NAME: …… INDEX NO: ……

SCHOOL: …… DATE : ……

CANDIDATE'S SIGNATURE: ……

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PHYSICS
PAPER 1
THEORY
JULY / AUGUST 2014
TIME: 2 HOURS

NANDI NORTH SUB-COUNTY JOINT EVALUATION 2014

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

INSTRUCTIONS TO CANDIDATES:

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

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

(c) *This paper consists of **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.*

Take 'g' = 10m/s^2

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE'S SCORE
A	1 - 11	25	
B	12	15	
	13	14	
	14	11	
	15	07	
	16	09	
TOTAL SCORE		**80**	

SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided

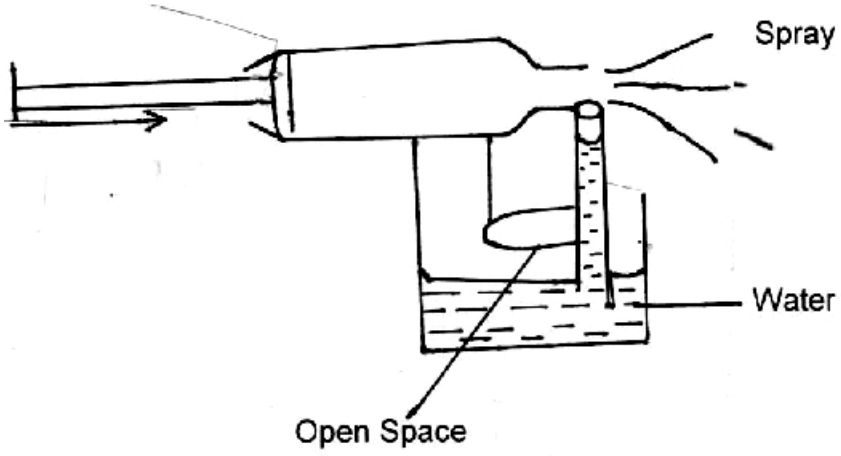
1. Figure 1 shows a reading of a micrometer screw gauge when a metallic spherical ball of mass 60g is measured by it.

If the micrometer screw gauge had a zero error of -0.01, what is:

(a) the radius of the sphere? (2mks)

(b) the density of the metal ball? (2mks)

2. Fig. 2 shows a simple toy spraying gun.



Briefly describe how sprays of water is produced at point A. (2mks)

3. A 4N load causes a 10cm extension of a spring.

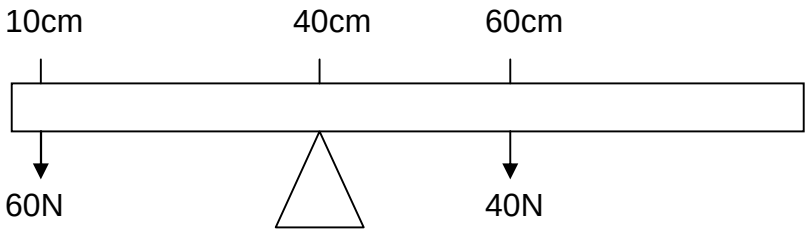
What would be the extension when two such identical springs are connected in parallel and a load of 2N is applied at their joint lower end? (3mks)

4. A rocket of mass 5 tonnes initially at rest is launched with a force 2.0×10^7N. If the

rocket was in contact with the ground for 0.2 seconds, what was the take off speed of the ball? (3mks)

5. (a) What is meant by the centre of gravity of an object? (1mk)

(b) A uniform metre rule is in equilibrium on a knife-edge placed at 40cm mark as shown on figure 2 when a weight of 60N and 40N is placed at 10cm and 60cm mark respectively. Determine the weight of the metre rule. (3mks)

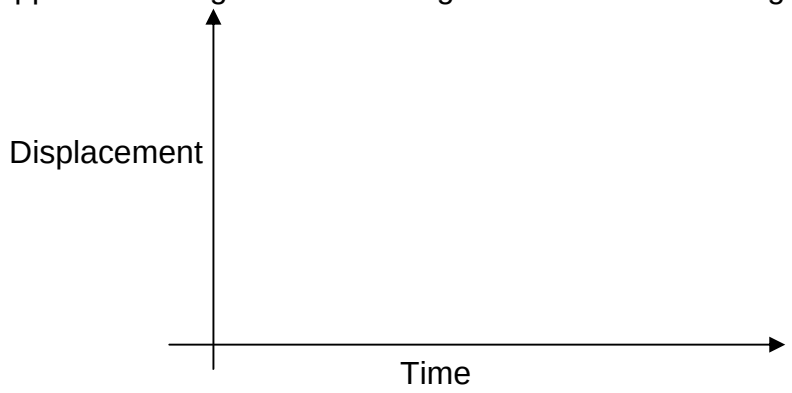


6. A block of mass 300g is placed on a frictionless rotating table while fixed to the centre of table by a thin thread. The distance from the centre of the table to the block is 20cm. If the maximum tension the thread can withstand is 0.375N, determine maximum angular velocity the table can attain. (3mks)

7. A student heated some pure water and noticed it boiled at 94^0C instead of 100^0C. If the thermometer was not faulty, what is the possible cause for this? (1mk)

8. What is the function of a lens in a smoke cell experiment? (1mk)

9. On the grid below, sketch the displacement-time graph that describe a free fall body dropped from height and hits the ground without bouncing. (1cm)



10. (a) Alcohol is sometimes very advantageous as thermometric liquid over mercury. Give a possible reason. (1mk)

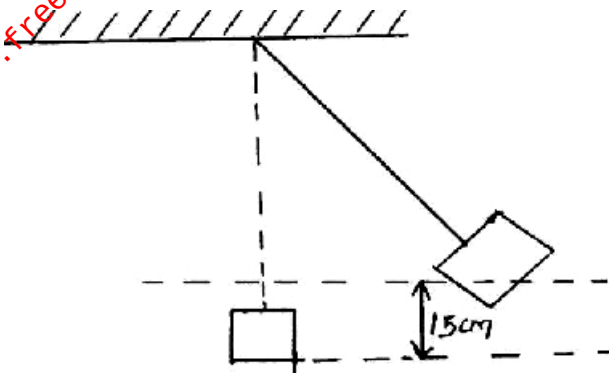
(b) State the function of a constriction in a clinical thermometer. (1mk)

11. Describe how the length of a conductor affects its rate of thermal conductivity. (1mk)

SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided

12. (a) When a bullet of mass 0.02kg was fired into a block of ballistic pendulum of mass 1.98kg, the block rose through a height of 15cm as in the figure below.



Determine:

(i) The potential energy gained by the block. (2mks)

(ii) Initial velocity of the bullet. (3mks)

(b) A trolley of mass 1kg moving at 1m/s collides head on with a stationary block of wood of mass 2kg. If the trolley and the block of wood are stuck together and moved a distance of 0.1m before coming to rest, find the;

(i) The velocity after collision. (2mks)

(ii) Kinetic energy after collision. (2mks)

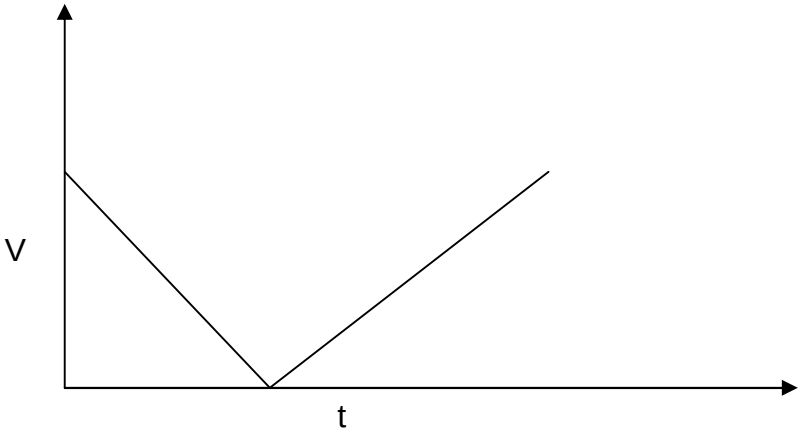
(iii) The frictional force. (2mks)

(c) A tape attached to a moving trolley is run through a ticker timer. A section of it appeared as shown below.

If the frequency of ticker timer is 50Hz, calculate the acceleration of trolley. (3mks)

(d) The figure below shows a velocity time graph for an object in water.

(i) On the same axes, sketch a velocity-time graph for the same motion.



(ii) Describe the motion of the body. (1mk)

13. (a) Explain why bodies in circular motion undergo acceleration even when their speed is constant. (2mks)

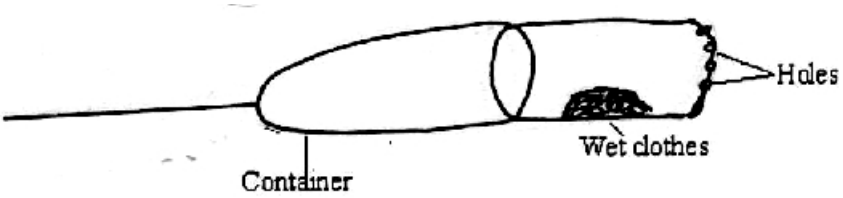
(b) A particle moving along a circular path of radius 5m describes on arc length 2m every 2 seconds. Determine:-

(i) Its angular velocity. (2mks)

(ii) Its periodic time. (2mks)

(c) A stone of mass 40g is tied to the end of a string 50cm and whirled in a vertical circle at 2 revolutions per second. Calculate the maximum tension in the string. (3mks)

(d) The figure below shows a container with small holes at the bottom in which wet clothes have been put.

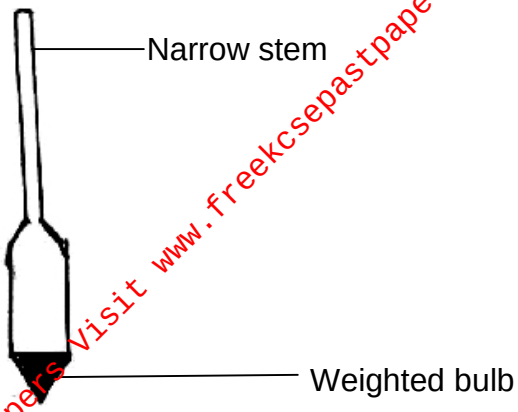


When the container is whirled at high speeds, it's observed that the clothes dry faster. Explain how the rotation of the container causes the clothes to dry faster. (3mks)

(e) State **two** factors affecting centripetal force. (2mks)

14. (a) A solid weighs 40N in air, 15N when totally immersed in water and 20N when fully immersed in liquid X. Determine the relative density of liquid X. (2mks)

(b) The figure below shows a bulb hydrometer.



(i) State the principle used in the hydrometer. (1mk)

(ii) Explain why:

I. The stem is narrow (1mk)

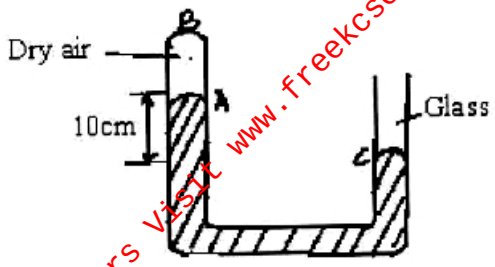
II. The bulb is wide. (1mk)

(iii) The lead shots are placed at the bottom. (1mk)

(c) A simple hydrometer is set-up with the test tube partially filled with lead shots. Its mass is 10g and its cross-sectional area is $0.5cm^2$, determine the length of the tube immersed in brine of density $1.20g/cm^3$. (3mks)

(d) State **two** examples where a hydrometer is commonly used in practical life. (2mks)

15. (a) The figure below represents a transparent glass sealed on one end and containing mercury. The set up was used to verity Boyle's law.



(i) Explain why the gas should be dry. (1mk)

(ii) Describe how the set up can be used to verify Boyle's law of gases. (3mks)

(iii) Sketch a graph to represent the results that would be obtained. (1mk)

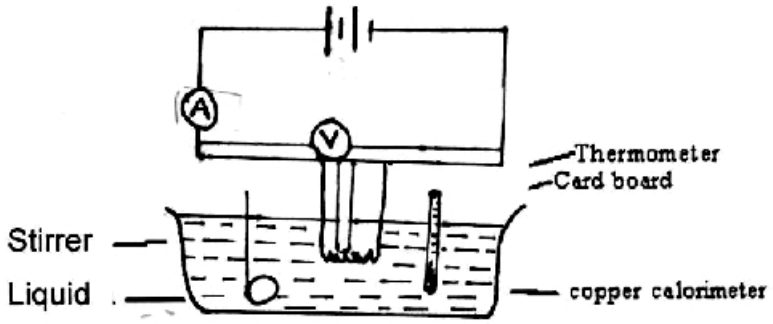
(iv) Use Kinetic theory of gases to explain:

I. Boyle's law (1mk)

II. Why pressure of gas increases with temperature. (1mk)

16. (a) Distinguish between heat capacity and specific heat capacity. (2mks)

(b) The figure below shows a set up that may be used to determine a specific heat capacity.



Outline the measurements that should be taken in the experiment. (2mks)

(i) Explain how the measurements taken in (i) may be used to determine the specific heat capacity. (2mks)

(ii) State **one** precaution one would take in modifying the set up for accurate results. (1mk)

(c) An electric heater rated 2KW is used to heat a 400g aluminum container filled with 1kg of water. Assuming no heat is lost to surroundings; calculate the time taken to raise the temperature of the water by 10^0C. Take specific heat capacity of aluminium is 900J/kg/k, and that of water is 4200J/kg/k. (2mks)