Name……. Index Number……/……

232/1 **Candidates Signature…….**

PHYSICS

PAPER 1 **Date…….**

(Theory)

JULY/AUG. 2018

2 HOURS

LANY ACHIEVERS 2 JOINT EXAMINATION

Kenya Certificate of Secondary Education

PHYSICS PAPER 1

(Theory)

2 HOURS

Instructions to candidates

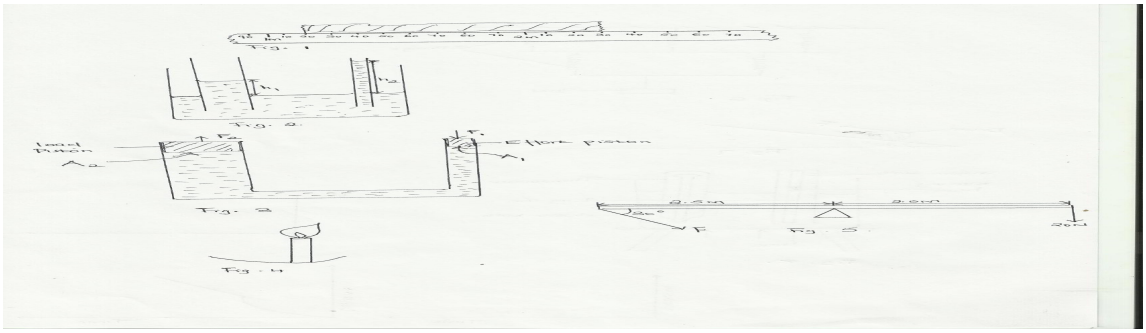
a) *Write your name and index number in the spaces provided above.*
b) *Sign and write the date of examination in the spaces provided above.*
c) *This paper consists of* ***TWO*** *sections* ***A*** *and* ***B****.*
d) *Answer* ***ALL*** *the questions section* ***A*** *and* ***B*** *in the spaces provided.*
e) *All working* ***MUST*** *be clearly shown.*
f) *Electronic calculators and mathematical table may be used.*

For Examiners Use Only

Section	Question	Maximum Score	Candidates Score
A	1-13	25	
B	14	12	
	15	11	
	16	14	
	17	10	
	18	8	
		TOTAL	

SECTION A (25 MARKS)

Fig. 1 shows a fencing post whose length is being measured using a strip of a measuring tape.



Use this information to answer questions 1 and 2.

1. State the accuracy of the tape. (1 mark)

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2. What is the length of the post? (2 marks)

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3. Explain why brakes fail in a hydraulic braking system when air gets into the system. (2 marks)

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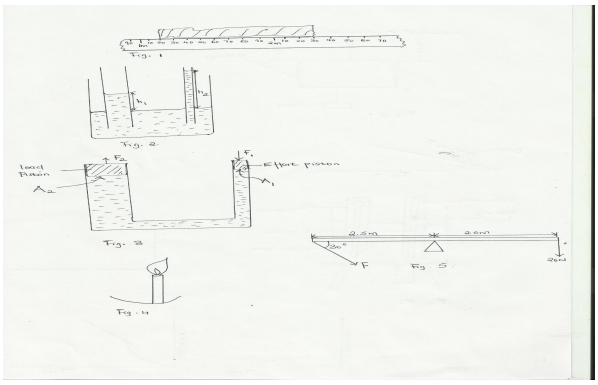
4. The diagram in **figure 4** shows two glass tubes of different diameters dipped in water.



Explain why h_2 is greater than h_1 (2 marks)

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5. When a liquid is heated in a glass flask its level at first falls then rises. Explain this observation. (2 marks)

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6. **Figure 3** shows air flowing through a pipe of non-uniform cross sectional area. Two pipes A and B are dipped into the liquid as shown.

Indicate the levels of the liquid A and B. (1 mark)

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7.A uniform metre rule of mass 100g is balanced by suspending a 10g mass and a 20g mass on its ends as shown in **Figure 4**.

Fig. 4

Determine the position of the pivot. (3 marks)

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8. State two factors affecting stability of an object. (2 marks)

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9 . Air is trapped in a thin capillary tube by a thread of mercury 5cm long as shown in figure 5.

Figure 5

Use the information in figure 6 to calculate the value of the value of the atmospheric pressure in mmHg. (3 marks)

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10. A car of mass 800kg is initially moving at 25m/s, calculate the force needed to bring the car to rest over a distance of 20m.

(2 marks)

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11. A force of 20N is used to stretch a spring through 5cm. Calculate the elastic potential energy stored in the spring.

(2 marks)

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12.State two reasons why the efficiency of a pulley system is not 100%. (2 marks)

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13. Explain why ice skaters use sharp-edged shoes to slide on ice
(1 mark)

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SECTION B (55 MARKS)

14. (a) State the law of floatation. (1 mark)

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b) A rectangular block of cross section area $0.08m^2$ is immersed in a liquid of density $1200kg/m^3$. The top surface is 20cm above the surface while the lower surfaces is 80cm below the surface of the liquid.

(i) What is the weight of the block? (2 marks)

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(i) Calculate the upthrust on the block. (3 marks)

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(c) A block of glass of mass 0.25kg floats in mercury of density 1.36x 10^4 kg/m^3.What volume of the glass lies under the surface of Mercury? (3 marks)

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d) The weight of a cube in air is 0.5N when immersed in water; it weighs 0.44N and when in oil weighs 0.46N.Calculate the relative density of the oil. (3 marks)

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15. a) **Figure 6** shows a body of mass, M, attached to the centre of a rotating table with a string whose tension can be measured. (The device for measuring tension in not shown in the figure
The tension, T on the string was measured for various values of angular velocity, ω. The distance r, of the body from the centre was maintained at 30cm. The graph shows the variation of tension, T, and the square of angular velocity, ω^2

i. From the graph, determine the mass, m of the body given that $T= m \omega^2 r – C$, where C is a constant. (4 marks)

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ii. Determine the constant C from the graph. (1 mark)

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(b) State Newton's first law of motion. (1 mark)

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(c) Give a reason why it is important that passengers in moving vehicles put on safety belts. (1 mark)

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(d) A metal ball is released from the top of a tall jar containing viscous liquid. Sketch a displacement – time graph for the motion of the ball from the time it is released to the point just before reaching the bottom. (1 mark)

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(e) **Figure 7** below shows a wooden block placed on a horizontal bench and pulled by a force F. If it is

moving with a constant velocity and the co-efficient of friction is 0.6.

(i) Show the other two forces acting on the block and Name them. (1 mark)

(ii) Determine the value of F. (2 marks)

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16.(a) **Figure 8** shows a set-up that may be used to verify Charles' law.

(i) State the measurements that should be taken in the experiment. (2 marks)

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(ii) Explain how the measurements taken in (i) above may be used to verify Charles' law. (2 marks)

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(i) A certain mass of hydrogen gas occupies a volume of 1.6cm^3 at a pressure of 1.5 x 10^5 pa and temperature of 12^o C. Determine its volume when the temperature is 0^{o}C at a pressure of 1.0 x 10^5 pa. (3 marks)

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(iv) Give a reason why an air bubble increases in volume as it ascends to the surface of the liquid in a boiler. (1 mark)

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(v) Define the term absolute temperature. (1 mark)

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(b) (i) An electric kettle connected to a 250V mains supply draws a current of 4.0A. It contains 1 litre of water with 1 kg of ice, all at 0^{0}C. Neglecting all heat losses, including heat absorbed by the kettle, find the time taken for all the ice to be just melted. (Take specific latent heat of fusion to be 3.34 x 10^5 J/kg and latent heat of vaporization is 2.26 x 10^6 J/kg Specific heat capacity of water is 4.2J/g). (2 marks)

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(ii) Determine the time taken until half the contents of the kettle boils away. (3 marks)

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17. (a) Distinguish between load and effort.
(2 marks)

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(b) A mason uses a six wheel pulley system to raise a weight of 250N through a vertical height of 2.5m using the machine. If the mason pulls using an effort of 500N. Calculate:

i) The velocity ratio of the pulley system.
(2 marks)

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ii) The work done by the mason.
(2 marks)

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iii) The useful work done by the pulley system.
(2 marks)

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iv) The efficiency of the system
(2 marks)

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18. . A bullet of mass 24g travelling in a horizontal path with a velocity of 450ms^{-1} strikes a wooden block of wood of mass 976g resting on a rough horizontal surface. After impact, the bullet and the block move together for a distance of 7.5m before coming rest.

(a) Name the type of collision above (1 mark)

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(b) What's the velocity of the two bodies when they start sliding
(2 marks)

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(c) Calculate the force which brings the two bodies to rest

(3 marks)

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(d) Determine the coefficient of friction between the block and the surface during this motion.
(2 marks)

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