

KAPSABET HIGH SCHOOL

232/1 - PHYSICS - Paper 1



2 Hours



Name Index Number

School Class

Candidates Signature..... Date

2022 TRIAL 2 JULY INTERNAL EXAMINATION

(Kenya Certificate of Secondary Education)

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

Instructions to candidates

- a) Write your name and class in the space provided.
- b) This paper consists of two sections; **SECTION A** and **B**
- c) Answer **all** the questions in the spaces provided
- d) **ALL** working **MUST** be clearly shown.
- e) Mathematical tables and electronic calculators may be used
- f) Take: Acceleration due to gravity: $g = 10\text{m/s}^2$

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

For Examiner's Use Only

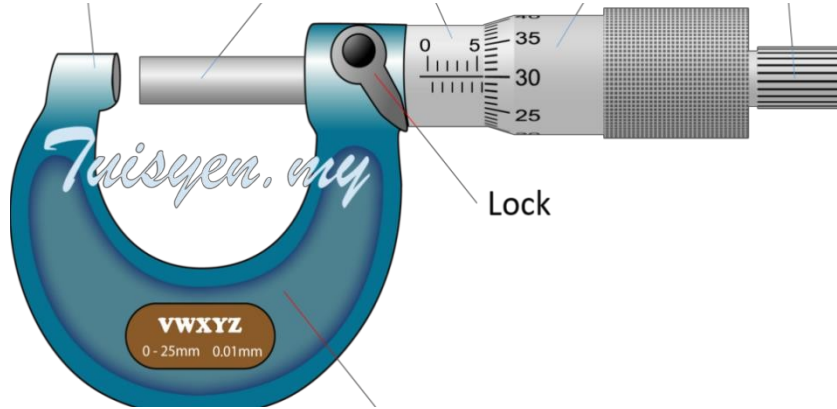
| Section | Question | Maximum Score | Candidate's Score |
|---------|----------|---------------|-------------------|
| A | 1 – 13 | 25 | |
| | 14 | 11 | |
| | 15 | 10 | |

KAPSABET BOYS HIGH SCHOOL

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| B | 16 | 11 | |
| | 17 | 12 | |
| | 18 | 11 | |
| | Total Score | 80 | |

SECTION A (25 MARKS)

1. The figure below shows a micrometer screw gauge used by a student to measure the thickness of a wire. If it has a zero error of $+0.08\text{mm}$, determine the actual thickness of the wire. (2 marks)



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2. In an experiment to demonstrate Brownian motion, smoke was placed in a smoke cell and observed under a microscope. State and explain the observation. (2marks)

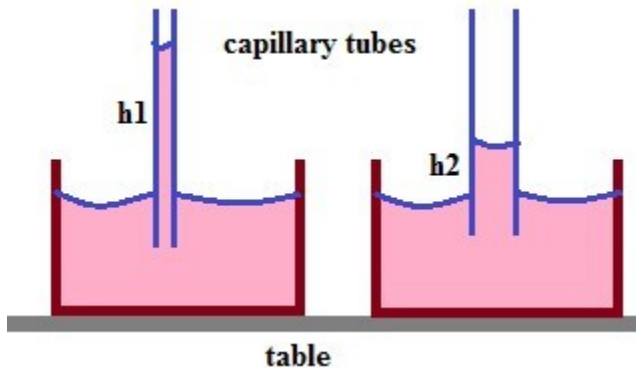
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3. The diagrams below show two glass tubes of different diameters dipped in water.



Explain why h_2 is less than h_1 .

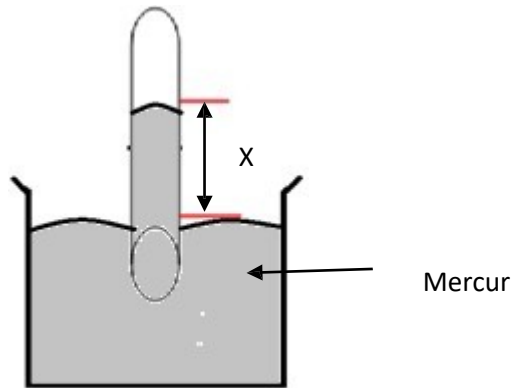
(1 mark)

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4. State a reason why a burn from steam at 100°C is more severe than a burn from boiling water at the same temperature (1 mark)

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5. The figure below shows the instrument used to measure pressure



a) Name the instrument

(1 mark)

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b) What would be observed if the test tube is tilted assuming the instrument is functioning normally?

(1 mark)

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6. The rate of heat flow in thermal conductivity increases with increase in cross-section area. Explain this observation. (1 mark)

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7. A mass of 100g is hung at the 10cm mark and a 50g mass at the 70cm mark of a uniform metre rule balanced at the 40cm marks. Determine the weight of the rule. (3 marks)

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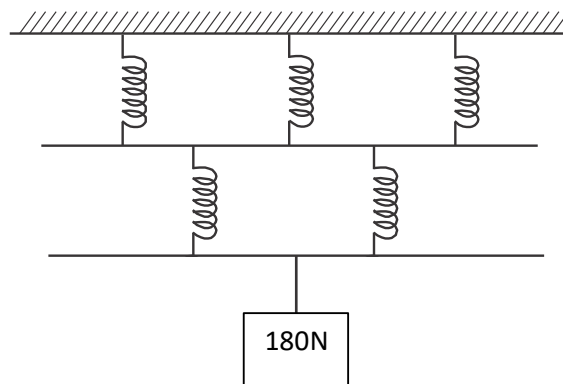
8. An object dropped from a height h attains a velocity of 6m/s just before hitting the ground, find the value of h . (2marks)

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



Given that the 180N weight causes a total extension of 30cm, determine the spring constant of each spring. (The weight of each spring is negligible.) (3 marks)

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10. The radius of the effort piston of a hydraulic lift is 1.4cm while that of the load piston is 7.0cm. This machine is used to raise a load of 120kg at a constant velocity through a height of 2.5m given that the machine is 80% efficient, calculate the effort needed. (3 marks)

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11. State the branch of physics that deal with kinetic energy of matter. (1 mark)

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12. The water in a burette is 30.6cm³, 50 drops of water each of volume V are added to the water in the burette. The final reading of the burette was 20.6cm³. Calculate the radius of the drop of water. (2 marks)

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13. State two factors that affect the stability of an object (2 marks)

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SECTION B: (55 MARKS)

14. a) State Newton's second law of motion. (1 mark)

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b) Use the law above to derive the relation $F = Ma$. (3 marks)

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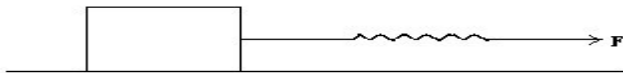
c) Distinguish between elastic and inelastic collisions. (1 mark)

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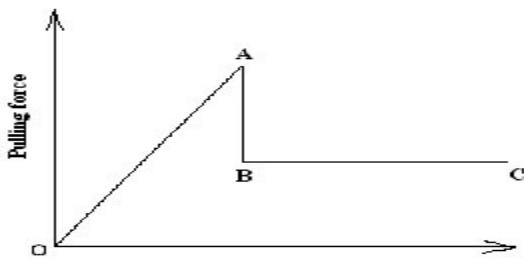
d) A car of mass 1500kg is brought to rest from a velocity of 40ms^{-1} by a constant force of 2400N. Determine the change in momentum produced by the force and the time it takes the car to come to rest. (3 marks)

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e) The diagram below shows a rectangular block of wood resting on a horizontal flat surface. It is pulled by force, F as shown in the diagram.



The spring reading are plotted against time and represented in the graph below.



Explain what is happening in the sections.

i) OA (1 mark)

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ii) AB
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(1 mark)

iii) BC

(1 mark)

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15. a) An astronaut in orbit round the earth may feel weightless even when the earth's gravitational field still acts on him. Explain
(2 marks)

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b) Distinguish between angular velocity and linear velocity

(1 mark)

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c) a stone is whirled with uniform speed in a horizontal circle of radius 15 cm. it takes the stone 10 seconds to describe an arc of length 4cm. calculate

i) Angular velocity

(3 marks)

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ii) Linear velocity of the stone

(2 marks)

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iii) Periodic time

(2 marks)

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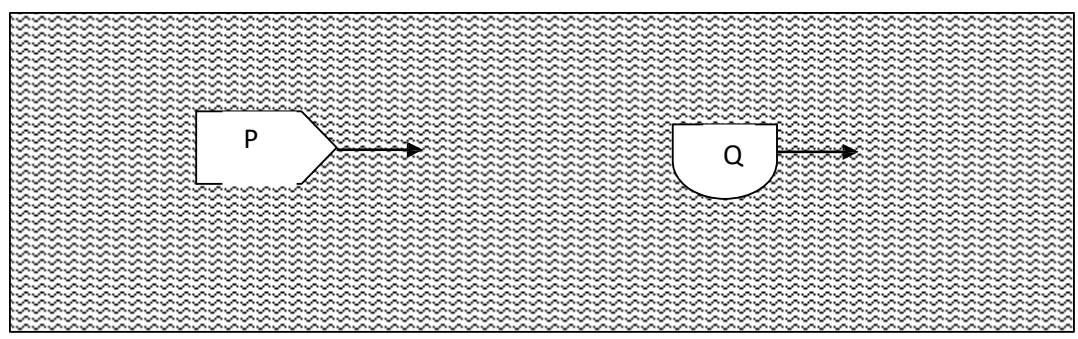
16. a) State the Bernoulli's principle of fluids. (2 marks)

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b) In derivation of equation of continuity in fluids, state two assumptions to be made. (2marks)

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b) The figure below shows cross-section of two submerged bodies P and Q in an ocean. The bodies were then pulled by a ship in the direction shown.

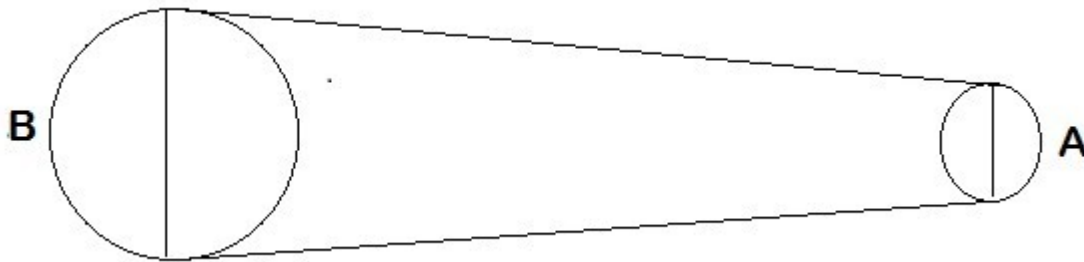


i) State with a reason, which body is easier to pull if they have equal volume and density (2 marks)

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ii) On the same diagram, show the path followed by each body and their streamlines
(2 marks)

c) Water flows steadily in a pipe as shown in the figure below. The diameter of A and B are 3cm and 5cm. If the volume flux at A is $45\text{cm}^3/\text{s}$. find the speed of water at B. (3 marks)



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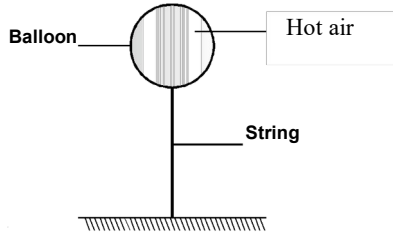
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17. a) State the law of floatation

(1 mark)

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b) The diagram below shows a hot air balloon tethered to the ground on a calm day. The balloon contains 1300m^3 of hot air of density 0.82 kg/m^3 . The mass of the material making the balloon without hot air is 420kg . The density of the surrounding air is 1.35 kg/m^3 . Determine



i) The total weight of hot air balloon

(3 marks)

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ii) The weight of air displaced by the balloon

(2 marks)

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iii) Upthrust force on the balloon

(1 mark)

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iv) the tension in the rope holding the balloon in the ground. (2 marks)

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v) the acceleration with which the balloon begins to raise when released. (3marks)

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18. a) Define the term specific latent heat of fusion of a substance. (1mk)

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b) In an experiment to determine the specific latent of heat of vaporization of water, the following results were obtained.

- Mass of calorimeter = 250g
- Mass of calorimeter + water = 750g
- Mass of ice at 0°C in the calorimeter = 20g
- Final temperature when dry steam is passed over the calorimeter = 25°C
- Mass of condensed steam = 25g

Given that the latent heat of fusion of water is $3.36 \times 10^5 \text{ JKg}^{-1}$, the specific heat capacity of copper is $400 \text{ Jkg}^{-1} \text{ K}^{-1}$ and specific heat capacity of water is $4200 \text{ JKg}^{-1} \text{ K}^{-1}$. Determine the heat gained by;

i) Ice (2 marks)

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ii) Water

(2 marks)

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iii) Calorimeter

(2 marks)

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c) If L_V is the specific latent heat of vaporization of water, use an appropriate equation to find L_V . (4mks)

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