NAME.. INDEX NO..

SCHOOL.. SIGN.............................. DATE......................

232/1
PHYSICS
PAPER 1
FORM 4
MARCH 2013
TIME: 2 HOURS

PENTAGON JOINT EXAMINATIONS (WARENG DISTRICT)

The Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES:

1. Write you name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided
3. This paper consists of two sections: A and B.
4. Answer ALL the questions in section A and B in the spaces provided.
5. Non-programmable electronic calculators and KNEC tables may be used.
6. Where applicable take : g = 10N/Kg; Density of water 1000Kg/cm^3.

FOR EXAMINERS USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1 – 15	25	
B	16	08	
	17	12	
	18	13	
	19	10	
	20	12	
TOTAL		**80**	

1. The diagram shows scales used to measure the width of a rod. The instrument has an existing reading before use of +0.02m.

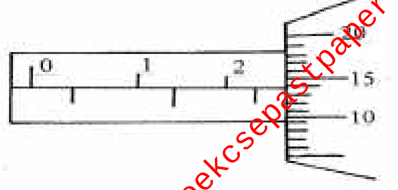
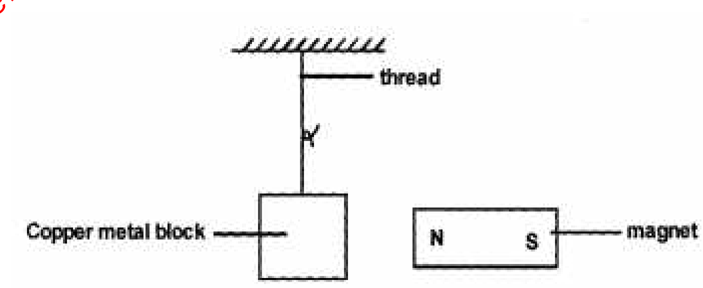


Fig 1

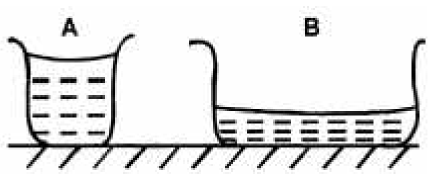
What is the width of the rod. (2marks)

2. On the diagram below, state forces acting on the metal block indicating their direction(s). (1mark)



3. A butcher has a beam balance and masses of 0.6kg and 2.5kg. How would he measure 1.9kg of meat on the balance at once? (1mark)

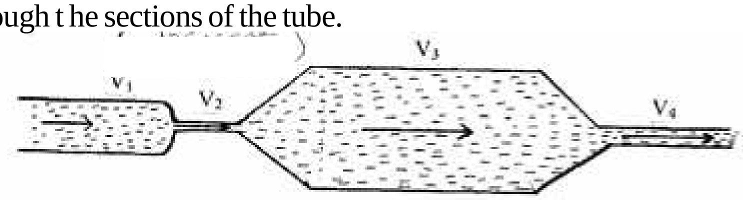
4. Figure 3 shows two silver containers A and B placed on a wooden table. A and B have equal volumes of hot water initially at the same temperature.



Which one cools faster and why? (2marks)

5. A girl heats 5kg of water to a temperature of 80^{0}C. When she adds X kg of water at 15^{0}C, the mixture attains a temperature of 40^{0}C, determine the value of X. (2marks)

6. 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 t he sections of the tube.



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

7. State the reason why electricity transmission cables are left sagging between the posts. (1mark)

8. A body attached to one end of a string 0.8m long is whirled in space in a horizontal circle at 30 revolutions per minute. What is the speed of the body along the circumference? (2marks)

9. A stone is thrown vertically upwards with a velocity of 50m/s from the ground. What is the maximum height reached by the stone? (2marks)

10. Explain why a drop of methylated spirit placed at the back of the hand feels colder than a drop of distilled water although are at same temperature. (1mark)

11. A non -drip candle is lighted and placed on a level bench. State and explain the changes in the stability of t he candle as it continues to burn.
(1mark)

12. A trolley of mass 1.0kg moving at 1m/s collide with an identical stationary trolley of mass 1.0kg. They stick and move off together with a common velocity (V). Determine their kinetic common velocity (V) if collision is perfectly elastic. (2marks)

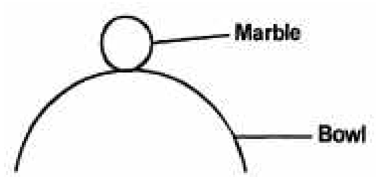
13. The weight of a solid in air is 5.0N. When its fully immersed in a liquid of density 800kg/m^3 its weight is 4.44N. Determine:

a) The up thrust in the liquid. (1mark)

b) The density of the solid. (3marks)

14. The barometric height in a town is 60cmHg. Given that the standard atmosphere is 76cmHg and density of mercury is 13600kgm^{-3}, determine the altitude of the town (take density of air to be 1.25kgm^{-3}). (2marks)

15. The figure below shows a marble resting on an inverted bowl.

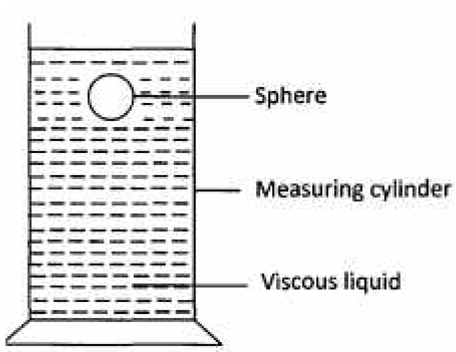


State with a reason, the state of equilibrium of the marble. (1mark)

SECTION B : (55 MARKS)

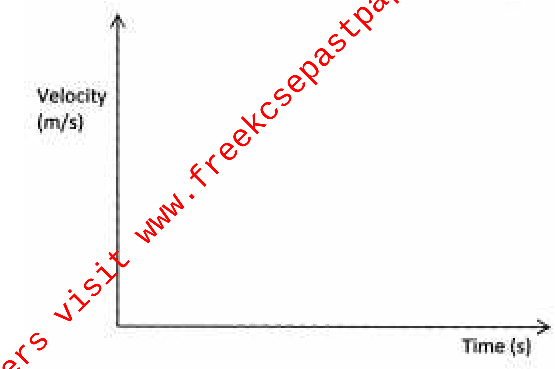
16. a) Distinguish between elastic and inelastic collisions. (2marks)

b) The figure below shows a sphere moving in a viscous liquid in a tall measuring cylinder.

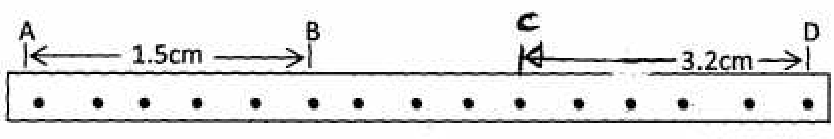


i) Show on the diagram the forces acting on the sphere. (3marks)

ii) Sketch a graph showing the variation of velocity with time and show on the sketch the terminal velocity Vt. (3marks)



17. a) A paper tape was attached to a moving trolley and allowed to run through a ticker timer. The figure shows the section of the tape.



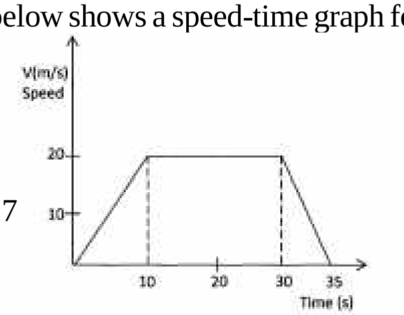
If the frequency of the tape is 100Hz, determine:

i) Velocity at AB and CD. (4marks)

ii) The average acceleration. (3marks)

b) The figure below shows a speed-time graph for part of the journey of a bicycle.

Fig 7



Calculate the total distance traveled. (3marks)

c) A bomber flying horizontally at 100m/s releases a bomb from the height of 200m.
Calculate the time taken for the bomb to hit the ground. (2marks)

18. a) State the pressure law. (1mark)

b) The pressure (P) of a fixed mass of a gas at constant temperature, (T = 300k), is varied continuously. The corresponding values of P and volume (V) of the gas are shown below.

Pressure (X 10^5 Pa)	3	3.5	4	4.5	5	5.5
Volume (m^3)	0.025	0.020	0.017	0.014	0.012	0.011
$\frac{1}{v}$ (m^{-3})						

i) Complete the table for the values (2marks)

ii) Plot a graph of P against $^{1}/_{V}$. (4marks)

iii) Given that $P = \frac{3RT}{v}$, find R from the graph. (3marks)

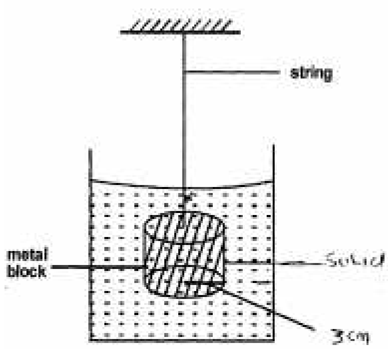
c) A container closed with an airtight lid contains air to a pressure 1.2×10^5 Pa and temperature of 32^0C. The container is heated in water bath until the lid opens. If the temperature at which the lid is 92^0C, calculate the pressure attained by the gas. (2marks)

d) With reference to intermolecular distance, explain how decrease in temperature affects he volume of a gas. (1mark)

19. a) i) Define relative density. (1mark)

ii) Name two main features of hydrometer. (1mark)

b) The figure below shows a cylindrical metal block of density 10.8g/cm^3 and radius 3cm and height 10cm suspended inside a liquid of density 1.2g/cm^3 by a string attached to a point above the liquid. Three forces acting on the block are tension T on the string, the weight W and the up thrust U due to the liquid.



i) Write down the expression relating T, W and U when the block is in equilibrium inside the liquid. (1mark)

ii) Determine the weight of the block. (3marks)

iii) Determine the weight og the liquid displaced by the fully submerged block. (2marks)

iv) Hence determine the tension T in the string. (2marks)

20. a) Explain why its advisable to use a pressure cooker for cooking at high altitudes. (2marks)

b) Water of mass 6kg initially at 25^0C is heated in an electric kettle rated 6.0kw. The water is heated until it boils at 100^0C (Take specific heat capacity of water 4200$jk^{-1}k^{-1}$, Heat capacity of the kettle 450j/k, specific latent heat of vaporization of water = 2.3 a 10^6j/kg).

Determine

i) The heat absorbed by the water to reach boiling point. (2mark)

ii) Heat absorbed by the electric kettle. (2marks)

iii) The time taken for the water to boil. (3marks)

iv) How much longer it will take to boil away all the water. (3marks)