

Name ..... Adm. No. ....

232/1  
PHYSICS  
Paper 1 (Theory)  
October 2016  
Time: 2 Hours

Candidate's Signature .....

Date .....

**KANDARA SUB-COUNTY FORM 3 JOINT EVALUATION**  
**Kenya Certificate of Secondary Education**

**PHYSICS**  
Paper 1  
October 2016  
Time: 2 Hours

**INSTRUCTIONS TO CANDIDATES**

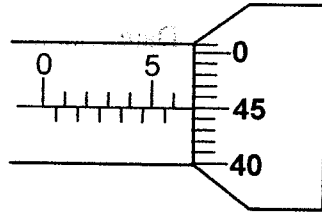
- \* Write your name and admission number in the spaces provided above.
- \* Sign and write the date of examination in the spaces provided above.
- \* This paper consists of two sections; A and B
- \* Answer ALL the questions in section A and B
- \* All working and answers must be written on the question paper in the spaces provided below each question.
- \* Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

**For Examiner's Use Only**

| Section            | Question | Maximum score | Candidate's score |
|--------------------|----------|---------------|-------------------|
| A                  | 1 - 12   | 25            |                   |
| B                  | 13       | 12            |                   |
|                    | 14       | 12            |                   |
|                    | 15       | 10            |                   |
|                    | 16       | 9             |                   |
|                    | 17       | 12            |                   |
| <b>Total Score</b> |          | <b>80</b>     |                   |

**SECTION A : (25 MARKS)**

1. The figure below shows a micrometer screw gauge used to measure the diameter of a metal rod. When the rod is removed and jaws of the gauge closed, the reading is 0.14mm. Determine the diameter of the rod. (1mark)



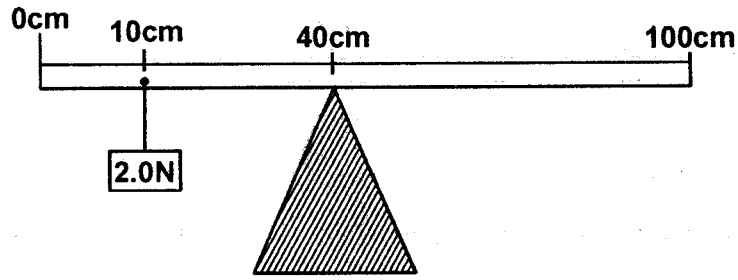
2. A ball is thrown horizontally at 8m/s from the top of a tower. It reaches the ground after 4 seconds. Calculate the height of the tower. (2 marks)

3. 200cm<sup>3</sup> of air at 27°C is heated to 97°C. Determine the new volume if the pressure remains constant. (2 marks)

4. An object of density  $9 \times 10^2 \text{kg/m}^3$  and mass 1.8kg is completely immersed in water. Calculate the mass of water displaced in kg. (Take density of water as  $1000 \text{kgm}^{-3}$ ) (2 marks)

5. In the diagram below, determine the weight of the metre rule shown below.

(2 marks)



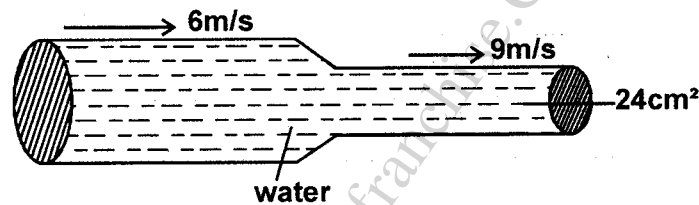
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6. The figure below shows a horizontal pipe in which the area of constriction is  $24\text{cm}^2$ . If the speed of water in the wider part of the pipe is  $6\text{m/s}$  and  $9\text{m/s}$  in the constriction, find the area of the wider part.

(2 marks)



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7. a) Give a reason why water wets glass.

(2 marks)

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b) Pure water was cooled from  $4^\circ\text{C}$  to  $0^\circ\text{C}$ . Explain what happens to its density.

(2 marks)

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8. A drop of oil whose volume is  $1 \times 10^{-6}\text{m}^3$  spreads on the surface of clean water to form a circular patch of area  $3.14 \times 10^{-4}\text{m}^2$ . Determine the thickness of the patch.

(2 marks)

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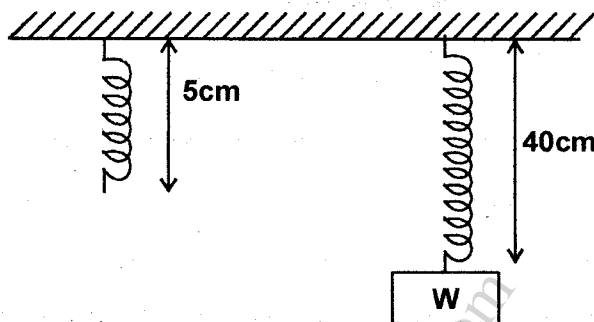
9. Explain why it will feel cooler in a white car than in a black one if both of them are left in the sun for a long time. (1 mark)

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10. The figure below shows a spring of spring constant  $75\text{N/m}$  when unloaded and when loaded with a weight  $W$ .



Determine the value of weight  $W$ . (3 marks)

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11. A block measuring  $20\text{cm}$  by  $10\text{cm}$  by  $4\text{cm}$  rests on a flat surface. The block has a weight of  $6.0\text{N}$ . Determine the maximum pressure it exerts on the surface. (2 marks)

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

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**SECTION B : (55 MARKS)**

13. a) State Hooke's law. (1 mark)

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II. the heat capacity of the water.

(3 marks)

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III. the mass of the water (specific heat capacity of water is  $4200 \text{KJ kg}^{-1} \text{k}^{-1}$ )

(3 marks)

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15. a) State two factors that reduce the efficiency of a block and tackle system of pulleys.

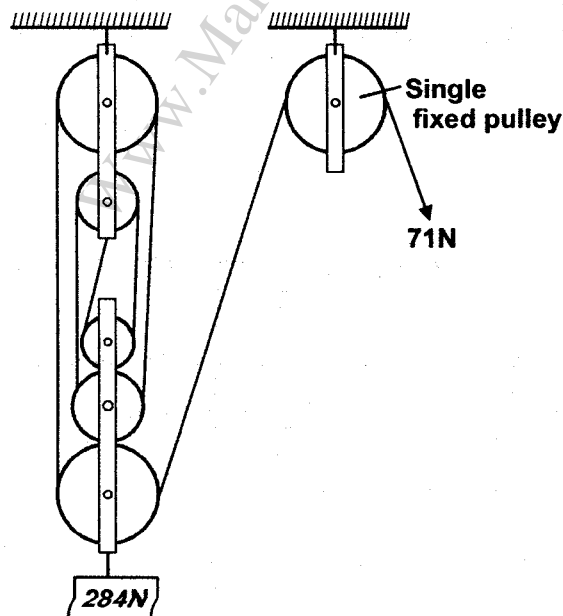
(2 marks)

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b) The figure below shows a system of pulleys used to raise a load.



i) State the purpose of the single fixed pulley in the system.

(1 mark)

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ii) Determine :

I. the velocity ratio of the system

(1 mark)

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II. the mechanical advantage of the system

(3 marks)

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III. the efficiency of the system

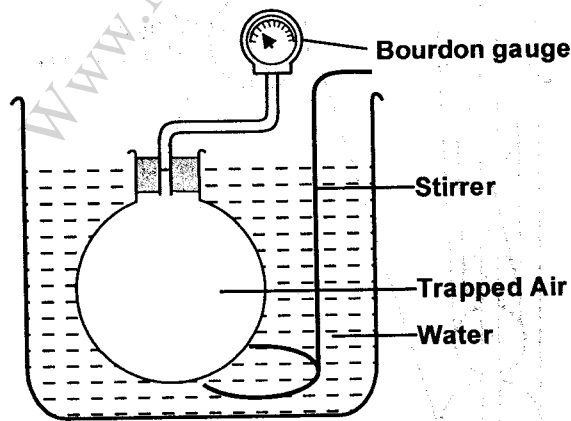
(3 marks)

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16. A student is asked to draw a diagram of the apparatus used to investigate how the pressure of some trapped air varies with temperature. His diagram is shown in the figure below.



a) Complete the diagram by drawing two essential items the student has omitted.

(2 marks)

b) What is the purpose of the stirrer ?

(1 mark)

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c) What is the purpose of the Bourdon gauge ?

(1 mark)

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b) A spring of a certain length was noted to attain a new length of 13cm and 15cm when load of 50N and 80N was suspended from its hook respectively. Calculate :

i) The spring constant (4 marks)

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ii) The original length of the spring (2 marks)

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c) A uniform rod of length 5m weighing 180N is held horizontally by a spring balance B at one end and a pivot at 0.5m from the other end.

i) Sketch a diagram of the set up showing the forces acting on the rod. (2 marks)

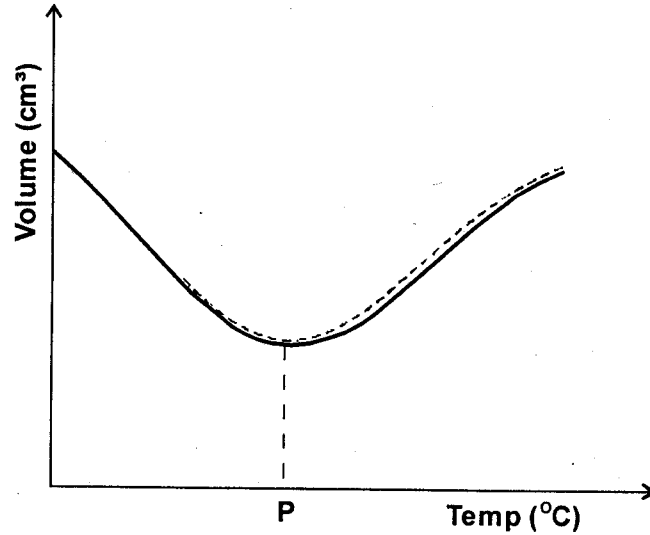
ii) Calculate the reading of the spring balance. (3 marks)

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14. a) Apart from the definition, distinguish between temperature and heat. (1 mark)

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b) Figure below shows variation of volume of water and temperature as water is heated from  $0^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ .

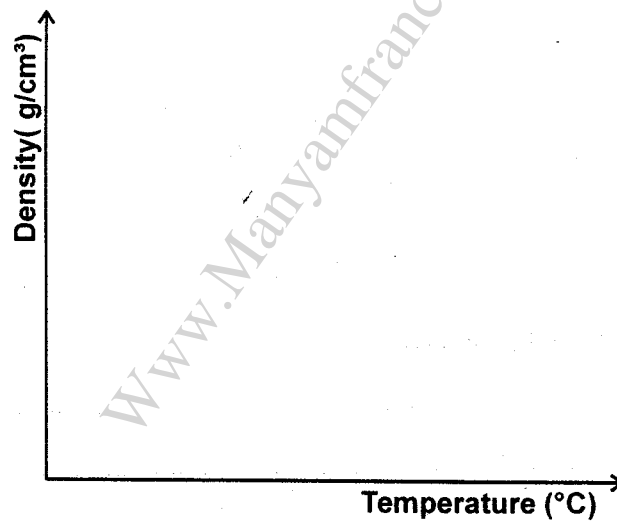


i) State the value of P. (1 mark)

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ii) In the figure below, sketch the graph of density of water against temperature upto  $10^{\circ}\text{C}$ . (1 mark)



iii) A heater rated  $300\text{W}$  was used to heat the water from  $0^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ . If the heating took 5 minutes, determine :

I. the heat supplied by the heater. (3 marks)

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d) At what Celsius temperature will the pressure of the air be theoretically zero ? (1 mark)

e) A certain mass of hydrogen gas occupies a volume of  $1.6\text{m}^3$  pressure of  $1.5 \times 10^5\text{Pa}$  and temperature  $12^\circ\text{C}$ . Determine its volume when the temperature is  $0^\circ\text{C}$  at a pressure of  $1.0 \times 10^5\text{Pa}$  (4 marks)

7. a) Define the term impulse of force. (1 mark)

b) A car of mass  $1000\text{kg}$  moving with a speed of  $10\text{m/s}$  crashes into a wall and comes to rest in  $0.4\text{s}$ .

Find :

i) the impulse (3 marks)

ii) the average force exerted by the wall. (2 marks)

c) i) State the law of conservation of linear momentum. (1 mark)

ii) A 5kg mass moving with a velocity of 10m/s collides with a 10kg mass moving with a velocity of 4m/s in the same direction along the same line. After collision the 5kg mass moves with a velocity of 7.0m/s.

I. Calculate the velocity of the 10kg mass. (4 marks)

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II. What type of collision is described in c(ii). (1 mark)

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