

NAME:..... INDEX NO:...../
SCHOOL:..... CANDIDATE'S SIGN.....
DATE:.....

232/1
PHYSICS
PAPER 1
KCSE MOCKS 2017

TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATES:

- Write your name and index number in the spaces provided above.
- Answer all the questions both in section A and B in the spaces provided below each question
- All workings must be clearly shown; marks may be awarded for correct steps even if the answers are wrong.
- Mathematical tables and silent electronic calculators may be used.
- Take $g = 10\text{m/s}^2$

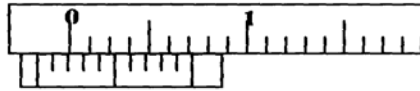
For Examiners' Use Only

| SECTION | QUESTION | MAXIMUM SCORE | CANDIDATE'S SCORE |
|--------------|----------|---------------|-------------------|
| A | 1 - 10 | 25 | |
| B | 11 | 11 | |
| | 12 | 10 | |
| | 13 | 10 | |
| | 14 | 13 | |
| | 15 | 11 | |
| TOTAL | | 80 | |

SECTION A (25 MARKS)

Answer questions in this section.

1. The figure below shows part of a vernier callipers when the jaws are closed without an object in between the jaws.



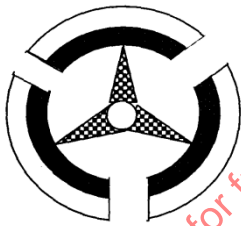
- a) State the zero error of the vernier callipers. (1mk)

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- b) A student used the same vernier callipers to measure the diameter of a test tube of actual diameter 2.15cm. What was the reading shown by the vernier callipers? (2mks)

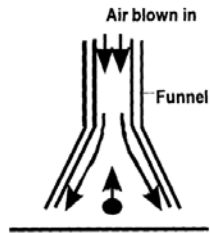
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2. The diagram below shows a bimetallic wheel whose diameter is not affected by changes in temperature. Briefly explain how the diameter of the wheel remains unchanged as the temperature increases. (3mks)



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3. The figure below shows a pith ball being lifted into a funnel end of a blower.



Explain this observation

(2mks)

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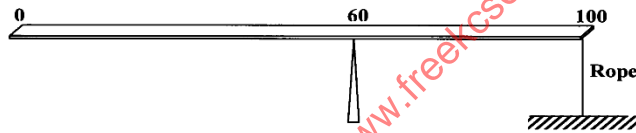
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4. A uniform meter rule of mass 40g is pivoted at the 60cm mark and held horizontal with a vertical rope as shown below. Determine the tension in the rope. (3 mks)



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5. A uniform mixture consists of 30cm^3 of water and 40cm^3 of ethanol. If the densities of water and ethanol are 1 g/cm^3 and 0.85 g/cm^3 respectively. Calculate the density of the mixture. (3mks)

6. Water flows through a narrow pipe of radius 6cm connected to another pipe of radius 9mm. If the speed of water in the narrow pipe is 3ms^{-1} , determine the speed of water in the wider section. (3mks)

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7. State one way of making the surface tension of a liquid stronger. (1mk)

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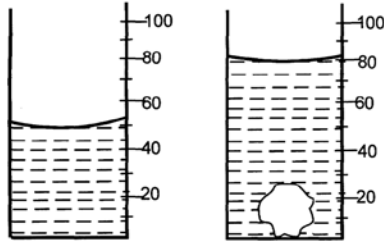
8. A car undergoes uniform retardation from 36km/h covering a distance of 25m. Calculate its deceleration (2mks)

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9. A constant mass of hydrogen occupies a volume of 4.0 cm³ at a pressure of 2.0 x 10⁵ Pa and a temperature of 288K. Calculate the volume of this gas at a pressure of 1.6x 10⁵ Pa when the temperature is 125K. (3mks)

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10. The figure below shows the change in volume of a liquid in a measuring cylinder when an irregular solid is immersed in it.



Given that the mass of the solid is 540g, determine the density of the solid in g/cm^3 . (2 mks)

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SECTION B (55 MARKS)

Answer **ALL** questions in this section.

11. a) A machine is a device that enables work to be done more easily and conveniently. State any two ways in which a machine makes work easier. (2 marks)

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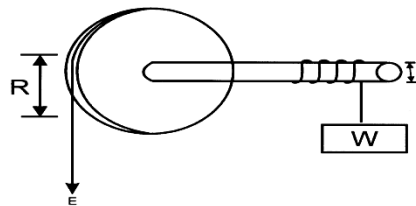
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- b) Figure 7 shows a wheel and axle being used to raise a load W by applying an effort E. The radius of the wheel is R and of the axle is r.



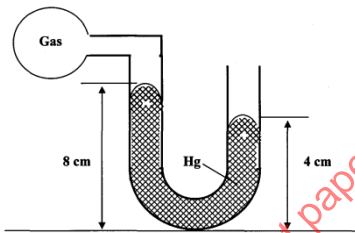
- i) Show that the velocity ratio (V.R) of this machine is given by $\frac{R}{r}$ (3 Marks)

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- ii) Given that $r = 5\text{cm}$ and $R = 50\text{cm}$, determine the effort required to raise a load of 200N if the efficiency of the machine is 90% . (3 mks)

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- c) An airtight flask containing a gas is connected to a mercury manometer. The levels of mercury in the two limbs of the manometer are as shown in the diagram below.



Calculate the pressure of the gas (Density of mercury = $1.36 \times 10^4 \text{ kg/m}^3$ and atmospheric pressure = $1.0 \times 10^5 \text{ N/m}^2$) (3mks)

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12. a) State the law of flotation. (1 mk)

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b) A block of glass of mass 0.25kg floats in mercury of density $1.36 \times 10^4 \text{kgm}^{-3}$. What volume of the glass lies under the surface of mercury? (3 mks)

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c) A steady force of 3000N is applied to stop a car of mass 1500Kg moving at a velocity of 40m/s. How long does the vehicle take to stop? (3 mks)

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d) A lift car carries 16 passengers of total mass 1200 Kg. Calculate the force exerted on the lift floor when the lift accelerates upwards at 1.5 m/s^2 . (3mks)

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13. a) Define a radian (1mk)

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- b) Three masses are placed on a rotating table at distances 6cm, 9cm and 12cm respectively from the centre of rotation. When the frequency of rotation is varied it is noted that each mass slides off at a different frequency of rotation of the table. The table below shows the frequency at which each mass slides off.

| | | | |
|-------------------------------|-----|-----|-----|
| Radius, r (cm) | 12 | 9 | 6 |
| Sliding off frequency (rev/s) | 0.5 | 0.8 | 1.1 |

- i) State two factors that determine the frequency at which each mass slides off. (2 marks)

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- ii) Oil is now poured on the table before placing the masses. Explain the effect of this on the frequency at which the mass slides off. (2 mks)

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- c) A marked point on a rim of a wheel has a linear velocity of 11.2m/s. If the rim has a radius of 0.8m, calculate;

- i) The angular velocity of the point (3 mks)

- ii) The centripetal acceleration. (2 mks)

14. (a) What is meant by specific latent heat of Vaporization? (1mk)

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- (b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100°C was passed into water contained in a well lagged copper calorimeter.

The following measurements were made:

Mass of calorimeter = 50g

Initial mass of water = 70g

Initial temperature of water = 5°C

Final mass of water + Calorimeter + condensed steam = 123g

Final temperature of mixture = 30°C

Specific heat capacity of water = $4200\text{Jkg}^{-1}\text{k}^{-1}$

Specific heat capacity of copper = $390\text{J kg}^{-1}\text{k}^{-1}$.

Determine the

- (i) Mass of condensed steam (2mks)

- (ii) Heat gained by water and calorimeter. (3mks)

- (c) Given that L is the specific latent heat of vaporization of steam

- (i) Write an expression for the heat given out by steam. (1 mk)

- (ii) Determine the value of L (3mks)

(d) 500g of water at 20°C is mixed with 200g of water at 55°C Find the final temperature of the mixture. (3mks)

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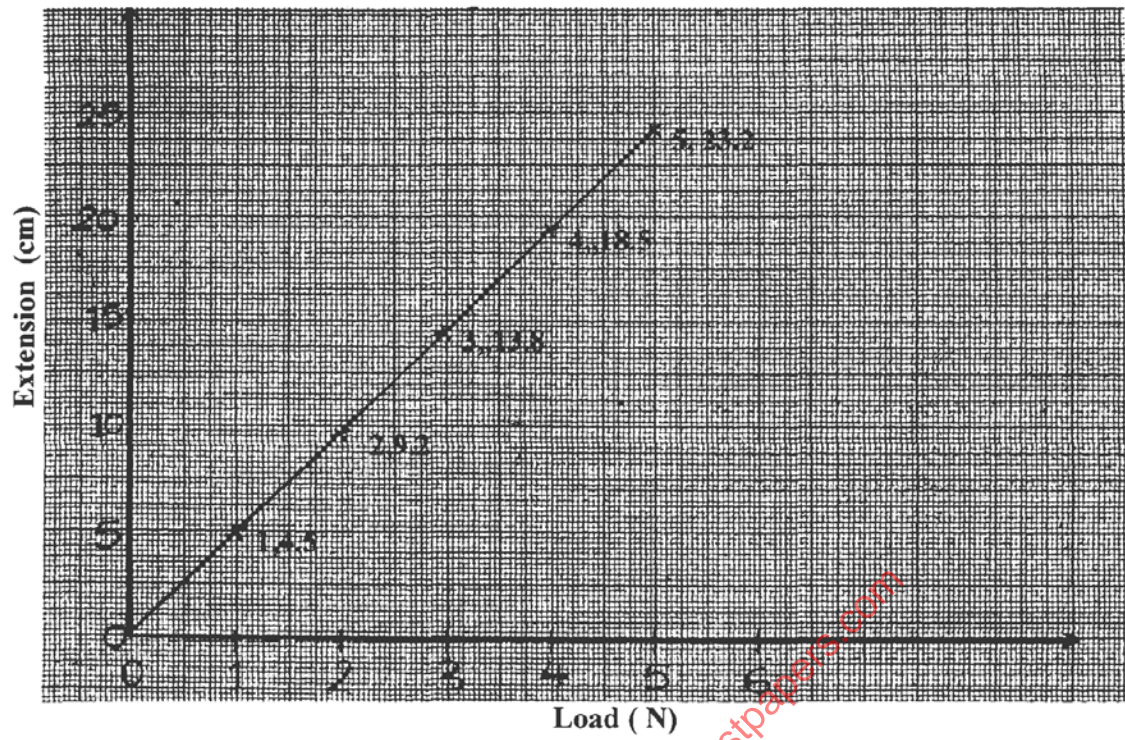
15. a) State Hooke's law. (1mk)

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b) The graph shows how extension e of a helical spring varied with load, hanging on it.



Determine from the graph, the proportionality constant of the spring. (3mks)

c) State two factors that affect the proportionality constant of a helical spring. (2mks)

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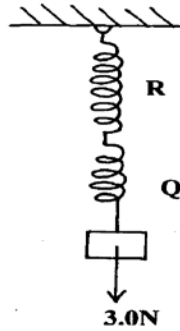
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- d) Two springs **Q** and **R** have proportionality constants 20Nm^{-1} and 25Nm^{-1} respectively. **Q** weighs 0.2 N while the weight of **R** is negligible. The two springs are arranged to support a load of 3.0N as shown in the diagram below.



Determine the extension in

i) **Q**

(2mks)

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ii) **R**

(2mks)

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