Name:
Index No: $\qquad$
Candidate's signature $\qquad$
Date $\qquad$

## 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 $\boldsymbol{T W O}$ sections: $\boldsymbol{A}$ and $\boldsymbol{B}$.
Answer $\boldsymbol{A} \boldsymbol{L} \boldsymbol{L}$ the questions in sections $\boldsymbol{A}$ and $\boldsymbol{B}$ 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
Accelerationdue to gravity, $g=10 \mathrm{~m} / \mathrm{s}^{2}$ or $10 \mathrm{~m} / \mathrm{kg}$.
For Examiner's Use Only

| Section <br> O | Question | Maximum <br> Score | Candidate's <br> Score |
| :--- | :---: | :---: | :--- |
| A | $1-13$ | 25 |  |
|  | 14 | 10 |  |
|  | 15 | 09 |  |
|  | 16 | 14 |  |
|  | 17 | 11 |  |
|  | 18 | 11 |  |
|  | Total Score | $\mathbf{8 0}$ |  |

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.

2. An object weighs 8 N on earth where the gravitational field strength, g is $10 \mathrm{~N} / \mathrm{kg}$. Determine the mass of the object when on another planet if the gravitational field strength of the planet is $6.25 \mathrm{~N} / \mathrm{kg}$.
$\qquad$
$\qquad$
$\qquad$
3. Explain why ammonia gas released at the back of a laboratory spreads faster on a hot day than on a cold day.
(1mk)
4. A box of mass 20 kg 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

5. State one factor that affect the melting point of ice.
6. Figure $\mathbf{2}$ shows a rectangular tube filled with water up to the neck.


The water is heated at point $\boldsymbol{A}$ and potassium permanganaterystals 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)
7. In verifying the pressure law of gases, the temperature and pressure of a gas are varied. State the condition necessary for thelaw to hold.
8. Figure 3 belowíshows 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)
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.
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 $\mathrm{t}=2.0 \mathrm{~s}$.

(a) After rising, the stone falls. The astronaut catches the stone at $\mathrm{t}=6.0 \mathrm{~s}$. (Assume there is no air resistance on the surface $ه f$ the Moon)
(i) Complete the graphto show the motion of the stone.
(ii) State the value of $t$ when the stone is at its highest point.

(b) Use the graph to determine the acceleration of the stone between $\mathrm{t}=0$ and $\mathrm{t}=2.0 \mathrm{~s}$. (2mks)
11. Figure $\mathbf{4}$ below shows a ball moving through air.


If the ball is spinning in an anticlockwise direction, the ball is seen to move upwards from its initial path. Explain.
12. Figure 5 shows a suspended copper solid immersed in a fluid.


Explain what will happen to the tension in the string if a liquid of higher density is used.
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$\qquad$
13. The graph below shows the variation of force, $\boldsymbol{F}$ and extension, $\boldsymbol{e}$ for a spring that obeys Hooke's law. If the spring constant of the spring is $\boldsymbol{k}$, use the graph to show that the energy $\boldsymbol{E}$, stored in the spring when it has extended elastically by an amount $\boldsymbol{e}$ is given by $\mathbf{E}=1 / 2 \mathbf{k e}^{2}$.
(3mks)


## Extension,



## 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.
(i) $\boldsymbol{O A}$
(ii) $\boldsymbol{A B}$
(iii) $\boldsymbol{B C}$.
(b) A hot air balloon falling through the air attains terminal velocity after a short-time. State the reason why it attains terminal velocity.
(c) State Newton's first law of motion.
(1mk)
(d) A ball of mass 0.2 kg is thrown vertically upwards with velocity of $8 \mathrm{~ms}^{-1}$. The air resistance is 0.5 N . Determine:
(i) The resaltant force on the ball as it moves up (take $g=10 \mathrm{~ms}^{2}$ ).
$\qquad$
$\qquad$
(ii) The acceleration of the ball.
$\qquad$
$\qquad$
15. a) Name the three modes of heat transfer
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$\qquad$
$\qquad$
b) Figure $\mathbf{7}$ below shows the ball and ring apparatus.


## Figure 7

Briefly describe how the apparatus above can be used to illustrate thermal expansion of metal.
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$\qquad$
c) Draw a well labeled diagram in the space below to illustrate how a seabreeze occurs.
(3mks)

16. a) State one assumption made in the study of streamline flow in liquids
b) State two conditionsunder which the flow of the fluid becomes turbulent. (2mks)
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c) Figure $\mathbf{8}$ 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.
d) A water pipe of diameter 5.6 cm is connected to another pipe of diameter 1.4 cm . The speed of water in the smaller pipe is $4 \mathrm{~ms}^{-1}$. Calculate,
i) The speed of water in the larger pipe.
(3mks)
ii) The mass flux if the density of water is $1 \mathrm{~g} / \mathrm{cm}^{3}$.
(3mks)
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(b) A pendulum bob is whirled with uniform speed in a horizontal circle of radius 20 cm . The bob describes an arc of length 5 cm within 0.1 seconds. Calculate:
(i) Angular velocity
(3mks)
(ii) The uniform speed of the bob along the circular path.
(3mks)
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$\qquad$
$\qquad$
(iii) The frequency with the bob moves along the circular path.
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$\qquad$
$\qquad$
(c) State why the bob is accelerating yet it moves with the uniform speed along its path.
18. (a) State the law of floatation.
(b) A cork of volume $100 \mathrm{~cm}^{3}$ is floating on water. If the density of the cork is $0.25 \mathrm{gcm}^{-3}$ and that of water is $1 \mathrm{gcm}^{-3}$; calculate:
(i)

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

(iii) The minimum force is required to immerse the cork completely. (3mks)
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$\qquad$
(c) State the effect on the upthrust force in a liquid when the temperature of the liquid is reduced?

