Name: …………………………………………………… Index No: ………………….………………

School: ………………………………………………….. Candidate's Signature: …………………

Date: ………………..……………………………………..

232/1
PHYSICS
Paper 1
(THEORY)
July/August 2014
Time: 2 Hours

TRANS-MARA WEST ASSESSMENT TEST (TWAT)
Kenya Certificate of Secondary Education(K.C.S.E)

PHYSICS
Paper 1
July/August 2014
Time: 2 Hours

INSTRUCTIONS TO CANDIDATES:-
- *Write your **name**, **index number** and **school** in the spaces provided above.*
- *This paper consists of **two** sections; A and **B***
- *Answer **all** the questions in section **A** and **B** in the spaces provided*
- *All working **must** be clearly shown.*
- *Mathematical tables and electronic calculators may be used*
- *Take the earth's gravitational field strength g = 10 m/s².*

For Examiner's Use Only:

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1-15	25	
B	16	12	
	17	09	
	18	08	
	19	12	
	20	14	
TOTAL SCORE		**80**	

This paper consists of 12 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided.

1. The figure below shows the change in volume of water in a measuring cylinder when an irregular solid is immersed in it.
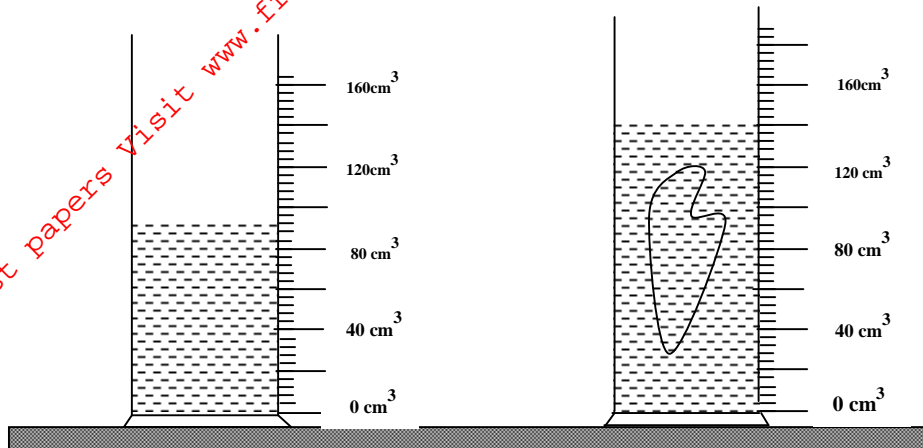
Given that the mass of the solid is 567g, determine the density of the solid in SI units. (Give your answer correct to 2 decimal places.)   (3mks)

2. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.
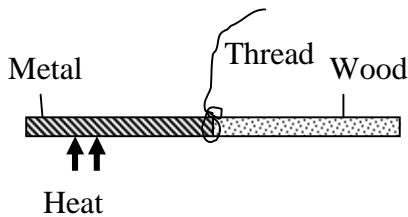
The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt   (1mk)

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3. (a) Estimate the size of an oil molecule if a drop of oil of volume 6.0×10^{-10} m^3 forms a patch of radius 32 cm on a water surface.   (2mks)

(b) Other than oil patch being monolayer, state any **one** other assumption in the oil drop experiment.

(1mk)

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4. An immersion heater rated at 180 W is placed in a liquid of mass 2 kg. When the heater is switched on for 7.5 minutes the temperature of the liquid rises by 40^0C. Determine the specific heat capacity of the liquid.
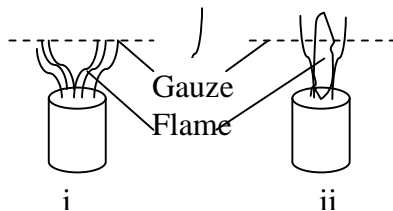
(2mks)

5. Other than temperature state **one** other factor that affects the surface tension of water. (1mk)

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6. The figure below shows a uniform bar pivoted at its centre and is at equilibrium.
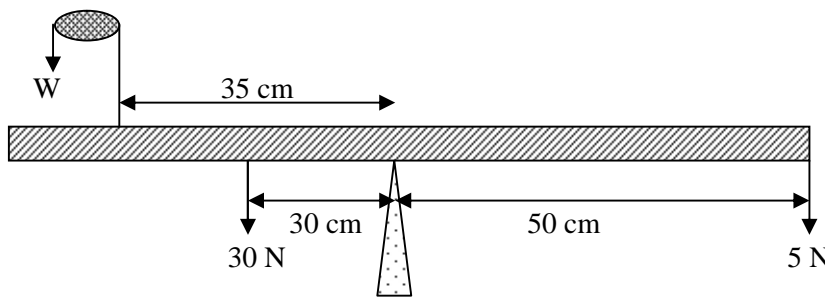
Determine the value of **w**. (3mks)

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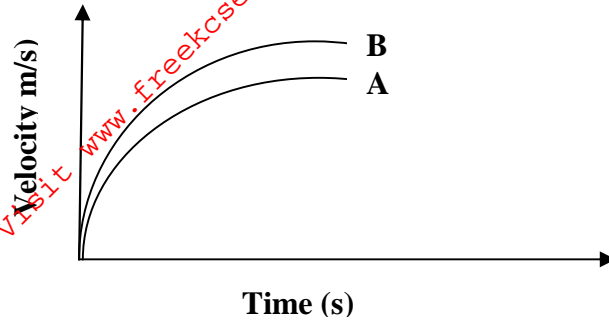
7. When a bunsen burner is lit below wire gauze, it is noted the flame initially burns below the gauze as shown in figure (i) below. After sometime, the flame burns below as well as above the gauze as shown in figure (ii).

Explain this observation (2mks)

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8. The figure shows the velocity time graph of two identical spheres released from the surfaces of two liquids **A** and **B**.

Give a reason why the terminal velocity of the sphere In B is higher than in A. (1mk)

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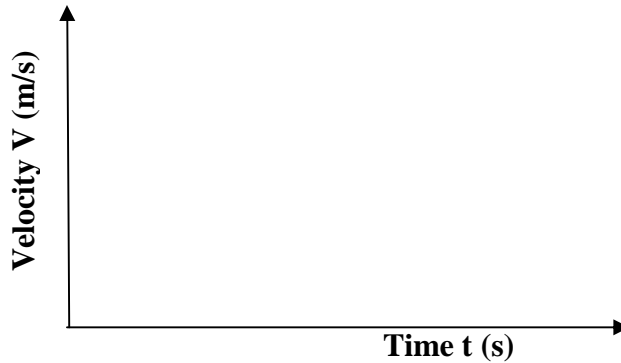
9. A box of mass 500g is dragged along a level ground at a speed of 12 m/s. if the force of friction between the box and the floor is 2000N, calculate the power developed. (2mks)

10. On the axes provided sketch a graph of velocity (v) verses time (t) for uniformly accelerated motion given that to **t** = 0, **v** is greater than zero. (1mk)

11. State how heat losses by convection and radiation are minimised in a thermos flask. (2mks)

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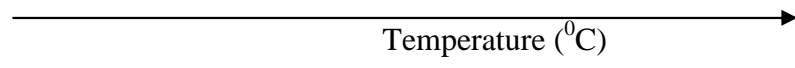
12. Sketch on the axes provided, a graph to show how mass per unit volume of water varies with temperature when water is heated from 0^0C to 20^0C (1mk)

Temperature (^{0}C)
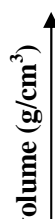
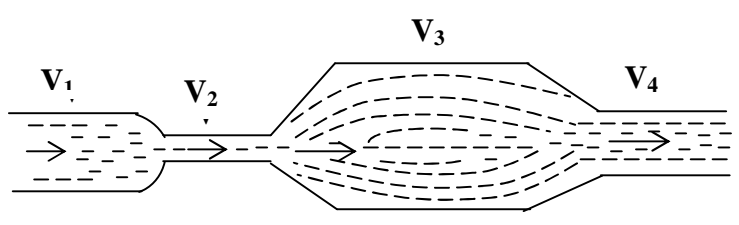13. State how the velocity of a moving fluid varies with pressure. (1mk)

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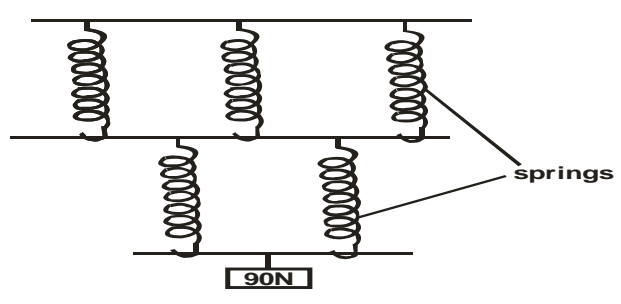
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14. The figure below shows a tube of varying cross sectional area. V_1, V_2, V_3 and V_4 represent the speeds of water as it flows steadily through the sections of the tube.

Arrange the speeds V_1, V_2, V_3 and V_4 in decreasing order starting with the highest. (1mk)

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15. The spiral springs shown in figure below are identical. Each spring has a spring constant k = 300N/m

springs

90N

Determine the total extension of the system (take the weight of the cross bars to be negligible) (3 mks)

SECTION B (55 marks)

Answer all questions in this section

16. A pulley system having a velocity ratio of 5 is used to raise a load of 800 N through a height of 0.6 m at a constant speed using an effort of 200 N in a time of 15 seconds.

a) Draw a diagram in the spaces provided below to show the pulley system and on it mark the direction of tension on all the string sections; (2mks)

b) Calculate the mechanical advantage of the pulley system; (2mks)

c) Find the efficiency of the pulley system; (3mks)

d) Calculate the power developed by the effort. (3mks)

e) Give **two** reasons why the efficiency of the pulley system is less than 100 %. (2mks)

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17. a) What is diffusion? (1mk)

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b) A smoke cell contains a mixture of trapped air and smoke. The cell is brightly lit and viewed through a microscope. State and explain what is observed. (2mks)

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c) A beaker is filled completely with water. A spoon full of common salt is added slowly. The salt dissolves and the water does not overflow.

  (i) Why is salt added slowly? (1mk)

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  (ii) State the reason why water does not overflow. (1mk)

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d) In the figure below, ammonia gas and an acid gas diffuse and react to form a white deposit on the walls of a long glass tube as shown.

Cotton wool soaked in concentrated ammonia

Cotton wool soaked in concentrate HCl
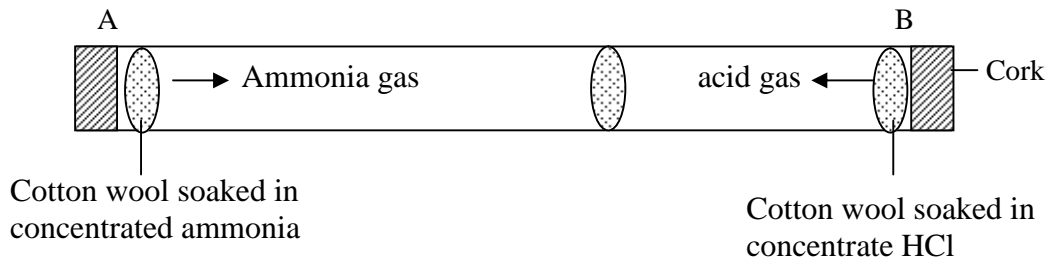
  (i) What conclusion can be made from the result of this experiment? (1mk)

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  (ii) How does the size and mass of a gas affect its rate of diffusion? (1mk)

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  (iii) The experiment is performed at a lower temperature. Explain how the time taken to form the white deposit would be affected. (2mks)

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18. a)The figure below shows a minibus of mass (m) moving along a curved part of the load with a constant speed.
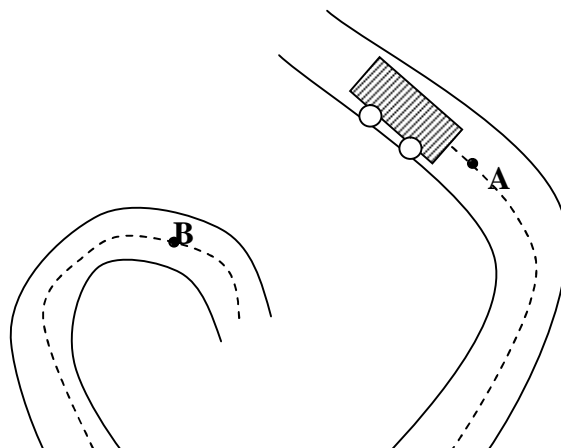
i) Explain why the minibus is more likely to skid at **B** than at **A** if it moves at the same speed; (2mks)

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ii) If the radius of the path at B is 250 m and the minibus has a mass of 6000 Kg, determine the maximum speed the vehicle can be driven while at B to avoid skidding if the angle of banking is 20°. (3mks)

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b) A string of length 70 cm is used to whirl a stone of mass 0.5 kg in a vertical circle at 5 revolutions per second. Determine:

    (i)   The period; (1mk)

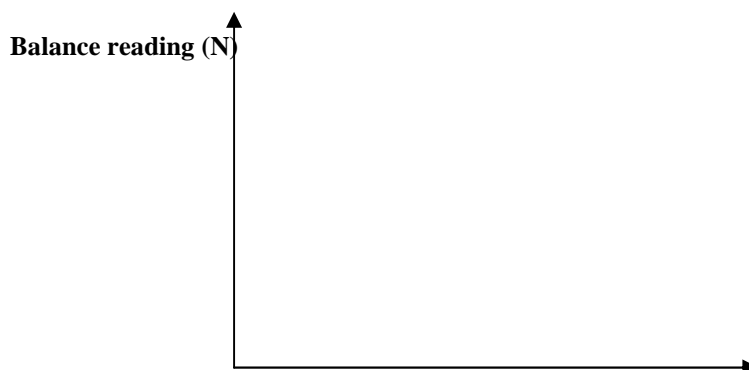……………………………………………..…..………………………………………………………………

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    (ii)   Angular velocity. (2mks)

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19 a) An object is attached to a spring balance and then gradually lowered into a liquid.

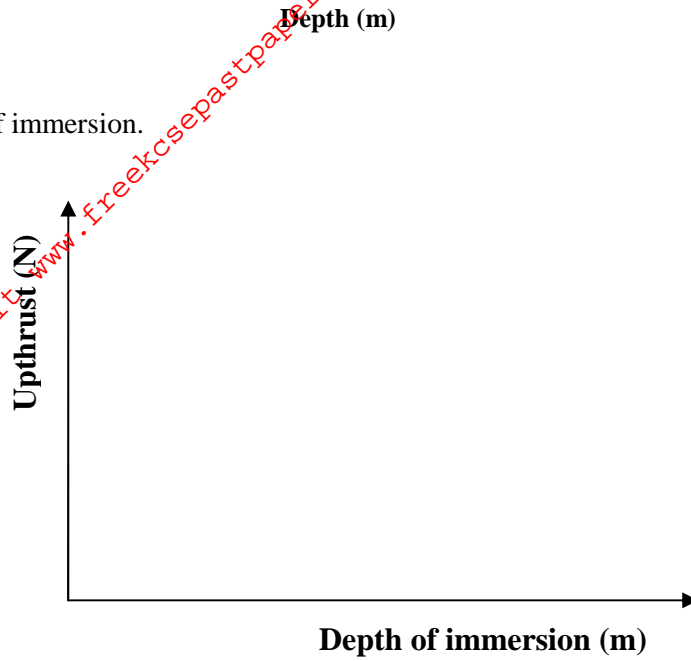In the spaces provided below sketch a graph to show the variation of the:

i)Balance reading with depth of immersion; (1mk)

Balance reading (N)

ii)Up thrust with depth of immersion.   (1mk)

Depth (m)

b) A rectangular metal block of dimensions 0.1 m by 0.15 m by 0.2 m and density 3000 Kgm^{-3} is supported inside kerosene of density 800 kg/m^3 by a thread attached to a spring balance. The longer side is vertical while the upper side is 0.1m below the surface of kerosene.
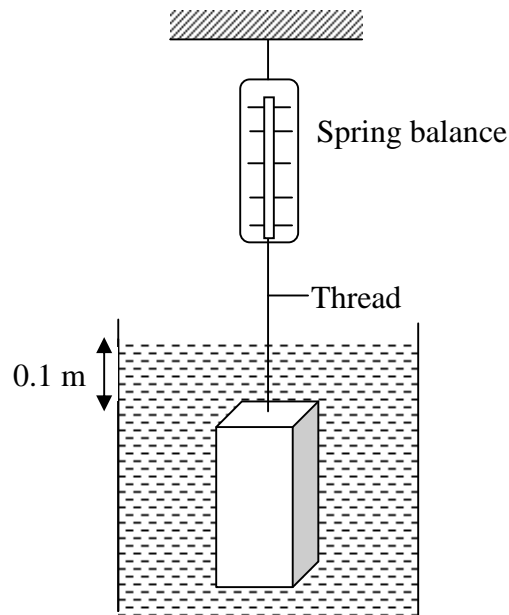
Calculate the force due to the liquid on:
i)The lower surface of the solid;   (3mks)

ii)The upper surface of the solid;   (3mks)

c) Calculate the up thrust on the solid;   (2mks)

d) Determine the reading on the spring balance.   (2mks)

20.(a) Define the term inertia   (1mk)

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b) A body **P** of mass 4 kg supported by alight inextensible string 4m long held at an angle of 60° from the

vertical position as shown in the figure below. A second body **R** of mass 4 kg rests at the edge of a platform

2 m high, the body is released and strikes body **R** head-on in a perfectly elastic collision.
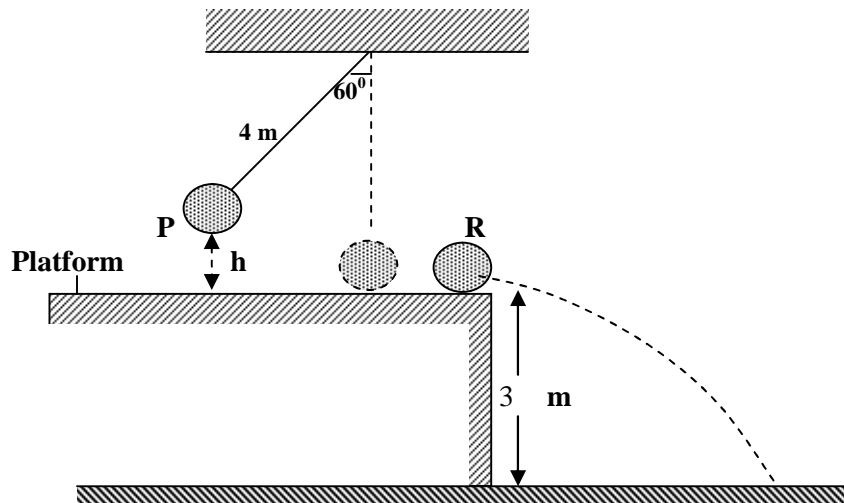
i)   Explain the term elastic collision   (1mk)

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ii)   Determine the maximum height, **h** attained by body **P** above the platform.   (2mks)

iii)   Determine how long it takes for body **R** to strike the ground after being hit by **P**.   (3mks)

iv)   Determine the horizontal velocity of body **R**.   (2mks)

v)   How far from the base of the platform will body **R** strike the ground if **P** stops after the collision

(3mks)

c)   A parachutist allows his leg to bend and roll over on the ground when he lands. Explain   (2mks)