NAME……..…… INDEX NO…….....……..…..

SCHOOL…….…… CANDIDATE'S SIGNATURE……..…..

DATE……...……..

232/1
PHYSICS
PAPER 1
(THEORY)
JULY/AUGUST 2014
TIME: 2 HOURS

KURIA WEST SUB-COUNTY JOINT EXAMINATION - 2014

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

INSTRUCTIONS TO THE CANDIDATE:

*(a) Write your **name** and **index number** in the spaces provided above.*
*(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** the questions in sections **A** and **B** in the spaces provided.*
*(e) All working **must** be clearly shown in the spaces provided.*
*(f) Non-programmable silent electronic calculators and KNEC Mathematical tables **may be** used.*

FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidate's Score
A	1 – 14	25	
B	15	9	
	16	11	
	17	10	
	18	11	
	19	14	
Total Score		80	

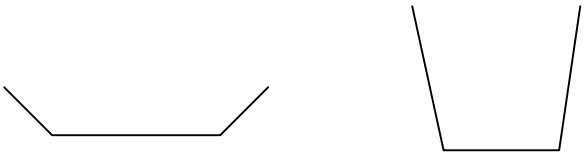
SECTION A: (25 MARKS)

Answer **all** questions in this section in the spaces provided:

1. The figure **below** shows a uniform triangular lamina.

Locate the centre of gravity of lamina. (2mks)

2. The figure **below** shows two containers of equal volume but of different diameters.



Equal volume of hot water was put in both containers. Explain why it cools faster in the wider container than in the narrower one. (1mk)

_____

_____

_____

_____

3. State **one** advantage of hydraulic brakes over mechanical brakes. (1mk)

_____

_____

_____

4. A body in a uniform circular motion experiences acceleration despite moving at a constant speed. Explain. (1mk)

_____

_____

_____

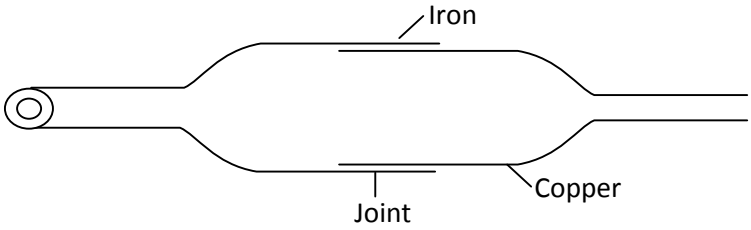
Use the information below to answer question **5** and **6**:

In an experiment to determine the density of a liquid, the following readings were made.
Mass of empty density bottle = 20g
Mass of bottle filled with water = 70g
Mass of bottle filled with a liquid = 695g

5. Find the density of the liquid, given that density of water is $1000kgm^{-3}$. (3mks)

6. Find the mass of the liquid. (3mks)

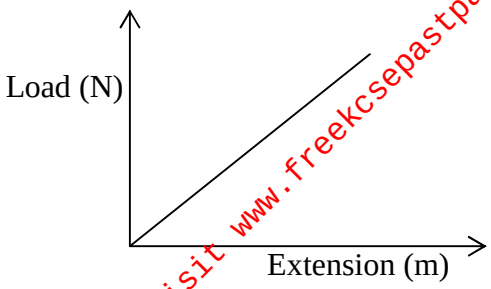
7. The diagram **below** shows a metal tube made of iron and copper. The joint is tight at room temperature.



Explain how you would separate the two by changing the temperature given that copper expands more than iron for some change in temperature. (2mks)

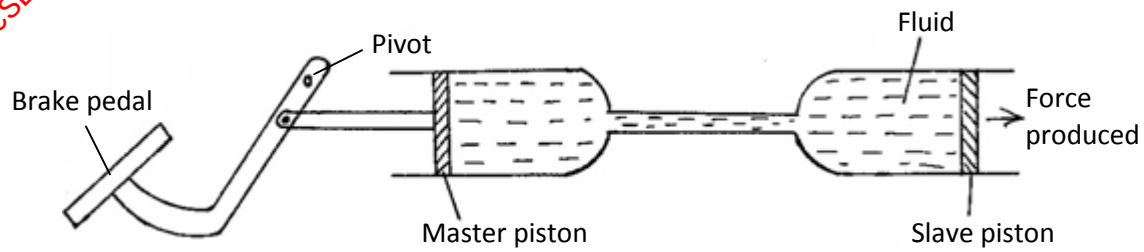
8. State **one** assumption made when estimating the size of an oil molecule in the oil drop experiment. (1mk)

9. The figure **below** shows a load-extension graph for various loads hung from a single spring.



On the same axes sketch a graph for a spring double the diameter and half the length of the first one. (1mk)

Use the information **below** which represents hydraulic braking system to answer questions **10** and **11**.



10. State **one** property the fluid should have. (1mk)

_____

11. Explain briefly how the system operates. (3mks)

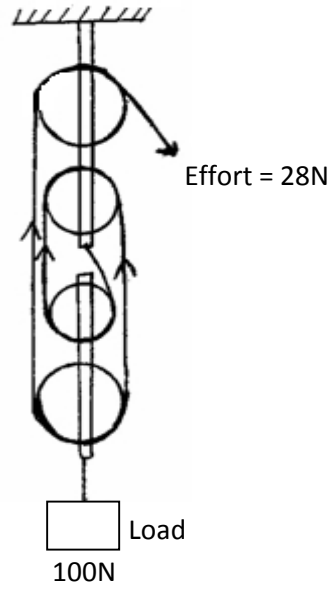
_____

_____

_____

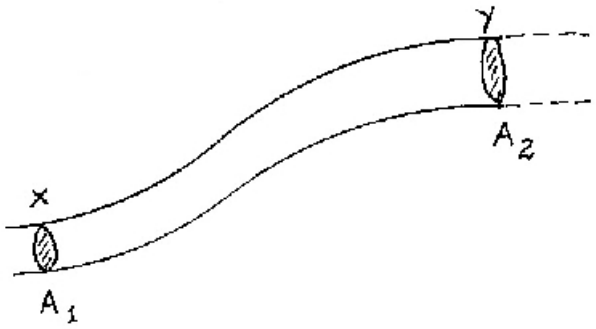
_____

12. Figure **below** shows a pulley system being used to raise a load.



If the effort applied is 28N and the load lifted is 100N, determine the efficiency of the system. (3mks)

13. Figure **below** shows a section of a pipe XY. A constant pressure difference maintains a streamline flow of a liquid in the pipe.



If the cross-sectional area A_1 at X is less than A_2 ay Y, state how the liquid velocity V_2 at Y compares with V_1 at X. (1mk)

_____

14. Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell. (2mks)

_____

_____

_____

_____

SECTION B: (55 MARKS)

Answer question in this section in the spaces provided.

15. (a) State what is meant by centripetal acceleration. (1mk)

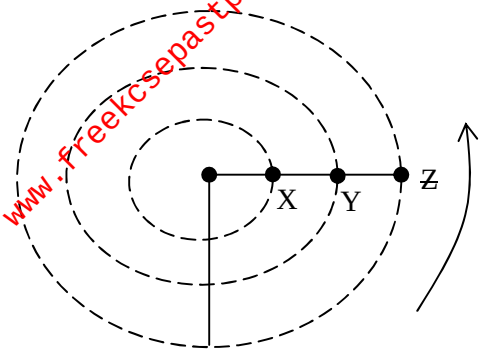
_____

_____

_____

_____

(b) The figure shows masses **X**, **Y** and **Z** placed at different points on a turn table. The turn table is rotated at different angular velocities.



(i) State **two** factors that would cause the masses to slide. (2mks)

_____

_____

(ii) At the time that start sliding off, state the mass with the highest angular velocity, give reason for your answer. (2mks)

_____

_____

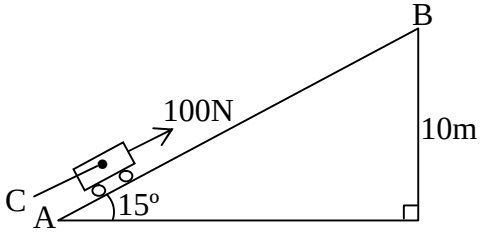
_____

_____

(c) (i) If the centripetal for is 2N and the mass and radius of the path for mass Y are 100g and 0,03m respectively. Calculate the angular velocity of the mass when the system is in equilibrium. (3mks)

(ii) Indicate on the same diagram the direction of velocity of mass Z at that position. (1mk)

16. The figure **below** shows an inclined plane, a trolley of mass 30kg is pulled up a slope by a force of 100N, parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.



(i) What is the work done on the trolley against the gravitational force in moving from **A** to **B**.? (2mks)

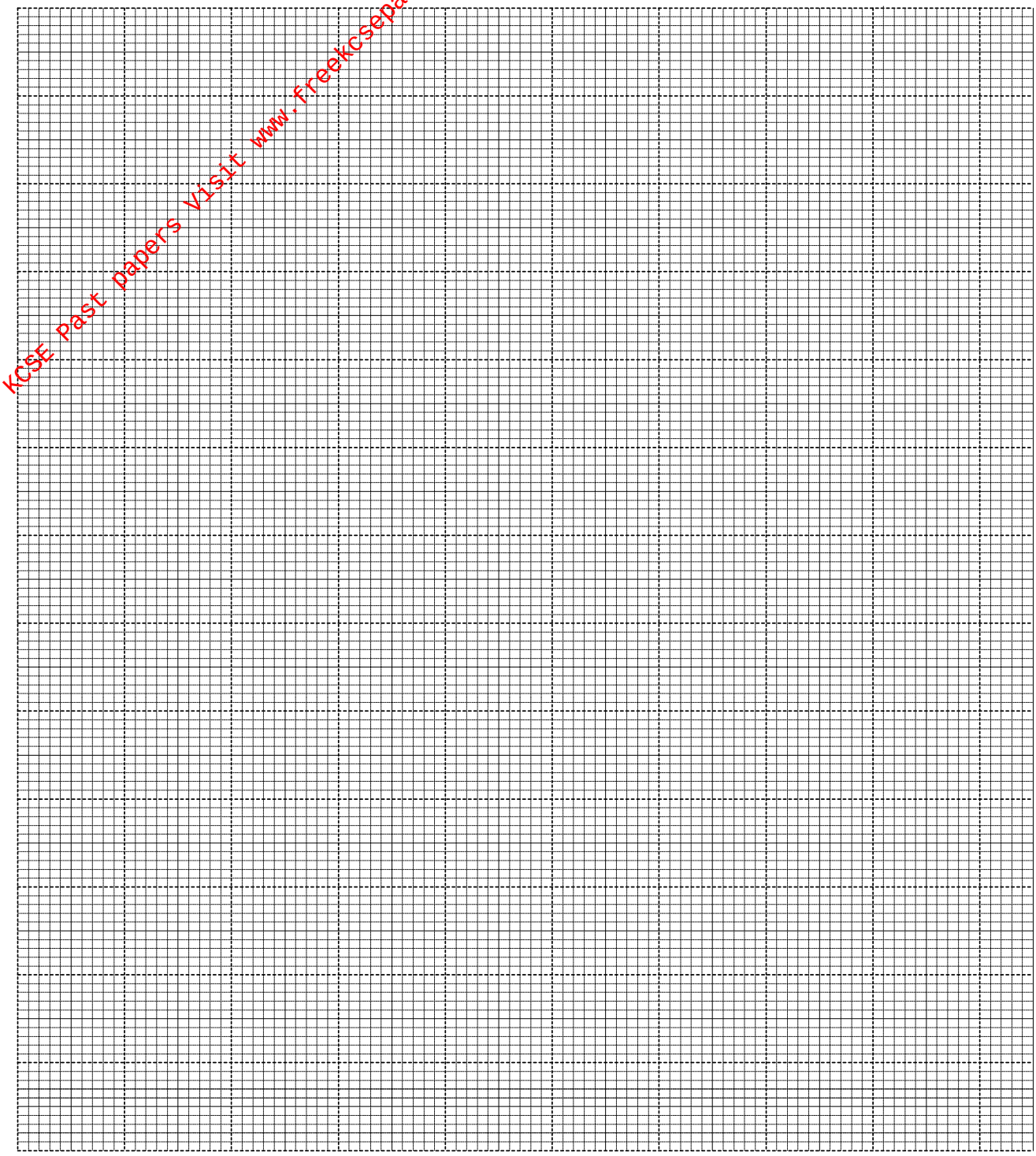
(ii) Determine the work done by the force in moving the trolley from **A** to **B**. (2mks)

(iii) Determine the efficiency of the system. (3mks)

(iv) Determine the work done in overcoming the frictional force. (1mk)

(v) Determine the mechanical advantage of the system. (3mks)

17. The graph represents displacement-time graph for a car moving with uniform acceleration along a straight horizontal road.



From the graph determine:

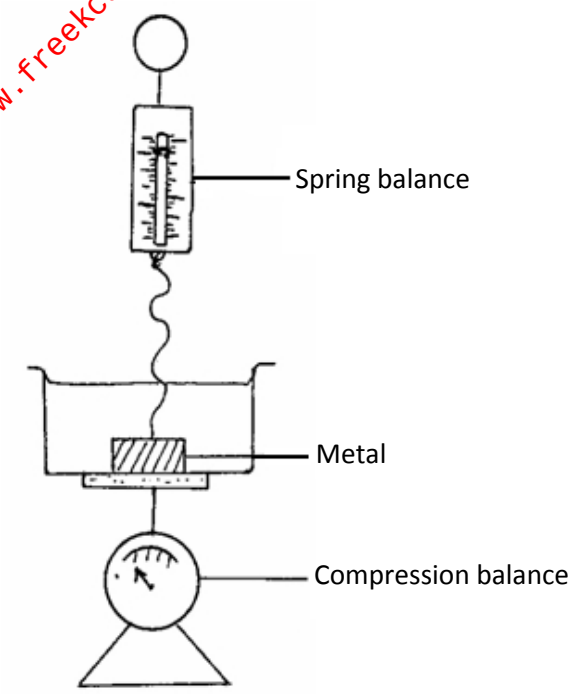
(i) the velocity of the car at the 20^{th} second. (2mks)

(ii) the velocity at the 50^{th} second. (2mks)

(iii) the acceleration of the car between the 20^{th} second and 50^{th} second. (3mks)

(b) A bullet is fired horizontally from a storey building 15m high. If the initial speed is $350ms^{-1}$, determine the maximum horizontal distance covered by the bullet. (3mks)

18. (a) A cylindrical block of metal of mass 500g and density $5.0 \times 10^3 kg/m^3$ rests on the bottom of a beaker containing a liquid of density $2.5 \times 10^3 kgm^{-3}$, standing on a compression balance. The metal is attached to a spring balance by a light inextensible string and to begin with the string is slack as shown in the figure **below**.



The metal is slowly raised by raising the spring balance vertically until the metal is well above the surface of the liquid. The mass of the beaker and liquid, without the metal is 1.5kg. Determine the readings, in Newton's, that will be recorded on each of the balances when

(i) the string is slack as shown the diagram. (3mks)

_____

_____

_____

_____

(ii) the string is taut with the metal fully immersed in the liquid. (5mks)

(b) The weight of a stone in air is 7.5N. When fully immersed in paraffin of density 0.8g/cm³ its weight is 6.3N. Determine the;

(i) up thrust in the paraffin. (1mk)

(ii) volume of the stone. (2mks)

19. (a) What is meant by specific latent heat of vaporization of a substance? (1mk)

(b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100ºC was passed into water contained in a well-lagged copper calorimeter. The following measurements were made:

- Mass of calorimeter = 55g
- Initial mass of water = 75g
- Final mass of calorimeter + water + condensed steam = 133g
- Final temperature of the mixture = 30ºC

[Specific heat capacity of water = 4200JKg^{-1}k^{-1} and specific heat capacity of copper = 390JKg^{-1}k^{-1}]

Determine the

(i) mass of condensed steam. (1mk)

(ii) heat gained by the calorimeter and water if the initial temperature of the calorimeter + water = 20ºC. (2mks)

(iii) given that L is the specific latent heat of vaporization of steam,

(I) Write an expression for the heat given out by steam. (2mks)

(II) Determine the value of L. (2mks)

(c) (i) In verifying the Charles' law of gases, the volume and the temperature of a gas are varied at constant pressure, State the condition necessary for the law to hold. (1mk)

(ii) With an aid of a labeled diagram, describe an experiment to verify Charles' law. (5mks)