Name: …….. Index No. ……

School:……. Candidate's Signature……

Date: ……...

232/1
PHYSICS
PAPER 1
(THEORY)
JULY / AUGUST 2018
TIME: 2 HOURS

NYANDARUA WEST CLUSTER EXAM

Kenya Certificate of Secondary Education (K.C.S.E)

Physics
Paper 1

INSTRUCTIONS TO CANDIDATES:-

- Write your **name**, **indexnumber** and **school** in the spaces provided above.
- This paper consists of **two** sections; **A** and **B**
- Answer **all** the questions in section **A** and **B** in the spaces provided
- All working **must** be clearly shown.
- Mathematical tables and electronic calculators may be used

For Examiner's Use Only:

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1-13	25	
B	14	12	
	15	13	
	16	11	
	17	09	
	18	10	
TOTAL SCORE		**80**	

This paper consists of 12 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (25 MARKS)

1. State **one** factor that a bimetallic strip relies on for its working (1mk)

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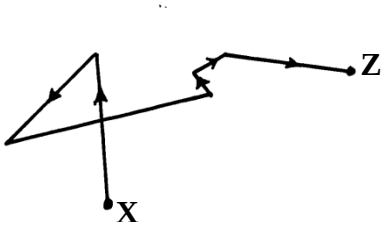
2. The figure below shows a path taken by a gas molecule moving from point x to z



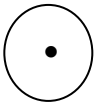
(a) Explain how this movement can be observed (1mk)

……

(b) State in full, the law of motion that governs movement from x to z (1mk)

……

3. Complete the figure below to show how a single pulley can be arranged to a velocity ratio(V.R) of 2 (2mks)



4. An object weighs 2.6 N in air and 2.2N when completely immersed in water. Determine the relative density of the object (2mks)

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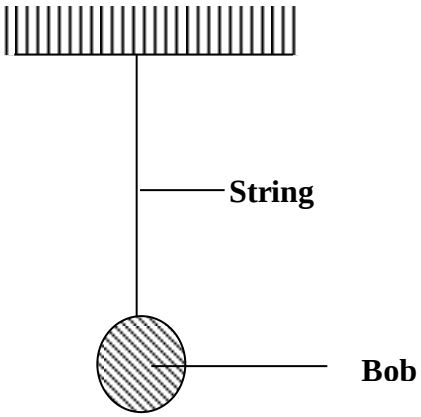
5. A single pendulum consisting of a heavy bob and string is suspended in air as shown in the figure below



Mark on the diagram and name one other force acting on the bob

6. The bob in the figure above is deflected then released to oscillate. State and explain **one** factor that will determine whether the string breaks or not (2mks)

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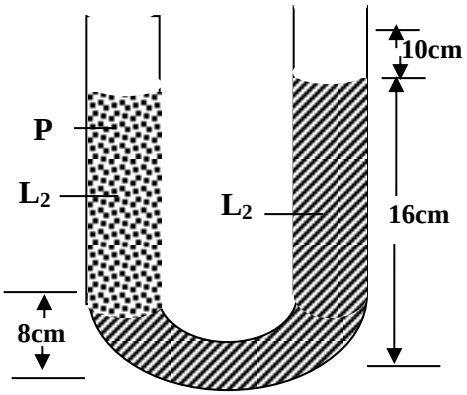
……

7. A u-tube vertically holds two liquids L_1 and L_2 as shown in the figure below



(a) Mark accurately the point in liquid $\mathbf{L_2}$ that is at the same pressure as point **P** (1mk)

(b) Determine the number of times $\mathbf{L_1}$ is denser than $\mathbf{L_2}$ (2mks)

……

8. Define crystal cleavage (1mk)

……

……

9. A crystal of potassium permanganate was carefully introduced at the bottom of water column held in a gas jar. After sometime, the whole volume of water was coloured. Explain this observation (2mks)

……

……

……

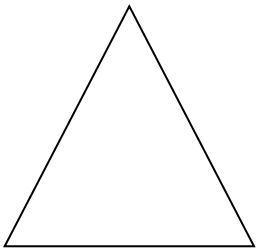
10. A turning effect of force depends on the magnitude of the force. State two other factors that determines the moment of a force (2mks)

……

……

……

11. The figure below shows a sheet of material with the shape of an isosceles triangle. Mark its centre of gravity accurately showing how you arrive at the answer (1mk)



12. Two objects made of the same material and having the same mass are heated to a temperature of $35^{o}C$ above that of the atmosphere and then allowed to cool in still air for 30 minutes. State one factor that will determine their final temperature (1mk)

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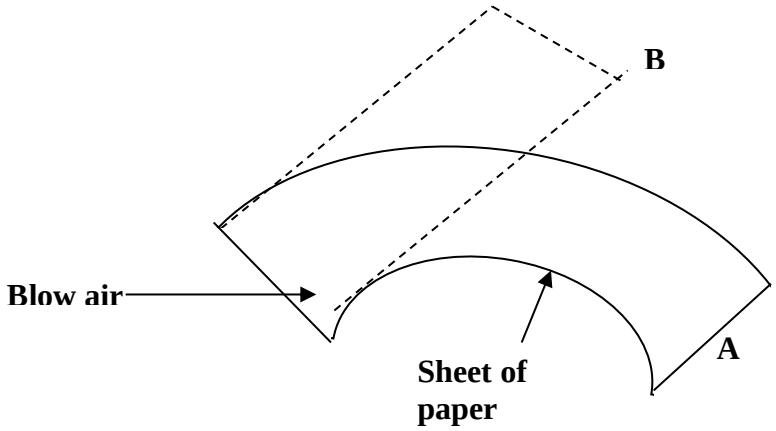
13. A student holds a sheet of paper at an end so that it hangs in the position **A** as shown below



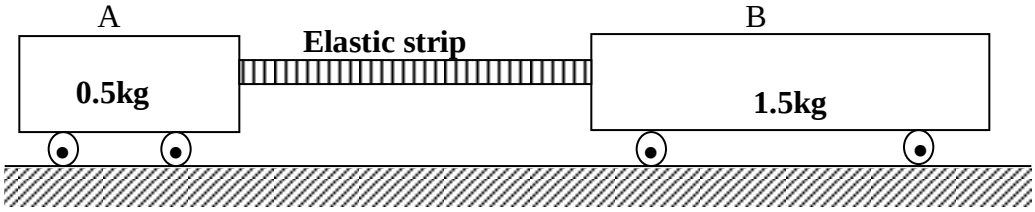
Explain why the paper rises to the position B when the student blows air in the direction shown by the arrow (2mks)

……

……

SECTION B (55MRAKS)

14. The diagram below shows two trolleys, A and B connected to each other by an elastic strip of negligible mass. The trolleys are pulled apart on a smooth plane till tension in the elastic strip is 4.0N and are then released suddenly



(a) State with reason the total momentum of the trolleys when they are just released (2mks)

……

……

(b) Calculate the initial acceleration of trolley **A** when released (3mks)

(c) The velocity of the trolley **B** is $0.9ms^{-1}$ just before it collides with A. Determine the velocity of **A** just before the collision (3mks)

(d) Which trolley covers a longer distance before collision? Explain (2mks)

……

……

(e) Explain why the elastic strip may not stretch to the same original length after impact (2mks)

……

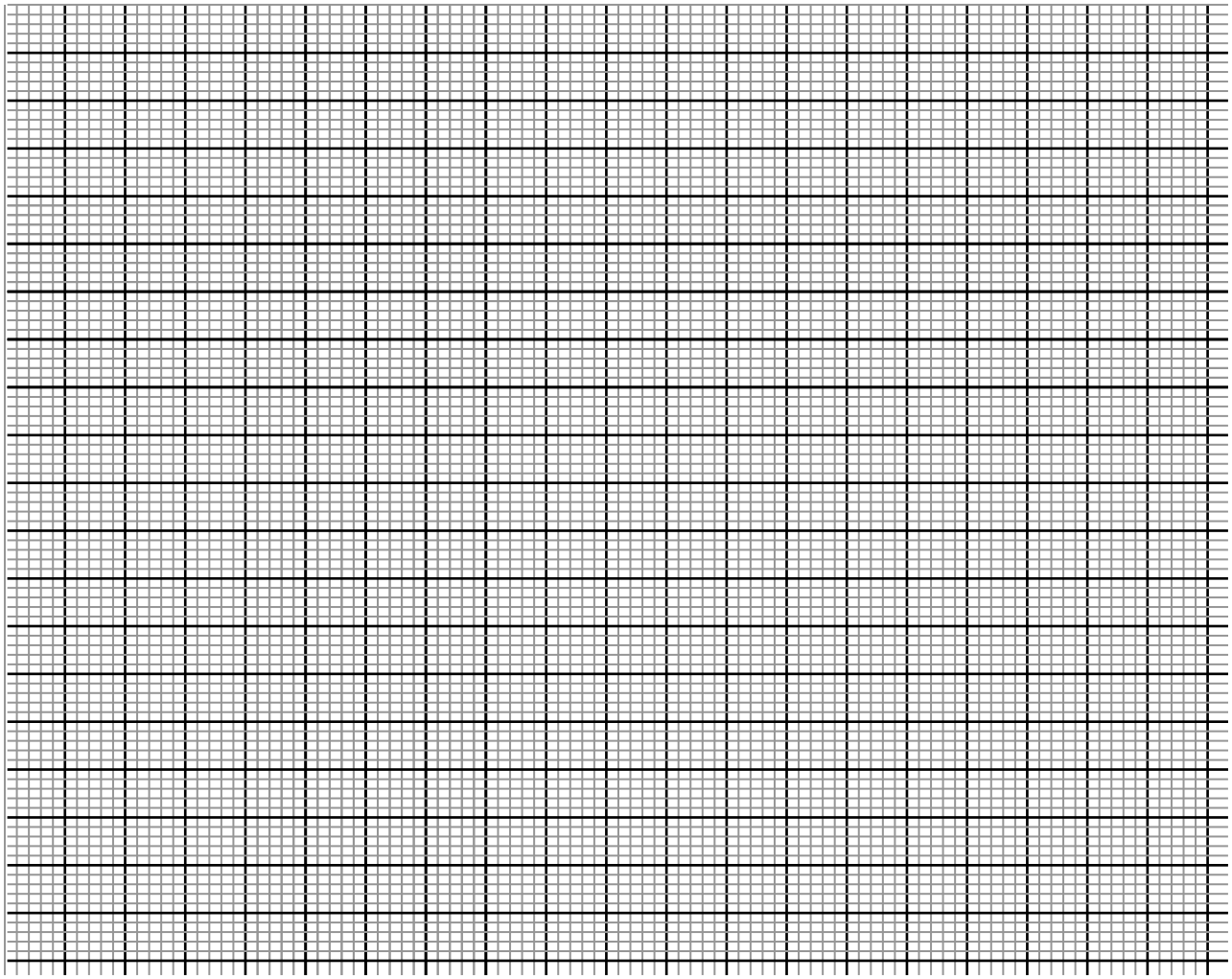
……

15. The readings tabulated below shows how the length of a helical spring varied with the load hanging on it

Load (N)	0	1	2	3	4	5
Length of spring (cm)	0.80	12.5	17.2	21.8	26.5	31.2
Extension (cm)						

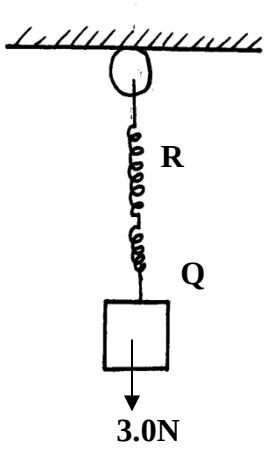
(a)(i) Complete the table to show the values of extension (2mks)

(ii) Draw a graph of extension (y-axis) against load for the spring (5mks)



(ii) Determining form the graph the proportionality constant of the spring (2mks)

(b) Two springs **Q** and **R** have proportionality constants 20N/M and 25N/M respectively. **Q** weighs 0.2 **N** while the weight of **R** is negligible. The two springs are arranged to support a load of 3.0N as shown in the diagram below



Determine the extension in

(i) **Q** ……..(1mk)

(ii) ……(1mk)

(c) State **two** factors that determine the proportionality constant of a helical spring (2mks)

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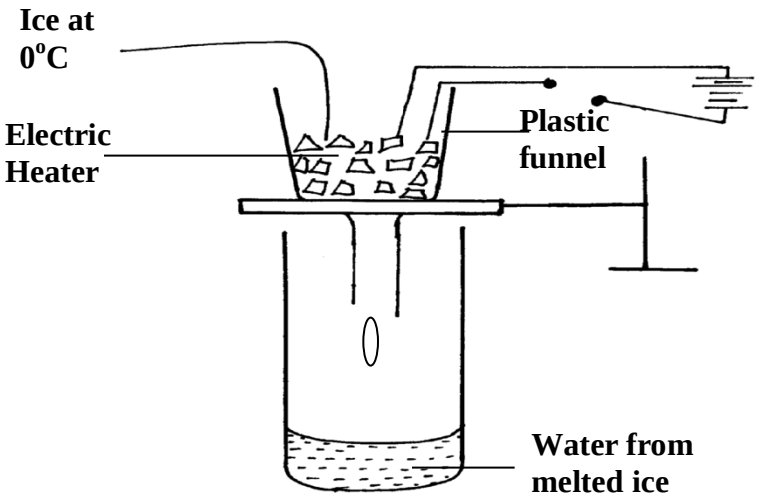
…….

16. A student set-up the apparatus as shown below to determine the power of an electric heater



(a)(i) Other than time, state the measurements that would be used to determine the quantity of heat P absorbed by ice in a unit time (2mks)

……

……

(ii) Complete the circuit to show the connection of the essential circuit components (2mks)

(iii) Describe how the student would proceed to determine **P** (3mks)

(iv) Give a reason why **P** may not be equal to the value indicated by the manufacturer (1mk)

……

……

(b) In another experiment, 100g of hot water at 90^oC was mixed with 20g of ice at 0^oC in a lagged plastics colorimeter. After stirring, all the ice melted and the temperature of the mixture was found to be 61.5^oC. Determine the latent heat of fusion of ice (3mks)

(Specific heat capacity of water $=4200Jkg^{-1}k^{-1}$)

17. (a) Explain what you understand by each of the following terms

(i) Angular velocity (1mk)

……

(ii) Centripetal force (1mk)

……

(b) A bicycle wheel with radius 28cm moves with a linear velocity of 8m/s, determine

(i) the angular velocity of the wheel (2mks)

……

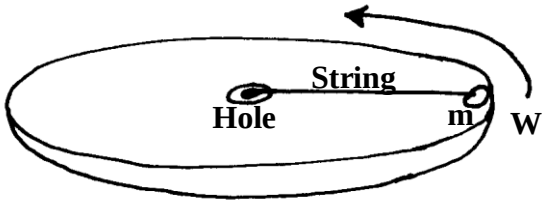
……

(ii) the centripetal acceleration of a point on the rim of the wheel (2mks)

……

……

(c) To determine the relationship between angular velocity w and tension **T**, a student used a smooth disc with a hole at the centre, a string and cylindrical object of mass m, as shown below



Describe how the student went about determining the relationship, specifying any other necessary material or instrument not shown in the diagram (3mks)

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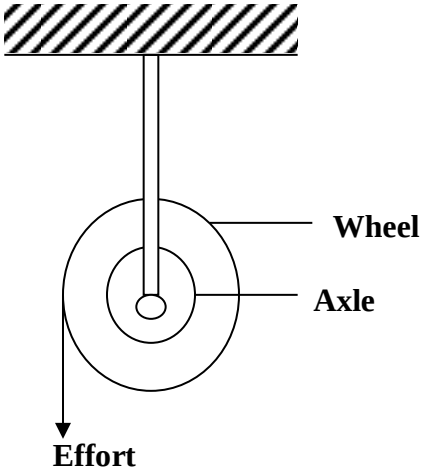
18. (a) The diagram in the figure below represents a wheel and axle used as a machine, whose efficiency is 80% to raise 400N of building materials. The wheel and axle have diameters of 75cm and 15cm respectively.



(i) Mark on the diagram the correct position and direction of the load to be lifted (1mk)

(ii) Name the principle on which this machine works (1mk)

……

(iii) Calculate the effort needed to raise the load (3mks)

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…….

…….

(iv) The machine is operated manually and raises the load to a height of 5m in 20 seconds. Calculate the power developed by the operator (2mks)

(b) (i) State **two** factors that determines the efficiency of an inclined plane as a machine (2mks)

…….

…….

(ii) Explain how these factors affect efficiency (2mks)