1mk)

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(b) The figure **6 below** shows a lever

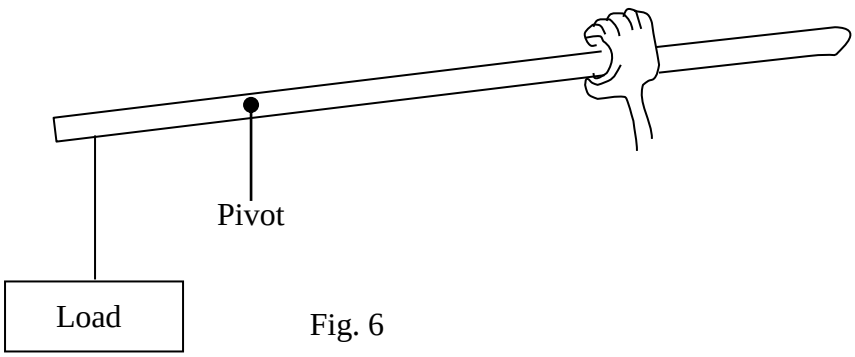

Fig. 6

Suggest **two** ways in which the mechanical advantage could be increased. (2mks)

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

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_____

(b) Figure 7 shows a simple hydrometer.

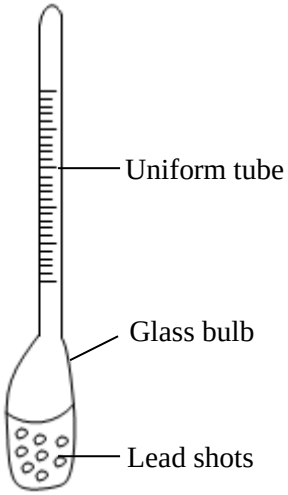

Fig.7

(i) Explain why the bulb is wide. (1mk)

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_____

(ii) How would the manufacturer increase the sensitivity of a hydrometer. (1mk)

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_____

SECTION B: (25 MARKS) Answer all questions:

12. (a) Figure **8 below** shows an aerofoil.

Explain the working of principle of aerofoil. (2mks)

(b) Figure 9 shows a tennis ball hanging close to a water tap. The tap is then opened so that the water flows. State and explain the observation made. (2mks)

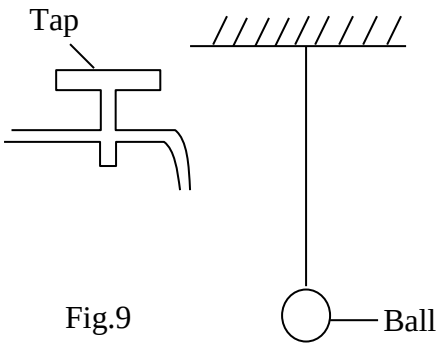

Fig.9

(c) Figure **10 below** shows water flowing through a pipe with three similar vertical columns.

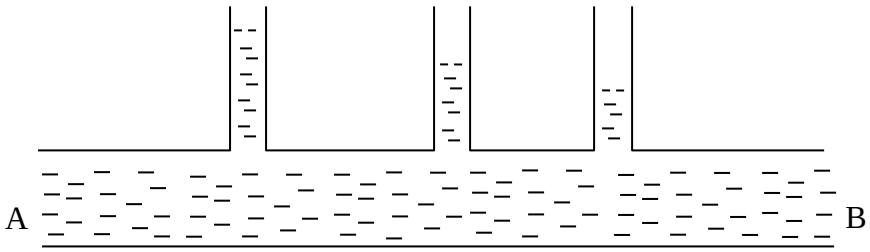

Fig.10

(i) Indicate the direction of the flow in the main pipe. (1mk)

(ii) Explain why the levels in the columns are not the same. (2mks)

(d) (i) Water flows in a pipe with velocity V_L and leaves the tap with velocity V_K. If the internal diameter of the pipe is E, give an expression of the internal diameter e of the tap. (2mks)

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_____

(ii) A jet of water emerges from a horse pipe of cross-section area $4.0 \times 10^{-3} m^2$ with a velocity of 4.0m/s. Determine the volume of water leaving the horse pipe per second. (2mks)

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13. The set-up in figure **11 below** shows a 20g mass being whirled on a horizontal circular path and is balanced by a hanging mass M.

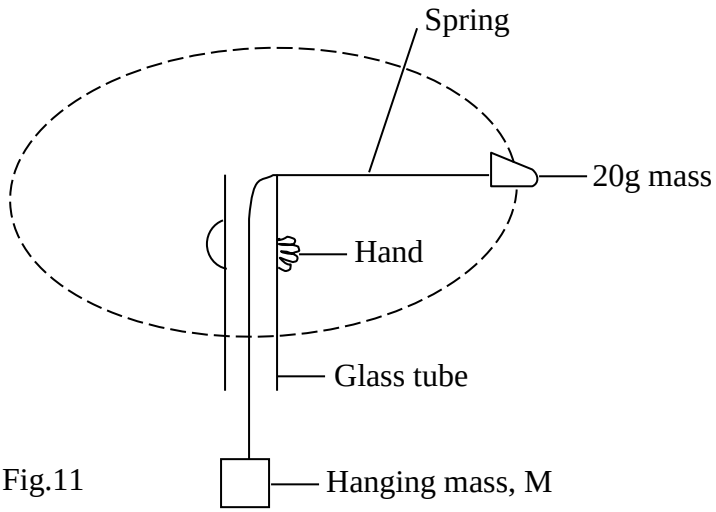

Fig.11

A student used the above set-up to investigate the variation of periodic time T and the radius r of the path of the 20g mass and obtained the result shon in the table below.

Radius (r) m	0.50	0.41	0.33	0.24	0.16
Periodic time (T) S	0.99	0.90	0.81	0.69	0.56

If the equation connecting radius r and periodic time is of the form.

$$T^2 = \frac{4\pi^2 mr}{F}$$

(a) Draw an appropriate graph of the system. (6mks)

GRAPH

(b) From the graph in (a) above find the value of the force, F, that keeps the 20g mass in horizontal circular path. (4mks)

14. (a) In experiment to determine the proportionality constant, K, between two wooden surfaces sliding on each other, a block of mass 2.50kg was placed on a horizontal bench. The block was then made to slide by adding mass, M. The experiment was repeated for other values of M. The acceleration of the block was measured for each mass added. The graph of acceleration against mass, M is as shown in the figure **12 below**.

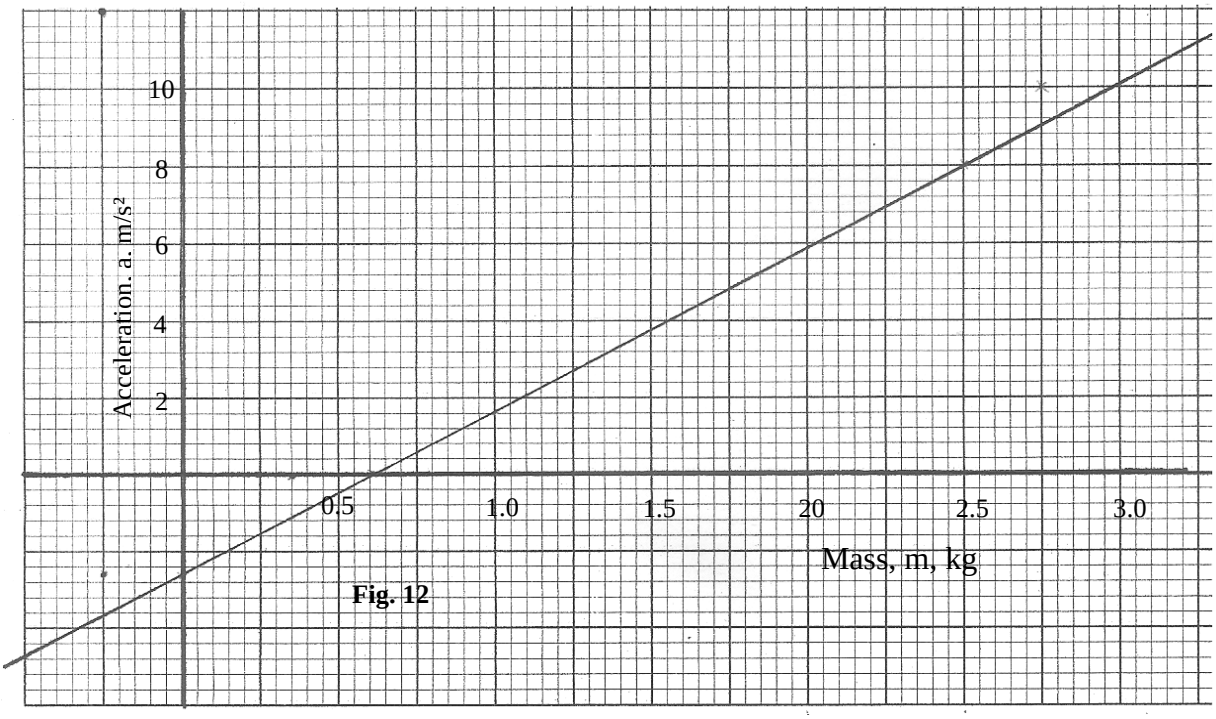

Fig. 12

Given that $a = \frac{Mg}{2.50} - Kg$. From the graph determine,

(i) g (3mks)

(ii) K (2mks)

(iii) State what will happen to the quantities K and a if an extra mass is added on the 2.50kg mass. (2mks)

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_____

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_____

(b) Figure **13(a) below** shows the acceleration-time graph for a certain motion.

(a)

Fig.13(a)

(b)

Fig.13(b)

On the axes provided in figure 13(b), sketch the displacement-time graph for the same motion. (2mks)

(c) Define the term displacement and give an example. (2mks)

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15. (a) Ice is known to melt at O°C. A student heated some ice and noticed that it melted at -2°C. State one possible reason for the observation. (1mk)

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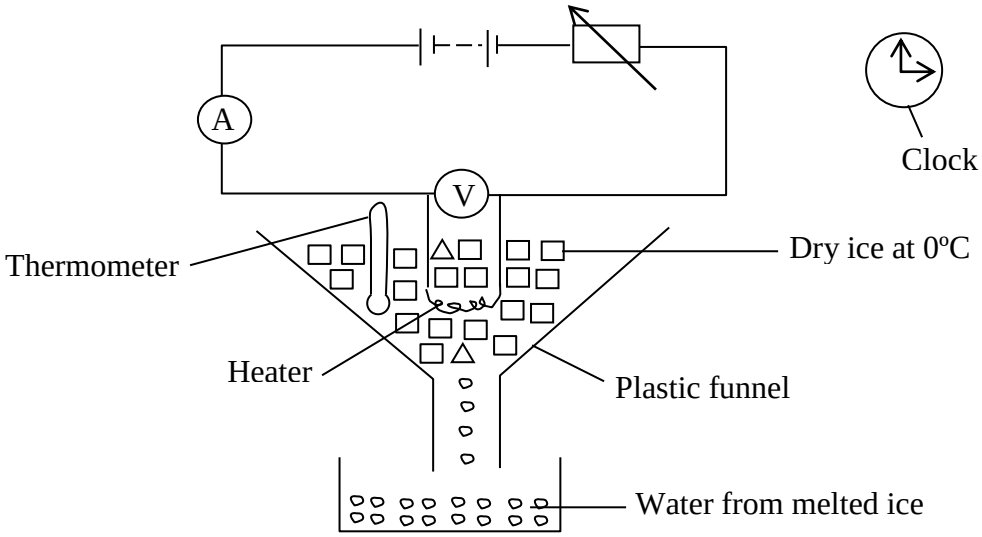
(b) Water of mass 5.0kg initially at 10°C is heated in an electric kettle rated 2.0kw. The water is heated until it boils at 100°C. (Take specific heat capacity of water = $4200JKg^{-1}K^{-}$, heat capacity of the kettle = $420JK^{-1}$).
Determine

(i) the heat absorbed by the electric kettle. (3mks)

(ii) the time taken for the water to boil. (3mks)

(c) The set up in the figure below was used to investigate the effect of electrical energy on dry ice.

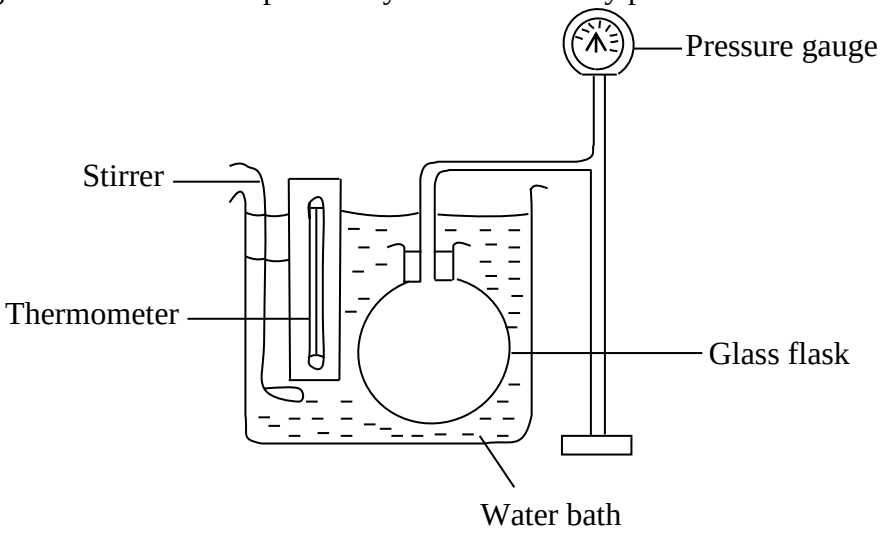


Describe how the quantity of heat absorbed by dry ice can be determined. (4mks)

16. (a) State the difference between temperature measured in Kelvin scale and celscius scale. (1mk)

(b) Using kinetic theory of gases, explain how the pressure of a gas rises when the gas is heated at constant volume. (3mks)

(c) Figure 13 shows a set up that may be used to verify pressure law.



(i) State the measurements that should be taken in the experiment. (2mks)

(ii) Explain how the measurements in (i) above may be used to verify pressure law. (3mks)

(d) State **one** assumptions of real gas laws. (1mk)

(e) At 20ºC, the pressure of a gas is 50cm of mercury. At what temperature would the pressure of the gas fall to 10cm of mercury? (2mks)