Name..... Index No.....

School..... Candidate's sign.....

Date.....

232/2

# PRE-MOCK

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

**PHYSICS**
**PAPER 1**
**Time: 2 Hours**

## INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided
2. Sign and write the date of examination in the spaces provided
3. This paper consists of TWO sections A and B
4. Answer ALL questions in the spaces provided
5. Mathematical table and electronic calculators may be used.
6. ALL working MUST be shown clearly where necessary

**FOR EXAMINERS USE**

| SECTION | QUESTION | MAXIMUM SCORE | CANDIDATE'S SCORES |
|---|---|---|---|
| A | 1 – 10 | 25 | |
| B | 11 | 14 | |
| | 12 | 13 | |
| | 13 | 14 | |
| | 14 | 14 | |
| | TOTAL | 80 | |

*This paper consists of 10 printed pages.*
*Candidates should check the question paper to ensure that all pages are printed as indicated*

*and no questions are missing*

## SECTION A (25 MARKS)

1. Figure 2 (a) shows a micrometer screw gauge used to measure the diameter of a spherical ball whose mass is 0.2g. Figure 2 (b) shows zero error of the instrument.

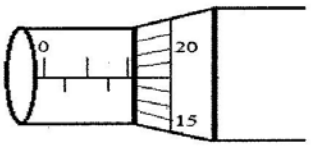

Figure 2 (a)

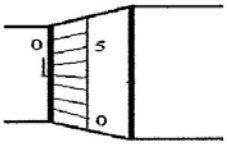

Figure 2 (b)

Determine;

i) the diameter of the spherical ball (1mk)

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ii) the density of the spherical ball (2mks)

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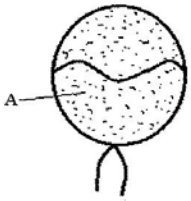
2. Figure 1 shows a soap film formed on a wire loop on which a cotton thread is tied loosely across.




i) State the aim of the above experiment (1mk)

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ii) Draw a diagram in the space provided to show what would be observed when point A is pierced with a sharp object (1mk)

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iii) Explain the observation made in (ii) above (1mk)

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3. How does increase in weight of a body affects its inertia? Explain (2mks)

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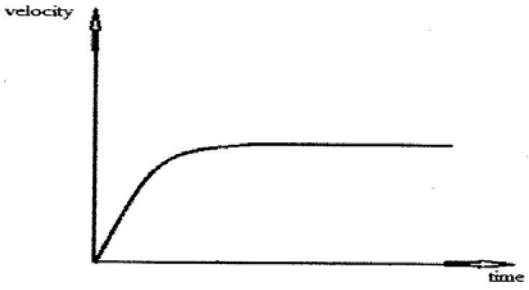
4. The graph below shows motion of a spherical ball dropped into a fluid. Explain the graph (3mks)

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5. A gas at $10^5$ N $m^{-2}$ pressure occupies space of 0.5 $m^3$. If the space is increased to 2.0 $m^3$ determine its new pressure assuming that temperature is constant (3mks)

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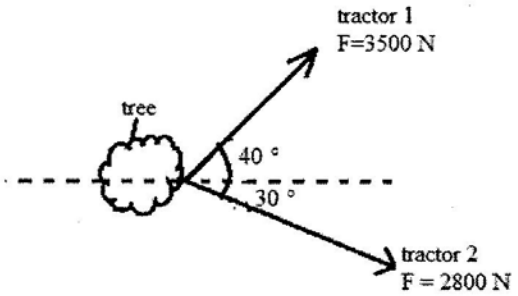
6. Figure 3 shows the horizontal forces exerted on a tree by two tractors in an attempt to pull it out of the ground.




Determine the magnitude of the resultant force (2mks)

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7. A stone of mass 0.45 kg is held in a sling and whirled round in a horizontal circle at a constant speed.
   a) State the direction the stone is accelerating at each point of its circular path (1mk)

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   b) Given that the acceleration of the stone is 25 $m/s^2$, determine the horizontal force acting on the stone (2mks)

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8. Describe a simple experiment using methylated spirit to show that evaporation produces cooling. (2mks)

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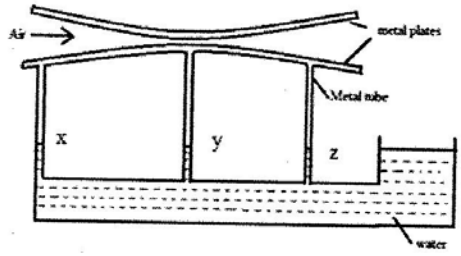
9. Figure 3 shows two curved metal plates 3 mm apart in the middle. The lower plate has three holes drilled in it and three metal tubes are fixed to them. If air is blown between the tubes as shown, use >, = or < to show how heights x,y and z vary
   (1mk)

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10. The distance between the 0 °C and 100 °C marks on a thermometer is 80 mm. Determine the temperature indicated by the thermometer when the liquid meniscus is 24 mm above 0 °C (3mks)

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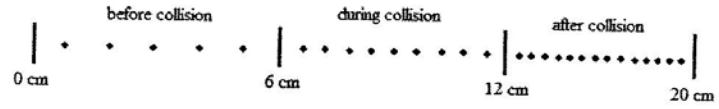
**SECTION B (55 MARKS)**

11. A trolley of mass 10 kg pulls a ticker-tape through a ticker timer which is working at a frequency of 50 hertz. If P strikes another trolley, Q of double P's mass and both trolleys move together as one after collision, the following ticker-tape is obtained




a) State Newton's second law of motion (1mk)

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b) State the type of current used to operate the ticker-tape timer (1mk)

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c) Determine the time for the distance between two ticks (1mk)

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d) Calculate the velocity of P before collision in m/s (2mks)

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e) Determine the velocity of P and Q after collision (2mks)

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f) Calculate the momentum of P before collision (2mks)

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g) Determine the time interval during the collision (2mks)

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h) Determine the force exerted on Q by P (3mks)

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12. I a) Two soda vendors using ice cubes to make their sodas cold were arguing whether to put ice block on top of the sodas or below the sodas in the soda containers they had. With reason explain the most appropriate method to use.
(2mks)

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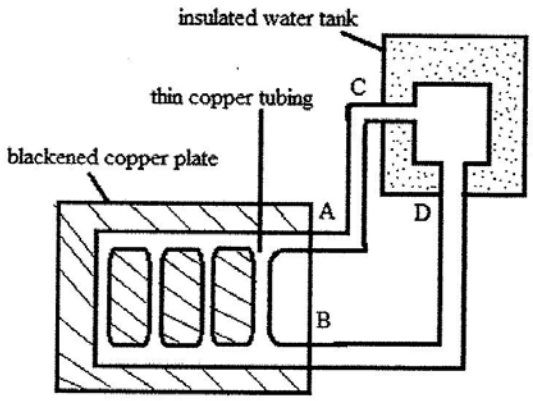
b) Figure 2 shows a solar heating system consisting of a unit which may be mounted on the sloping roof of a house to produce warm water which is stored in a tank.




i) Explain why it is necessary to place the insulated water tank at a higher level than the unit (1mk)

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ii) Which of the pipes AB or CD carries the warmer water (1mk)

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iii) State the reason why the tubes and the plate are made of copper (1mk)

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iv) Give a reason why the tube is thin-walled (1mk)

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v) Explain why the unit is more effective if the surface is of the tubes and plate is blackened rather than shiny
(2mks)

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II. Describe an experiment to determine the centre of gravity (c.g.) of an irregularly shaped thin sheet of cardboard using a plumb line. (5mks)

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13. I. State how pressure in a liquid depends on:

a) The depth of the liquid (1mk)

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b) The density of the liquid (1mk)

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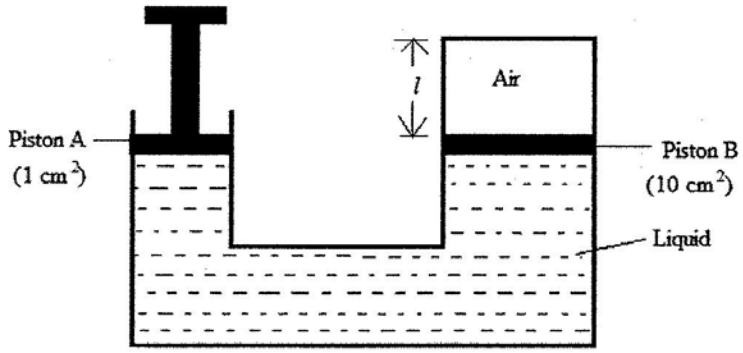
II. Figure 5 shows a cylinder, closed at its wider end, containing a liquid. The narrow end is fitted with a piston A of radius 0.58 cm. The wider end encloses a fixed mass of air and is fitted with a piston B of radius 1.16 cm. The pressure of the enclosed air is initially equal to the atmospheric pressure 15 N cm$^{-2}$.




a) State main reason why water is not a suitable liquid for the machine (1mk)

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b) A mass of 5 kg is now placed on piston A. Assuming that both pistons are of negligible weight, calculate;

i) the total force exerted by the fluid on piston B (3mks)

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ii) Pressure in N $m^{-2}$ of the enclosed air (2mks)

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III. Derive an expression for determining the velocity ratio of the above hydraulic machine, hence determine its velocity ratio (4mks)

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IV. State two applications of a hydraulic press (2mks)

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14. I. In an experiment to determine the specific heat capacity of aluminium, a kilogram of aluminium was immersed in 1 kg of water in a water bath. An electric heater was then inserted into a hole in the block of aluminium to supply 526 J $min^{-1}$ to the system. The initial temperature was 30 °C and after 35 minutes the steady temperature was 41 °C. The rise in temperature of the water bath was found to be 2 °C.

a) Draw a set up used for the experiment (3mks)

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b) State the purpose of the water bath (1mk)

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c) Give a reason why the hole in the aluminium block has oil (1mk)

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d) Determine the amount of energy supplied to the system by the heater (2mks)

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e) If the specific heat capacity of water is 4200 J/kg °C, calculate the amount of heat received by the water bath (3mks)

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f) Determine the specific heat capacity of aluminium (3mks)

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g) Give a reason why the value obtained in (f) above is lower than the theoretical value (1mk)

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