Name: ……..…… Index No: …….

Candidate's signature……

Date……

Muungano KCSE Trial Exam

232/1

PHYSICS

PAPER 1

July 2017

2 Hours

INSTRUCTIONS:

Write your name and index number in the spaces provided above.
This paper consists of ***TWO*** sections: ***A*** and ***B***.
Answer ***ALL*** the questions in sections ***A*** and ***B*** in the spaces provided.
All working ***MUST*** be clearly shown in the spaces provided in this booklet.
KNEC mathematical tables and non programmable silent calculators may be used.

Physical Constants

Acceleration due to gravity, g = 10m/s^2 or 10m/kg.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 - 13	25	
B	14	10	
	15	09	
	16	14	
	17	11	
	18	11	
	Total Score	**80**	

This paper consists of 10 printed pages

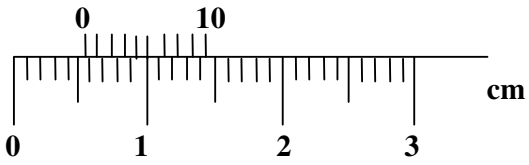
Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

SECTION A (25Marks)

Answer all the Questions in this section

1. **Figure 1** shows a vernier caliper. ***Determine*** the reading on the vernier caliper. (1mk)

Figure 1



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2. An object weighs 8N on earth where the gravitational field strength, g is 10N/kg. ***Determine*** the mass of the object when on another planet if the gravitational field strength of the planet is 6.25N/kg. (3mks)

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3. ***Explain why*** ammonia gas released at the back of a laboratory spreads faster on a hot day than on a cold day. (1mk)

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4. A box of mass 20kg is dragged on a horizontal floor by means of a rope tied on its front. If the coefficient of friction between the floor and the box is 0.15, ***calculate*** the force F required to move the box at uniform speed. (3mks)

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5. ***State one factor*** that affect the melting point of ice. (1mk)

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6. **Figure 2** shows a rectangular tube filled with water up to the neck.

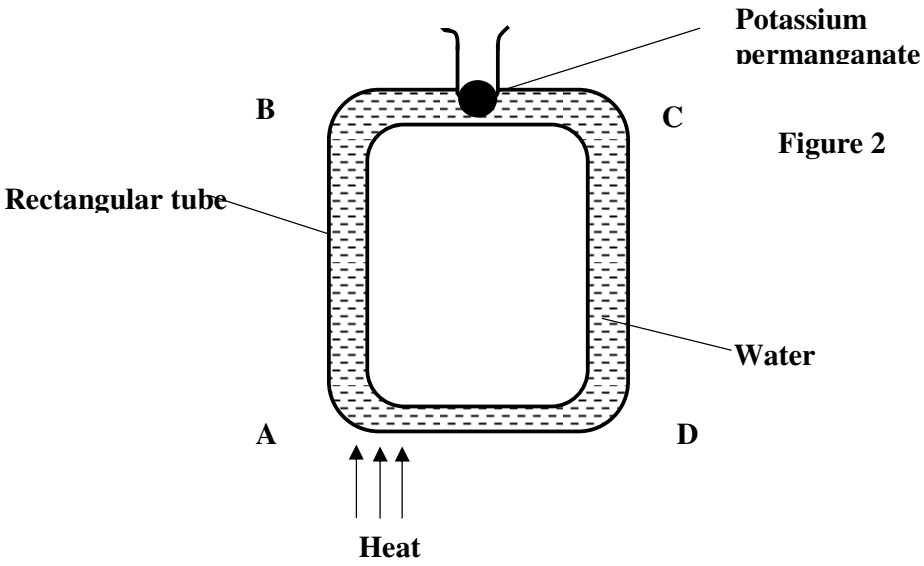

Figure 2

The water is heated at point ***A*** and potassium permanganate crystals introduced through the neck of the tube:

(i) ***Show*** on the diagram the movement of the colour of the potassium permanganate (1mk)

(ii) ***Explain*** your answer. (1mk)

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7. In verifying the pressure law of gases, the temperature and pressure of a gas are varied. ***State the condition*** necessary for the law to hold. (1mk)

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8. **Figure 3** below shows a vessel resting on a horizontal bench.

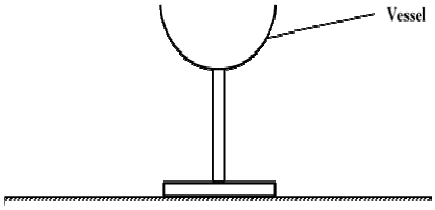

Figure 3

State the effect on the stability of the vessel when it is filled with water. (1mk)

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9. ***Explain why*** a thick glass tumbler is more likely to crack than a thin one when a hot liquid is suddenly poured into it. (1mk)

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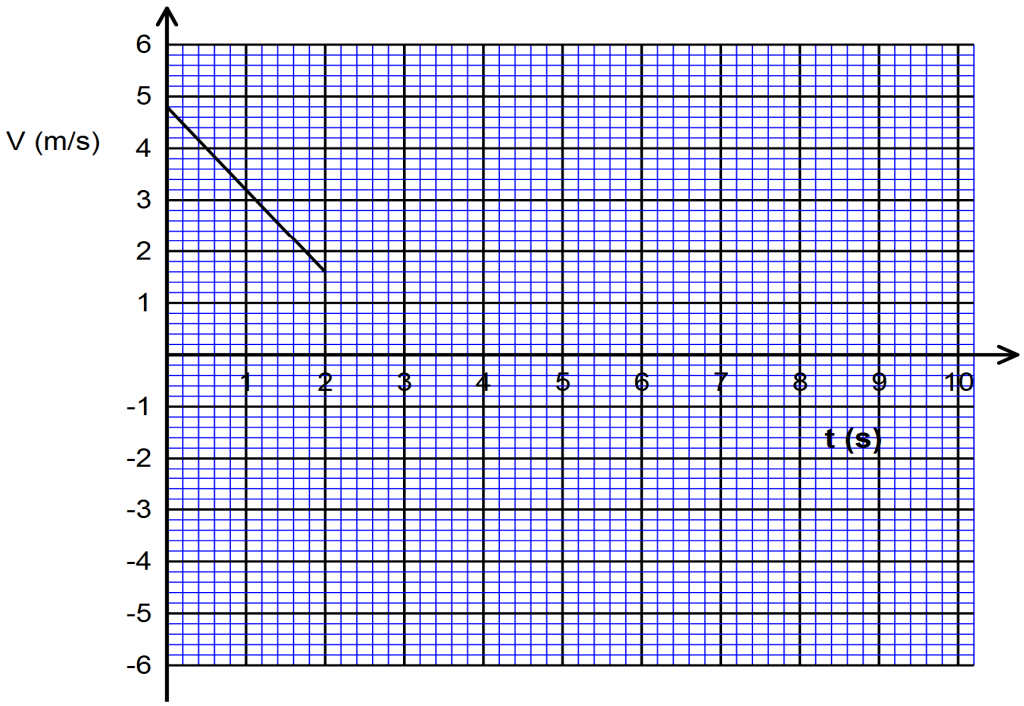
10. An astronaut standing on the Moon throws a stone vertically upwards. The stone leaves her hand at time t = 0. The line shows how the velocity v of the stone varies with time t until t = 2.0 s.



(a) After rising, the stone falls. The astronaut catches the stone at t = 6.0 s. (*Assume there is no air resistance on the surface of the Moon*)

(i) ***Complete*** the graph to show the motion of the stone. (1mk)

(ii) ***State*** the value of ***t*** when the stone is at its highest point. (1mk)

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(b) Use the graph to ***determine*** the acceleration of the stone between t = 0 and t = 2.0s. (2mks)

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11. **Figure 4** below shows a ball moving through air.

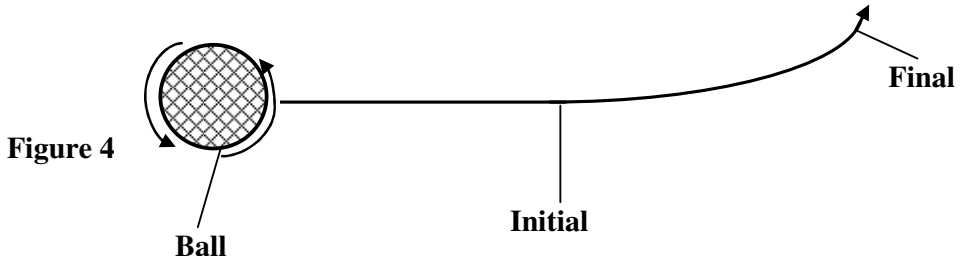

Figure 4

If the ball is spinning in an anticlockwise direction, the ball is seen to move upwards from its initial path. ***Explain.*** (2mks)

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12. **Figure 5** shows a suspended copper solid immersed in a fluid.

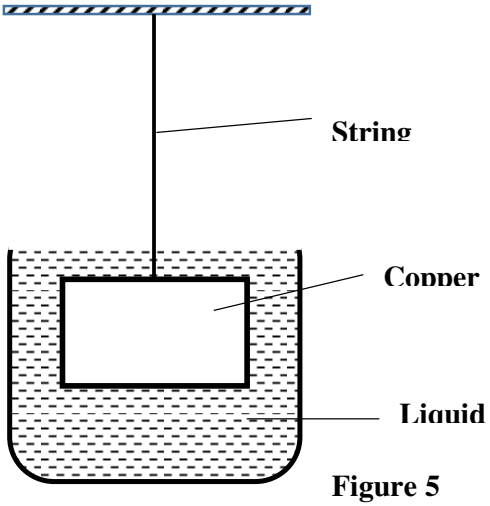

Figure 5

Explain what will happen to the tension in the string if a liquid of higher density is used.

(2mks)

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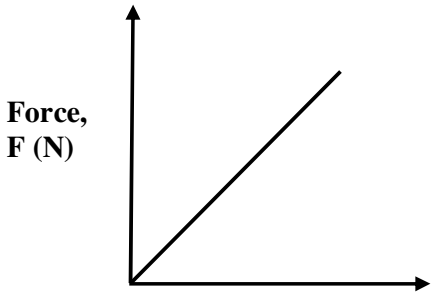
13. The graph below shows the variation of force, ***F*** and extension, ***e*** for a spring that obeys Hooke's law. If the spring constant of the spring is ***k***, use the graph ***to show*** that the energy ***E***, stored in the spring when it has extended elastically by an amount ***e*** is given by $\mathbf{E=\frac{1}{2}ke^2}$**.**

(3mks)



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SECTION A 55 (Marks)

Answer all the questions in this section in the spaces provided.

14. **Figure 6** below shows a displacement-time graph of the motion of a particle.

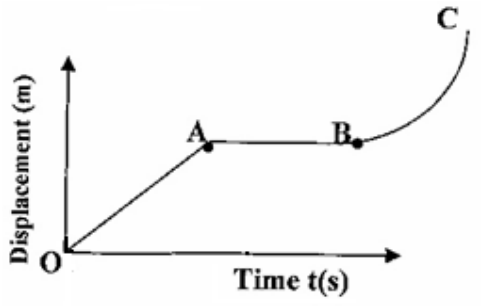

Figure 6

Describe the motion of the particle in the region. (3mks)

(i) ***OA***……..…

(ii)***AB***……..

(iii) ***BC***……..

(b) A hot air balloon falling through the air attains terminal velocity after a short-time. ***State the reason*** why it attains terminal velocity. (1mk)

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(c) ***State Newton's*** first law of motion. (1mk)

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(d) A ball of mass 0.2kg is thrown vertically upwards with velocity of $8ms^{-1}$. The air resistance is 0.5N. ***Determine***:

(i) The resultant force on the ball as it moves up (*take g = 10ms⁻²*). (2mks)

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(ii) The acceleration of the ball. (3mks)

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15. a) ***Name the three*** modes of heat transfer (3mks)

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b) **Figure 7** below shows the ball and ring apparatus.

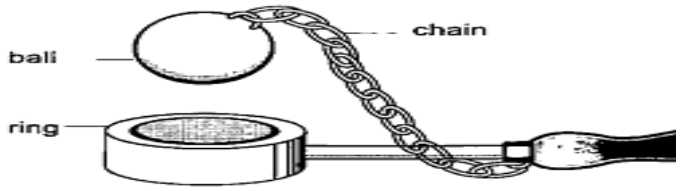

Figure 7

Briefly describe how the apparatus above can be used to illustrate thermal expansion of metal. (3mks)

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c) ***Draw*** a well labeled diagram in the space below to illustrate how a sea breeze occurs. (3mks)

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16. a) ***State one assumption*** made in the study of streamline flow in liquids (1mk)

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b) ***State two conditions*** under which the flow of the fluid becomes turbulent. (2mks)

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c) **Figure 8** below shows the cross section of an aeroplane wing, with the aeroplane moving in the direction shown by the arrow.

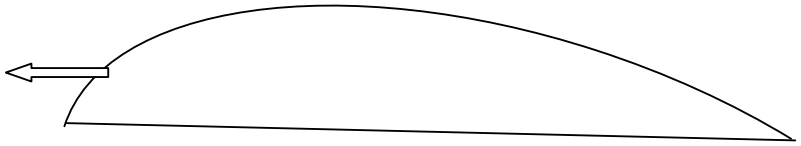

Figure 8

i) ***Sketch the streamlines*** to show how air flows past the wing as the aeroplane moves. (2mks)

ii) ***Explain how*** dynamic lift of the aeroplane is caused by the wing. (3mks)

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d) A water pipe of diameter 5.6cm is connected to another pipe of diameter 1.4cm. The speed of water in the smaller pipe is $4ms^{-1}$. ***Calculate***,

i) The speed of water in the larger pipe. (3mks)

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ii) The mass flux if the density of water is $1g/cm^3$. (3mks)

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17. (a) ***Distinguish*** between angular velocity and linear velocity. (1mk)

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(b) A pendulum bob is whirled with uniform speed in a horizontal circle of radius 20cm. The bob describes an arc of length 5cm within 0.1 seconds. ***Calculate***:

(i) Angular ***velocity*** (3mks)

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(ii) ***The uniform speed*** of the bob along the circular path. (3mks)

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(iii) ***The frequency*** with the bob moves along the circular path. (3mks)

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(c) ***State why*** the bob is accelerating yet it moves with the uniform speed along its path. (1mk)

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18. (a) ***State*** the law of floatation. (1mk)

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(b) A cork of volume $100cm^3$ is floating on water. If the density of the cork is $0.25gcm^{-3}$ and that of water is $1gcm^{-3}$; ***calculate***:

(i) The mass of the cork (3mks)

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(ii) The upthrust force on the cork. (3mks)

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(iii) The minimum force is required to immerse the cork completely. (3mks)

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(c) ***State the effect*** on the upthrust force in a liquid when the temperature of the liquid is reduced? (1mk)

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