Name…………………………………………………… Index No…………………/…….

School…………………………………………………… Date ……………………………

Candidate's Signature…………………………………….

232/1
PHYSICS
PAPER 1
July/August 2016
(Theory)
2 Hours

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

## Instructions to Candidates

- *Write your name and index number in the spaces provided in the question paper.*
- *This Paper consists of TWO sections: Sections A and B.*
- *Answer ALL QUESTIONS in sections A and B in the spaces provided after each question*
- *All working must be clearly shown.*
- *Non programmable calculators and KNEC Mathematical tables may be used*
- *Take acceleration due to gravity g = 10m/s^2, atmospheric pressure = 750mmHg*
  and specific heat capacity of water = 4200J/kg/K.

For Examiner's Use Only

SECTION	Question	Maximum Score	Candidate's Score
A	1 – 13	25	
B	14	12	
	15	12	
	16	11	
	17	10	
	18	10	
	Total Score	**80**	

This paper consists of 14 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated
and no questions are missing

1. The figure below shows the reading on a burette after 60 drops of liquid have been used.
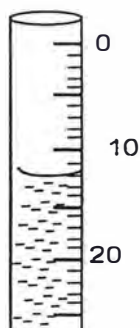
If the initial reading was zero mark, determine the volume of one drop   (2mrks)

....

....

....

....

2. An oil drop of average diameter 0.7mm spreads out into a roughly circular patch of diameter 75cm on the surface of water in a trough. Calculate the average diameter of a molecule of oil.

(2mrks)

....

....

....

....
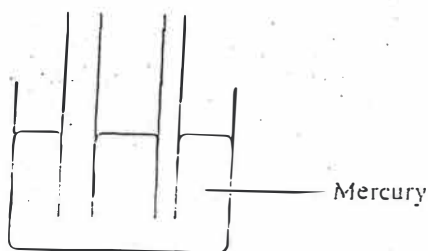
3. Complete the figure below the levels of mercury inside the two tubes.   (1mrk)

4. State the role of the following in a smoke cell experiment. (2mrks)

Lens

....

....

Microscope

....

....

5. Explain why aquatic animals are able to survive under water when the surface is already frozen. (1mrk)

....

....

6. State two features in a thermos flask which reduce heat loss by conduction. (2 mrks)

....

....

....

7. The figure below shows a mass of 6Kg on piston B balanced by force F acting on piston A
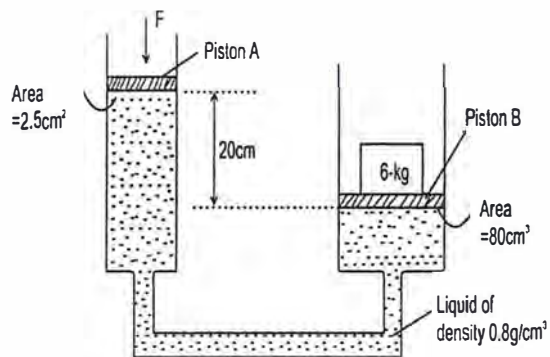
Determine the value of the force F. (3mrks)

....

....

....

....

....

....

8. Figure below shows a vessel resting on a horizontal bench.
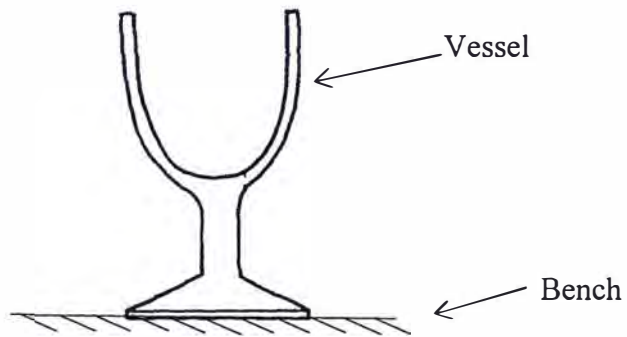
State the effect on the stability of the vessel when it is filled with water.   (1mrk)

....

....

9. The diagram below shows a beam of negligible weight balanced by constant forces P and Q.
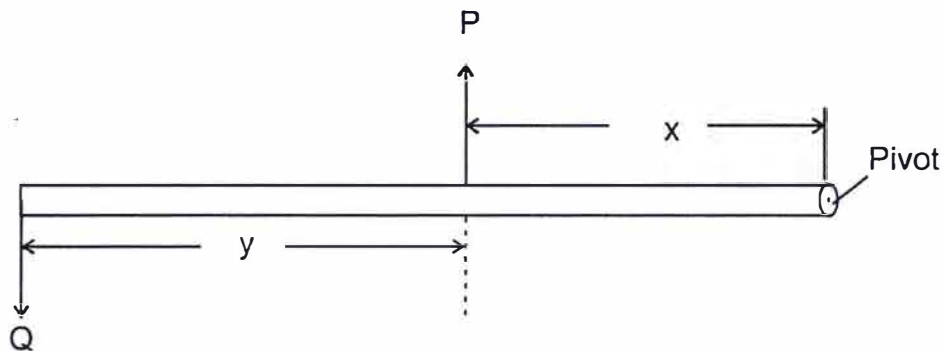
Express X in terms of P, Q and Y   (2mrks)

....

....

....

....

....

....

10. The diagram below shows three identical springs which obey Hooke's law.

(i) 2cm 2g

(ii) 3.5cm 5g

(iii) X cm 6g
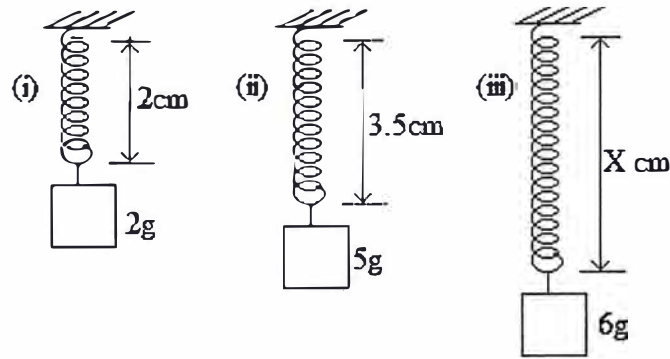
Determine the length X.   (3mrks)

....

....

....

....

....

11. The figure below shows an incompressible fluid flowing through a pipe, A_1 and A_2 are the cross-sectional areas of the pipes in the larger section and smaller section of the pipe respectively, while v_1 and v_2 are speeds of the fluid at the two sections of the pipe.
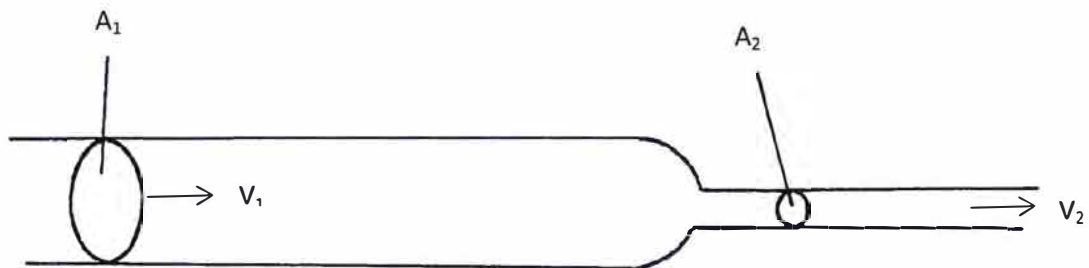
Derive an expression for the ratio of the speeds $\dfrac{v_2}{v_1}$ in terms of A_1 and A_2. (2mrks)

....

....

....

....

12. 3kg of hot water was added to 9kg of water at 10°c and the resulting temperature was 20°c. Ignoring heat gained by the container. Determine the initial temperature of the hot water.

(2mrks)

....

....

....

....

....

....

13. A load of 100Kg is raised by 20m in 30s. Calculate the power developed.   (2 mrks)

....

....

....

....

SECTION B(55marks)

14. (a) The diagram below shows a tape from a ticker timer pulled in the direction shown. If 50 dots are made in 0.5 seconds; use the diagram to answer the question that follow.
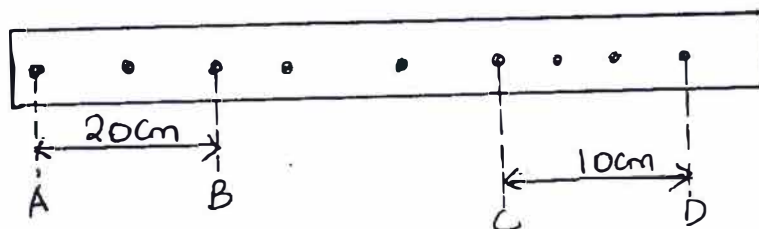
Determine:
(i)   Average velocity between A and B.   (2mrks)

....

....

....

(ii)   Average velocity between C and D.   (2 mrks)

....

....

....

....

....

(iii)   Average acceleration of the motion.   (2 mrks)

....

....

....

....

....

(b) (i)   State Newton's 2nd law of motion.   (1 mrk)

....

....

(ii)   A boy kicks a football of mass 2kg by applying a force F. If the ball was initially
        at rest and changes its velocity to 15m/s. determine:
        I.   Impulse   (2 mrks)

....

....

....

....

        II.   Applied force F, if the impact takes 0.3 seconds.   (2 mrks)

....

....

....

....

(iii)   Give a reason why high jumpers land on soft mattresses.   (1 mrk)

....

....

15. a). A worker on a building site raises a bucket full of cement at a slow steady speed using a pulley as shown in figure below.
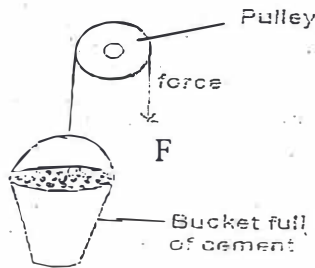
The weight of the bucket and cement is 200 N. The force F exerted by the worker is 210 N.The bucket is raised through a height of 4 m, determine the work done on the bucket and cement.

(2mrks)

....

....

....

....

b) A steam turbine is used to drive a wheel of radius R equal to 0.3m attached to a wheel of radius r equal to 0.2m and the arrangement is used to lift a load of 10 Kg as shown below;
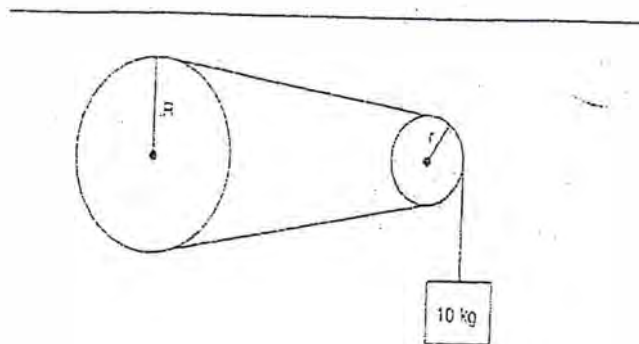
i. Calculate the velocity ratio of the arrangement of wheels. (2mrks)

....

....

....

....

ii. If the efficiency is 80%, determine the effort used. (3mrks)

....

....

....

....

c). i) State the Boyle's law. (1mrk)

....

....

ii) Along horizontal capillary tube of uniform bore sealed at one end contained dry air trapped by mercury column of 10mm. The length of air column is 142mm as shown in the figure below. Determine the length of air column when the tube is inverted. (3mrks)

10mm 142mm

X

10mm

....turn over........

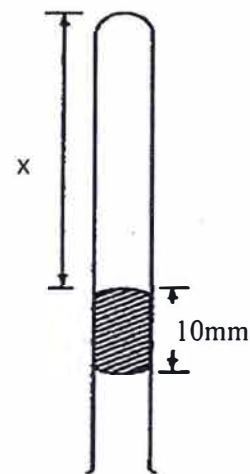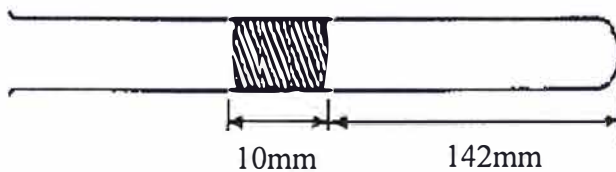..

....

....

....

....

iii) Define an ideal gas.   (1mrk)

....

....

16. a) Distinguish between latent heat of fusion and specific latent heat of fusion.   (1mrk)

....

....

....

b) The figure below shows a block of ice with two heavy weights hanging such that the copper wire connecting them passes over the block of ice.

It is observed that the wire gradually cuts its way through the ice block, but leaves it as one piece.

(i) Explain this observation.   (2mrks)

....

....

....

....

....

(ii)   What will be the effect of replacing the copper wire with a cotton thread?

(1mrk)

....

....

c)   The figure below shows one method of measuring the specific latent heat of fusion of ice. Two funnel A and B, contains crushed ice at 0°C.
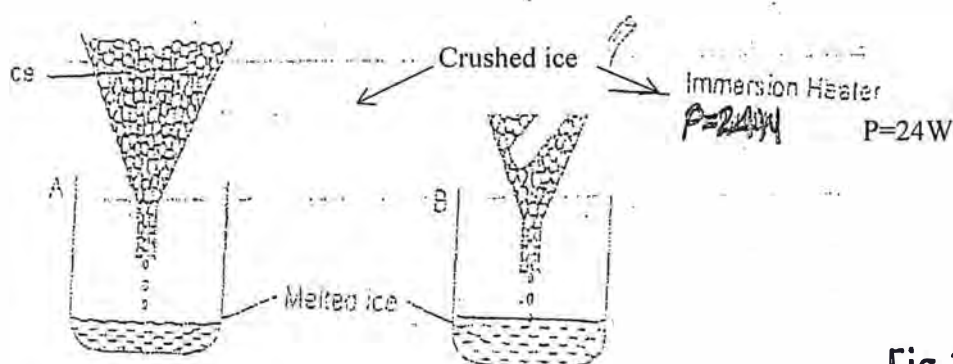
Fig 13

The mass of melted ice from each funnel is measured after 11 minutes. The results are shown below.

Mass of melted ice in A=24g

Mass of ice melted ice in B=63g

(i) What is the reason for setting up funnel A?   (1mrk)

....

....

(ii) Determine the;

I.   Quantity of heat supplied by the heater.   (2mrks)

....

....

....

II.   Mass of ice melted by the heater.   (1mrk)

....

....

....

    III.   Specific latent heat of fusion of ice.   (3mrks)

....

....

....

....

17. (a) A turntable of a record player, radius 0.15m makes 45 revolutions per minute. Calculate;

    (i) Its angular velocity.   (2mrks)

....

....

....

(ii) The linear velocity at a point 0.12m from the centre.   (1mrk)

....

....

....

    (b) (i) What is meant by centripetal force?   (1mrk)

....

....

....

An object of mass 0.5kg at the end of a light string is whirled round in a vertical circle of radius 2.0m with a constant speed of 10m/s.

    (ii) Determine the maximum tension in the string.   (2mrks)

....

....

....

....

      (iii) Determine the minimum speed the object must maintain for it not fall off at the top of the verticle circle.   (2mrks)

....

....

....

....

(c)   Explain why the wet clothes put in a drum get dried up faster when the drum is rotated at high speed.   (2mrks)

....

....

....

18. (a) State Archemede's principle.   (1mrk)

....

....

    (b)Differentiate between floating and sinking in terms Archemede's principle. (1mrk)

....

....

....

    (c) An object of density 600 kg/m^3 and mass 150g is tethered by an inextensible string to the bottom of a vessel containing a liquid of density 800 kg/m^3. The object is fully submerged. Calculate:
    (i)   The upthrust on the object.   (3mrks)

....

....

....

....

(ii)   Tension in the string   (2 mrks)

....

....

....

....

(iii)   The acceleration of the object as it moves upwards after the string breaks. (3mrks)

....

....

....

....

....

....

....

THIS IS THE LAST PRINTED PAGE