

Name Index No.

School Candidate's Signature

232/1

Date

PHYSICS

Paper 1 (Theory)

July/August 2016

Time: 2 Hours

NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016
Kenya Certificate of Secondary Education

PHYSICS
Paper 1
July/August 2016
Time: 2 Hours

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; 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.
- * All working must be clearly shown.
- * **Take $g = 10\text{ms}^{-2}$**

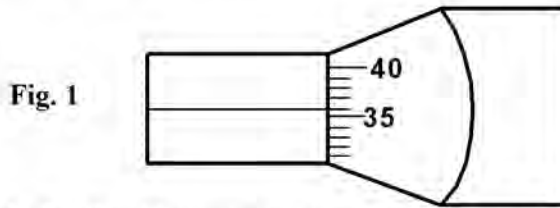
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Section	Question	Maximum score	Candidate's score
A	1 - 12	25	
B	13	8	
	14	10	
	15	12	
	16	12	
	17	6	
	18	7	
Total Score		80	

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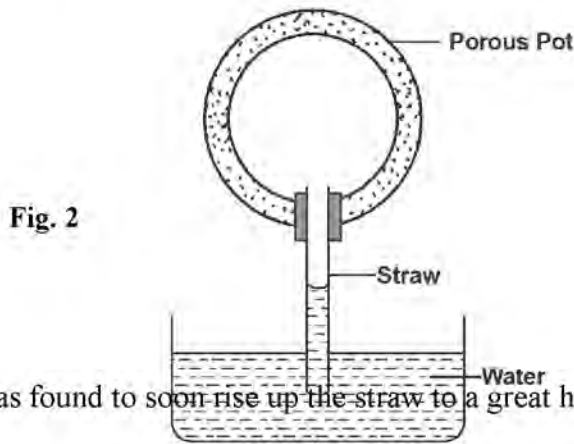
SECTION A : (25 MARKS)

1. Figure 1 is a sketch of part of a micrometer screw gauge.



Insert the main scale for the micrometer screw gauge to read 5.86mm. (1 mark)

2. In figure 2, a porous pot with a straw connected to it was filled with hydrogen gas to a pressure equal to atmospheric pressure. The pot was inverted such that the straw was immersed in water as shown.



The water was found to soon rise up the straw to a great height. Explain this observation. (3 marks)

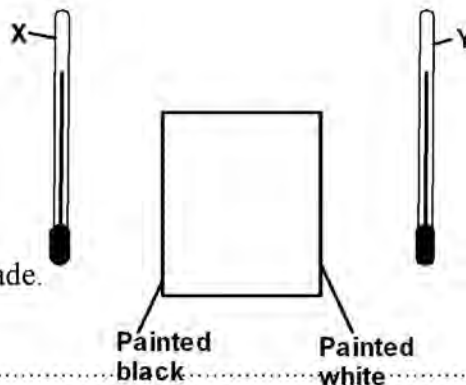
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3. Figure 3 below shows two thermometers placed at equal distance from a tank containing hot water.



a) State the observation made. (1 mark)

Fig. 3

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b) Give reason for your answer. (1 mark)

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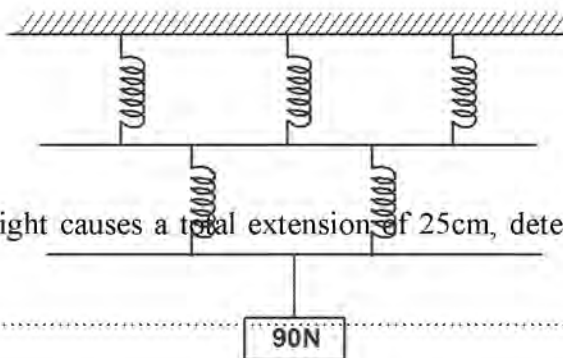
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4. Explain why water does not wet a waxed glass surface. (1 mark)

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5. The springs shown in the arrangement in figure 4 below are identical.

Fig. 4



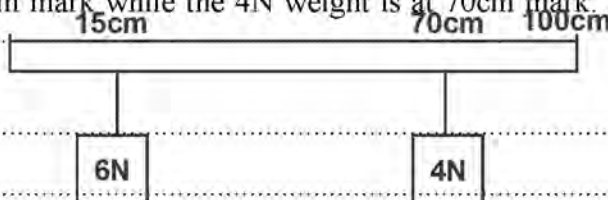
Given that the 90N weight causes a total extension of 25cm, determine the spring constant of each spring. (3 marks)

6. State and define the two fixed points of the Celcius scale. (2 marks)

7. Figure 5 below shows a uniform metre rule of weight 3N supporting two weights. The metre rule is pivoted somewhere such that it is horizontally balanced. (pivot not shown)

The 6N weight is at 15cm mark while the 4N weight is at 70cm mark. Determine the position of the pivot from zero cm mark. (3 marks)

Fig. 5



8. A force of 200N is applied on a 10kg block on a horizontal surface. The body attains an acceleration of 16m/s^2 . Determine the coefficient of friction between the block and the surface. (3 marks)

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9. A body is projected vertically upwards and returns back to its point of projection. In terms of its velocity, describe its motion. (3 marks)

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10. State the reason why trucks carrying heavy loads are fitted with many tyres. (1 mark)

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11. A mass of 200g is tied to a string and whirled in a vertical circle of radius 48cm at a speed of 12m/s. Calculate the tension in the string at the top of the circular path. (3 marks)

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12. State how the pressure in a moving fluid changes when the velocity of the fluid increases. (1 mark)

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SECTION B : (55 MARKS)

13. A student measured the mass of an empty container and found it to be 70g. He then put 80 drops of oil in the container and the mass of the container and its contents became 70.12g. Given that the density of the oil used is 0.75g/cm^3 .

a) Determine :

i) Volume of the oil put in the container. (2 marks)

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ii) Average volume of one drop (2 marks)

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b) One such drop is put on the surface of water where it spread into a thin circular film of diameter 100cm.
i) Estimate the diameter of the oil molecule. (3 marks)

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ii) State the assumption made in b(i) above. (1 mark)

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14. a) What is the meaning of term uniform acceleration ? (1 mark)

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b) The motion of a body is described by the graph shown in the figure 6(a).

Sketch a velocity-time graph for the motion on the set of axes in figure 6(b) (1 mark)

c) A body of mass 0.5kg falls from an 80m tall building and penetrates to the ground to a depth of 20cm. Determine :

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i) The velocity at which the body strikes the ground. (3 marks)

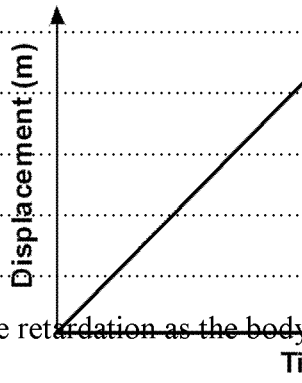


Fig. 6(a)

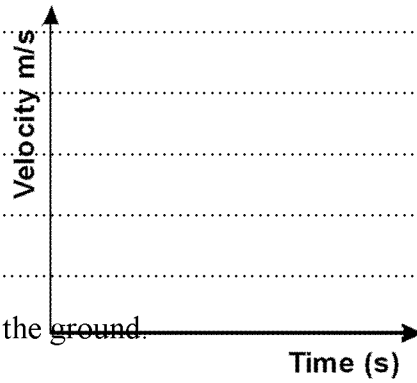


Fig. 6(b)

ii) The average retardation as the body penetrates the ground. (3 marks)

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iii) The retarding force on the body. (2 marks)

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15. a) State the law of conservation of energy. (1 mark)

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b) Figure 7 is an illustration of a simple pendulum.

i) Describe the energy transformation which takes place when the pendulum swings from P to R. (2 marks)

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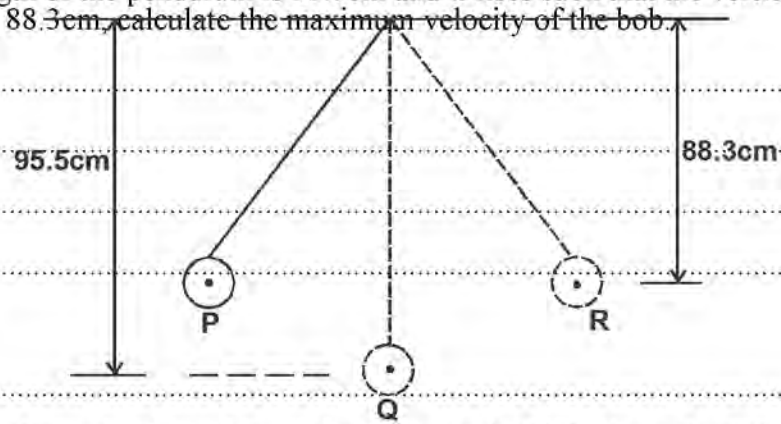
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- ii) Given that the length of the pendulum is 95.5cm and it rises such that the vertical length from the level of support is 88.3cm, calculate the maximum velocity of the bob. (3 marks)

Fig. 7



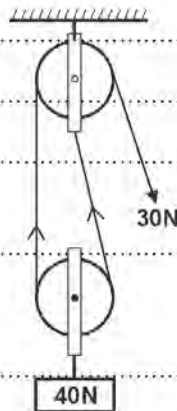
- c) The pulley system shown in figure 8 is used to lift a load of 40N through a height of 2m.

- Given that the effort applied is 30N, determine :

- i) Work done in lifting the load. (2 marks)

- ii) Work done by the effort. (2 marks)

Fig. 8



- iii) Efficiency of the system. (2 marks)

16. a) Figure 9 shows a set up to investigate one of the gas laws.

i) Name the gas law being investigated. (1 mark)

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ii) Give two reasons for using the concentrated sulphuric acid index. (2 marks)

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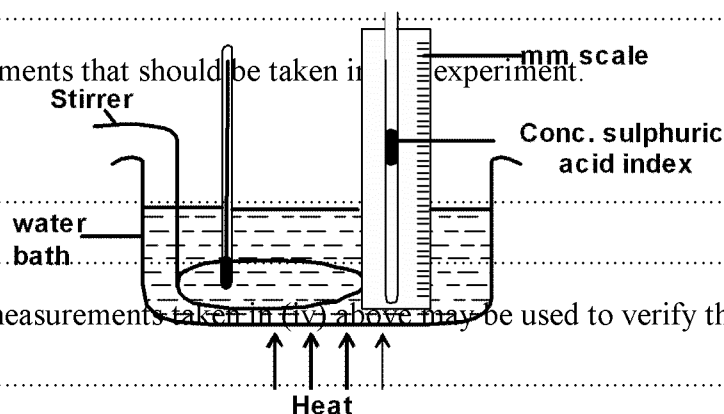
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iii) What is the purpose of the water bath ? (1 mark)

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iv) State two measurements that should be taken in this experiment. (2 marks)

Fig. 9



v) Explain how the measurements taken in (iv) above may be used to verify the law. (3 marks)

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b) A gas has a volume of 30cm^3 at 18°C and normal atmospheric pressure. Calculate the new volume of the gas if it is heated to 54°C at the same pressure. (3 marks)

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17. In an experiment to determine the density of a liquid, a uniform cylindrical metal rod of cross-sectional area, $A = 6.25\text{cm}^2$ was hung from a spring balance and lowered gradually into the liquid. The upthrust for various submerged heights was determined. The results obtained are shown on the graph in figure 10.

i) Determine the slope of the graph. (3 marks)

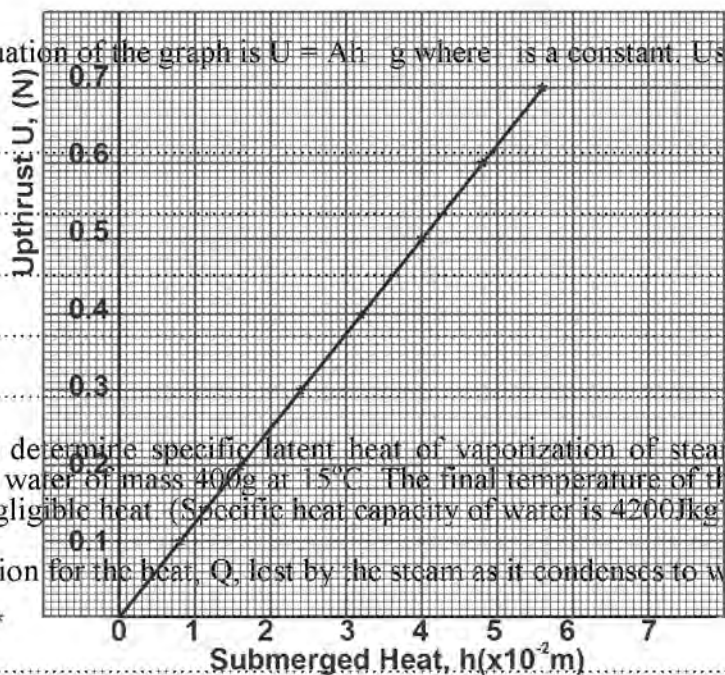
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ii) Given that the equation of the graph is $U = Ah - g$ where A is a constant. Use the graph to determine the value of A . (3 marks)



18. In an experiment to determine specific latent heat of vaporization of steam, steam of mass 6g at 100°C is passed into water of mass 400g at 15°C . The final temperature of the mixture is 24.4°C . The container absorbs negligible heat. (Specific heat capacity of water is $4200\text{Jkg}^{-1}\text{K}^{-1}$)

i) Derive an expression for the heat, Q , lost by the steam as it condenses to water at 24.4°C . (3 marks)

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ii) Calculate the heat, H , gained by water. (2 marks)

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iii) Determine the specific latent heat of vapourisation of steam. (2 marks)

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