NAME: ……………………………….. INDEX NO: ………………………….

SIGNATURE: …………………………… DATE : …………………………….…..

SCHOOL:…………………………………….

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PHYSICS
PAPER 1
THEORY
JULY / AUGUST 2013
TIME: 2 HOURS

NANDI CENTRAL DISTRICT JOINT MOCK 2013

Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 1
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

(a) *Write your Name and Index Number in the spaces provided.*

(b) *Sign and write the date of examination in the spaces provided above.*

(c) *This paper consists two sections A and B.*

(d) *Answer all questions in Section A and B in the spaces provided.*

(e) *All working MUST be clearly shown.*

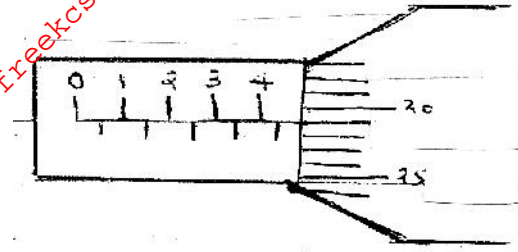(f) *Mathematical tables and electronic calculators may be used.*

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE SCORE
A	1 - 11	25	
B	12	10	
	13	10	
	14	11	
	15	10	
	16	14	
TOTAL SCORE		80	

1

1. The micrometer screw gauge below has a zero error of -0.019cm.
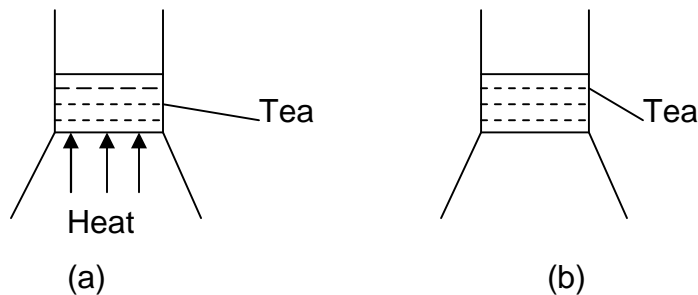

   Determine the true reading of the instrument.   (2mks)

2. A string of negligible mass has a metal ball tied at the end of the string 100cm long and the ball has a mass of 0.4kg. The ball is swinging horizontally, making 5 revolutions per second. Determine the angular velocity in radians per second.

                                                                                                        (3mks)

3. Study the set-ups below and use it to answer the questions that follow:

   (a)   (b)

   A student placed one teaspoonful of sugar in each of the identical cups with equal volume of tea as shown above. With a reason which cup of tea will taste sugary after 2 minutes?   (2mks)

4. Why is a wire gauze often placed above a Bunsen burner flame during an

experiment? (2mks)

5. A car traveling from Kisumu to Eldoret had its tyre pressure measured in Kisumu and found to be 300kPa. On arrival to Eldoret where the temperature is 18^0C. The pressure of the tyre was found to be 200kPa. What was the temperature of the air in the tyre in Kisumu? (Assume that the volume of the air in the tyre is constant)(3mks)

6. The diagram below shows some parts of a pressure cooker.
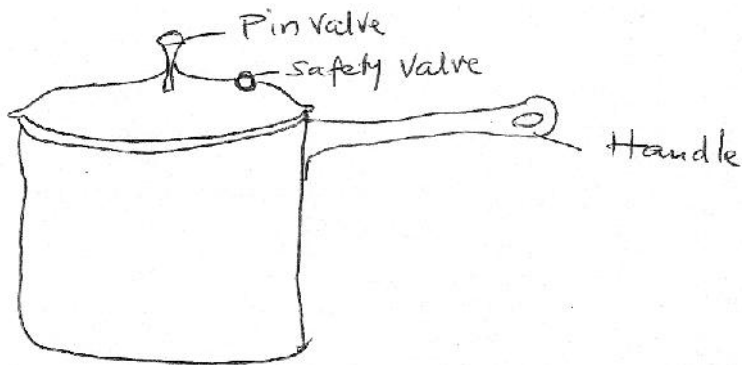
(a) What is the function of safety valve? (1mk)

(b) The mass of the material used to make the vessels above is 0.5kg, and its specific heat capacity if 420J/Kgk. Calculate its heat capacity. (2mks)

7. A single light spring has a spring constant of 0.2N/cm. The figure below shows an arrangement of such identical springs in which the third spring hangs midway
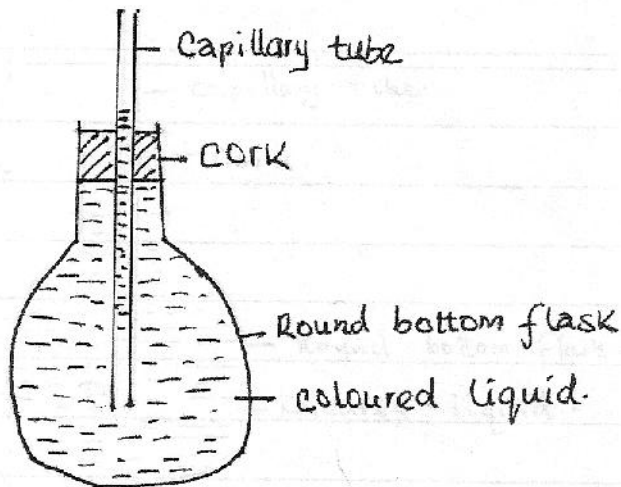
between two springs S_1 and S_2.
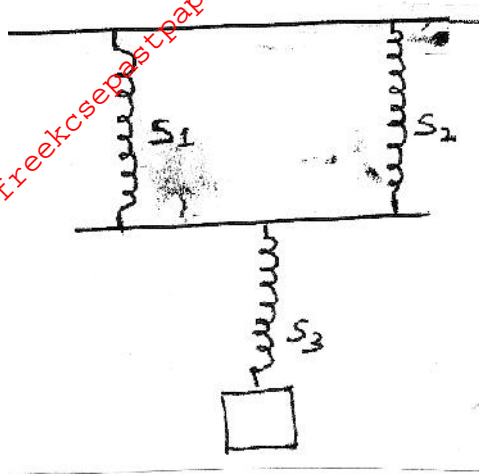
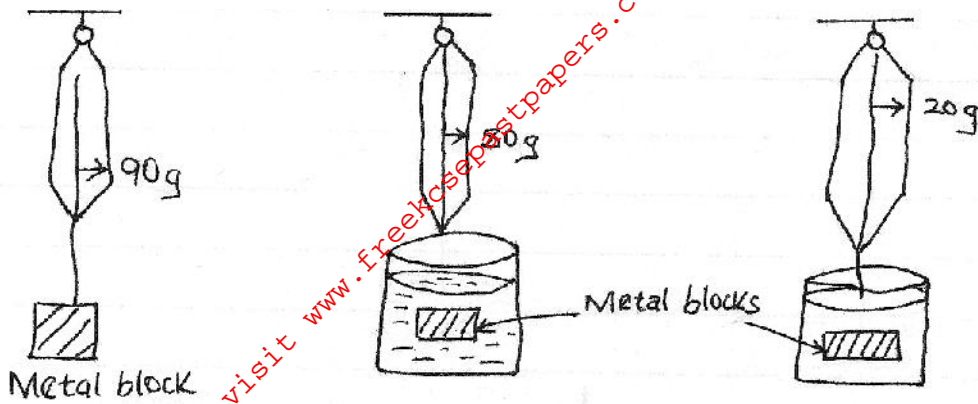Calculate the total extension of the system. (2mks)

8.

State what will be observed when the above apparatus is placed in cold water.
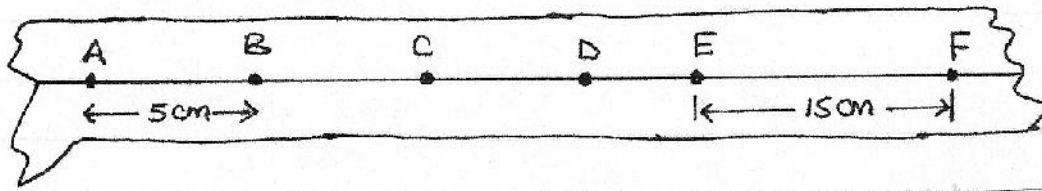
(2mks)

9. The diagram below shows the same metal block weighed in air, water and a liquid X.

90g

50g

20g

Metal blocks

Metal block

Metal blocks

Calculate the density of the metal. (3mks)

10. The figure below shows a large tape made from a ticker tape timer running at 50Hz.

A   B   C   D   E   F

←—5cm—→ |←——15cm——→|

Calculate the acceleration of the body over the interval AF. (4mks)

11. Name **two** forces that determine the shape of an oil drop on a table. (2mks)

SECTION B (55 MARKS)

5

Answer ALL questions in this section in the spaces provided

12. (a) State the principle of conservation of Linear momentum. (1mk)

(b) Calculate the recoil velocity of a gun of mass 0.4kg which fires a bullet of mass 0.090kg at a velocity of 600m/s. (3mks)

(c) (i) State **two** factors which affect frictional force of a body. (2ms)

(ii) Suggest any **two** ways in which friction can be minimized. (2mks)

(iii) State **two** advantages of friction. (2mks)

13. A farmer in Kapsabet town placed up a tank for use in irrigation as shown.
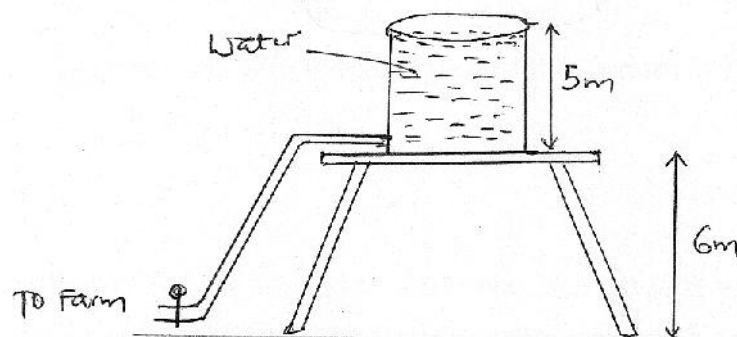
(i) The farmer discovered that there was not enough pressure to water his crops. Explain to him how the pressure can be increased. (2mks)

(ii)   Which form of energy is possessed by the water in the tank?   (1mk)

(iii) Calculate the velocity of the water jetting out of the pipe.   (3mks)

(iv)   Calculate the pressure at which the water jets out.   (2mks)

(v)   State **two** disadvantages of water barometer.   (2mks)

14. (a) State the law of conservation of energy.   (1mk)

(b) Draw a block and tackle system with a velocity ration of 5.   (2mks)

(c) The block tackle system above was used to lift 100kg of load. Given that the efficiency of the system is 75%. Calculate the effort applied to lift the load. (2mks)

(d) Give **two** reasons why the efficiency of the system is 75%. (3mks)

(e) An effort of 60N is applied to the brake of a car jack whose hand moves through a circle of radius 17.5cm. The pitch of the screw is 2.5mm. Determine the velocity ratio of the screw Jack. (3mks)

15. (a) What is a laminar flow? (1mk)

(b) The water from a gardener hose pipe fills a bucket in 30.0s. The volume of the bucket is $8.00 \times 10^{-3} m^3$. Find the speed of the water that leaves the hose pipe at:

   (i) An un-obstruction opening with cross-sectional area of $2.85 \times 10^{-4} m^2$. (3mks)
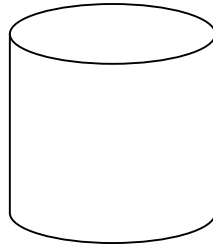
   (ii) An un-obstruction opening that has only half as much area. (3mks)

(iii) State **two** assumptions needed in derivation of equation of continuity.(2mks)

(c) State **one** effect of Bernoulli's principle.   (1mk)

16. (a) (i) Define the term centre of gravity of a body.   (1mk)

(ii) Locate the C.o.g. of the cylinder shown below.   (1mk)

(b) The figure below shows a boy and a girl on playground seesaw. The seesaw has a mass of 30kg and is pivoted at its centre. Their mother has to hold the girl's end in order to keep the seesaw level. The boy's mass is 50kg and the girl's mass is 30kg. All the distances are shown on the diagram.
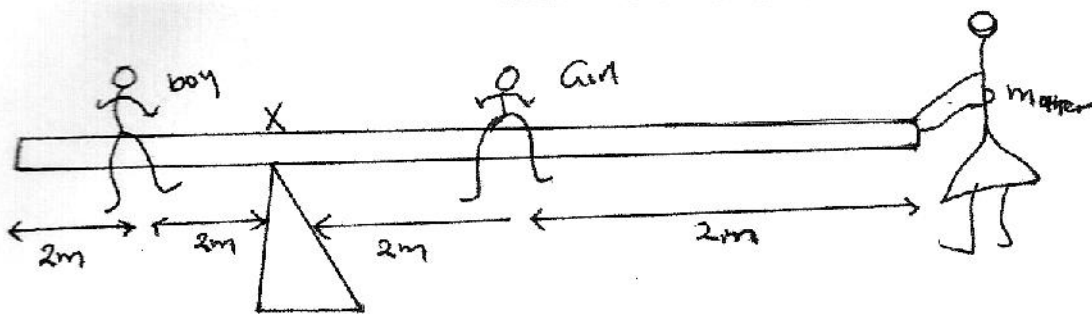
Calculate:
(i) The turning effect of the boy's weight about point x.   (1mk)

(ii) The turning effect of the girl's weight about x.   (1mk)

(iii) The force their mother must apply on the end of the seesaw in order to keep it level. (2mks)

(iv) The total downward force in the central support of the seesaw. (2mks)

(c) A stone is thrown vertically upward with an initial velocity of 30mls:

(i) Determine the maximum height reached. (3mks)

(ii) Time taken to come back to the point of projection. (3mks)