NAME OF THE SCHOOL ……

CANDIDATES' NAME…… INDEX NO. ……

CANDIDATES' SIGNATURE…… DATE……

NAKURU DISTRICT SECONDARY SCHOOLS TRIAL EXAMINATION 2013

Kenya Certificate of Secondary Education

PHYSICS PAPER 1

JULU/AUGUST 2013

SECTION1 (25 MARKS)

1. What is the reading of the micrometer screw gauge shown in the figure below if it has a zero error of -0.04 (2MK)

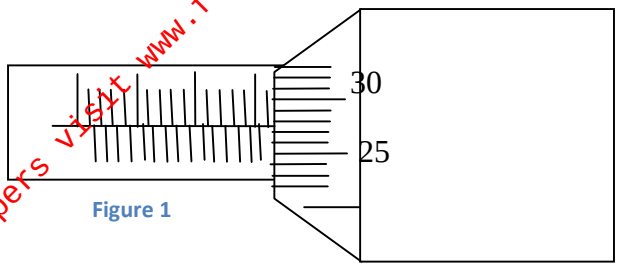
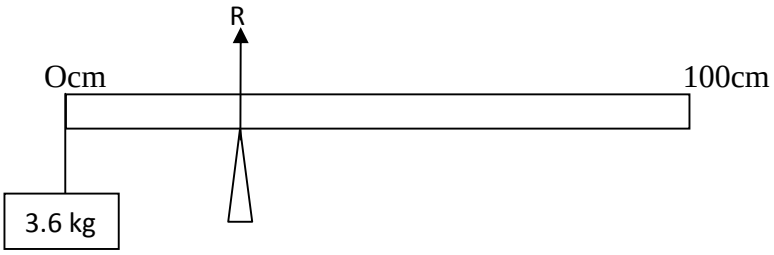


Figure 1

2. The figure 2 below shows a uniform meter rule pivoted at the 23 cm mark with a mass of 3.6kg hanging at the o cm mark the system is in equilibrium.



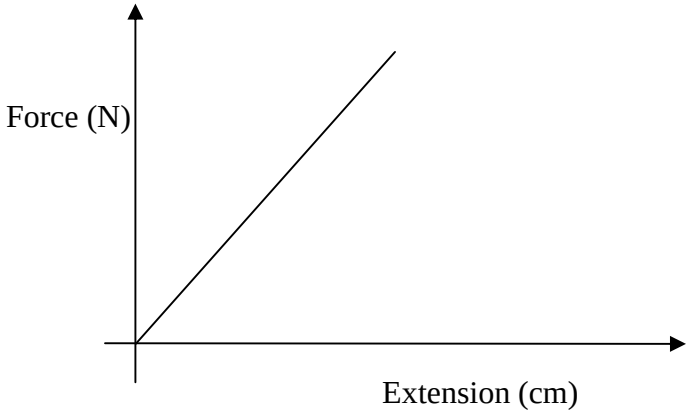
Determine,

i) the weight of the rule (2MK)

ii) the normal reaction force R at the rule (1 MK)

3. When a drop of oleic acid of known volume is dropped on the surface of water in a large trough it spread out to form a large circular patch. State one assumption made when the size of the molecule of oleic acid is estimated by determining the area of the patch (1mk)

4. The following is a graph of force against extension for a spring



On the same axes, sketch a graph of force against extension for a spring double the length, same thickness, same material as the spring above (1MK)

5. It is found that a force of 500N placed on a nail head cannot drive it into a piece of wood while the same nail is driven into the wood by a hammer if it strikes it with the same force. Explain (2MK)

6. Two parallel forces are acting on a body of mass 0.7 kg as shown in figure 4 below.

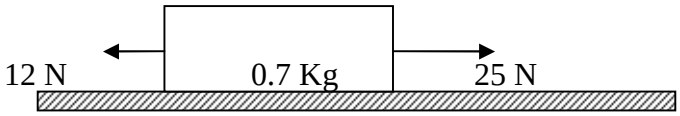


Figure 25

Calculate the acceleration of the 0.7Kg mass (3MK)

7. The figure 6 below shows a rectangular glass block of sides 10cm X 20cm X 60cm fully immersed in two liquids. One third of its volume is in paraffin while two thirds is under water.

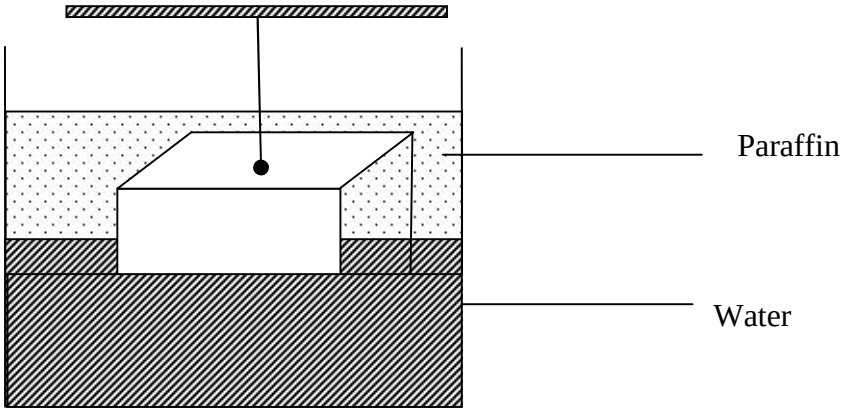


Figure 6

Given that the density of the block is 1200Kg /m^3 , density of paraffin is 800Kg, and that of water is 1000Kg, Calculate the tension in the string (3MK)

8. A passenger was sucked out after the rear door of a cargo plane opened accidentally during flight take off. Explain (2MK)

9. The figure 7 below shows three identical masses m_1, m_2 and m_3 placed on a smooth rotating table.

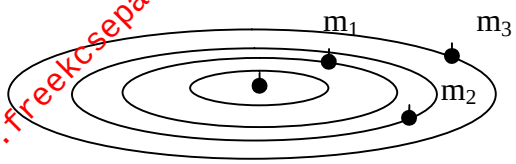


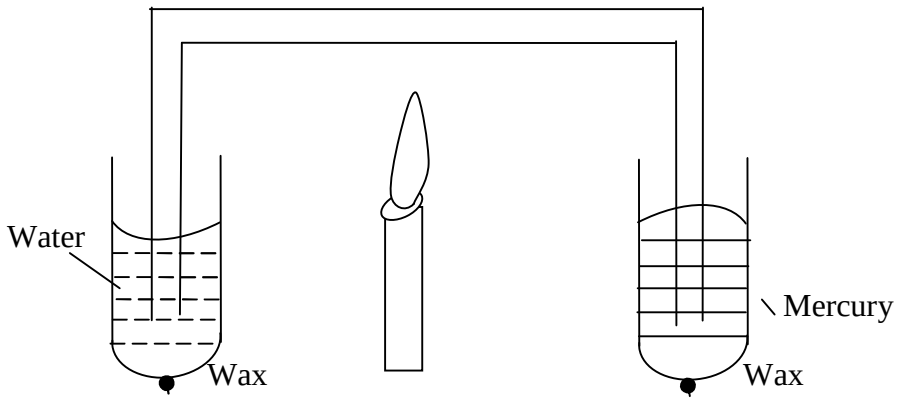
Figure 7

m_2

i. State the factor that determine whether a particular mass slides of the table or not (1MK)

ii. 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(3mk)

10. The set up below shows two test tubes one filled with water while the other with mercury. Some wax is fixed at the bottom of each. A thick copper rod is dipped in both as shown in figure 8 below. A Bunsen burner flame is lit at the centre.

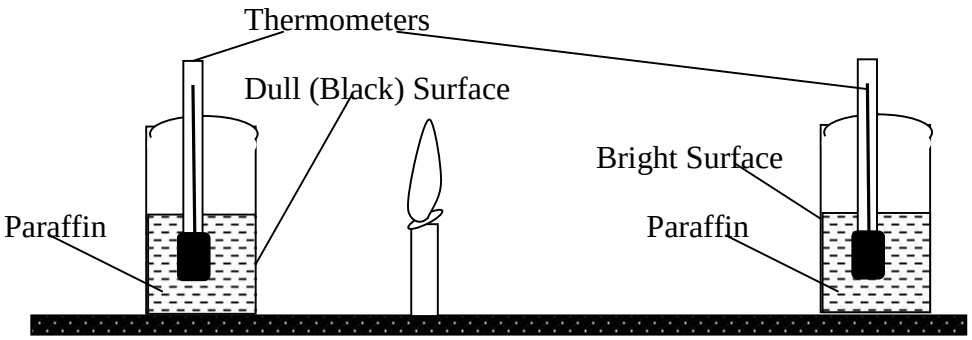


It was observed that the wax on the mercury test-tube falls off first. Give a reason for the observation (2MK)

11. A tall building has two barometers, one at the ground floor reading 750mmHg and the other at the top reading 748 mmHg. Determine the height of the building (2MK)

SECTION B (55MKS)

12.a) Two similar cans are partly filled with equal quantities of paraffin. Each of the cans is covered with a lid holding a thermometers as shown in figure 8



The cans are placed on a wooden bench at the same distance from a radiant heat. One is dull black and the other is bright silvered. The following temperatures are recorded.

Time (Minutes)	0	1	2	3	4	5
Temp. (^{0}C) Dull Surface	19	21	23	25	27	29
Temp. (^{0}C) Bright Surface	19	20	21	22	23	24

i. Study the table and explain why there is a difference between the rises in temperature of paraffin in the two cans. 1MK)

ii. Explain why the heat from the heater could reach the cans by radiation only but not through either convection or conduction (2MK)

12.b) On the axes provided in figure 9 sketch a graph of mass per unit volume against water heated from 0^0 to 10^0 (2MK)

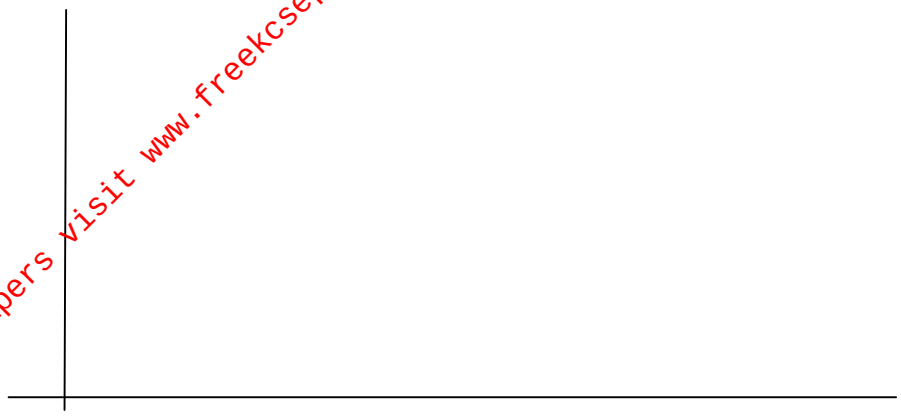


Figure 39

12.c) Water of mass 200g at a temperature of 60^0 C is put in a well lagged copper calorimeter of mass 80g. A piece of ice at 0^0C and mass 20g is placed in the calorimeter and the mixture stirred gently until all the ice melts. The final temperature T of the mixture is then measured. Given that ;Specific Latent heat of ice is 334000J/Kg, Specific heat capacity of water is 4200J/K/Kg and Specific heat Capacity of copper is 900J/K/Kg, Determine

i) The heat absorbed by the melting ice at 0^0 (2MK)

ii) The heat absorbed by the melted ice (water) to rise to the temperature T (answer to be given in terms of T)

iii) The heat lost by the warm water and the calorimeter (answer in terms of T)

The final temperature T of the mixture

13.a) Define efficiency of a machine (1MK)

b) The figure 10 below shows a windlass. An effort is applied on the handle which is turned on a radius of 70cm. as the handle turns a rope is wound around the drum of a diameter 28cm, thus raising a bucket of water out of a well.

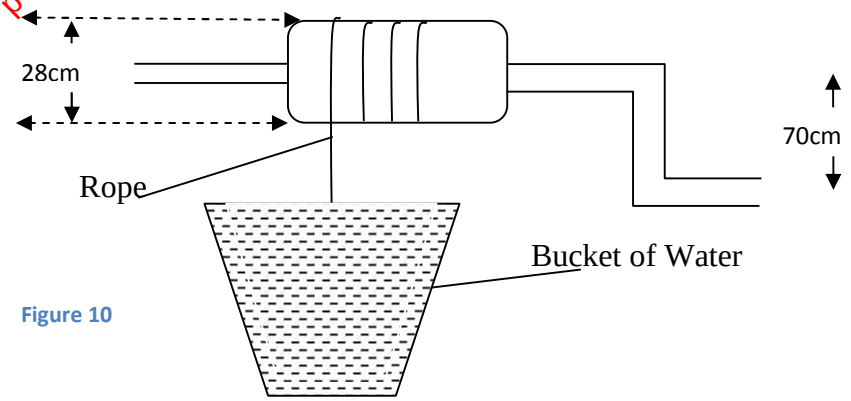


Figure 10

If an effort of 10N is needed to lift to the bucket full of water of mass 4Kg. Calculate;

i. The energy gained by the mass when the drum turns through one revolution(2MK)

ii. The work done by the effort during this revolution (2MK)

iii. Suggest a reason why the two quantities in (i) and (ii) are not equal (1MK)

iv. Calculate the velocity ration of the machine and the efficiency of the windlass (3MK)

14.a. State Newton's second law of motion (1 MK)

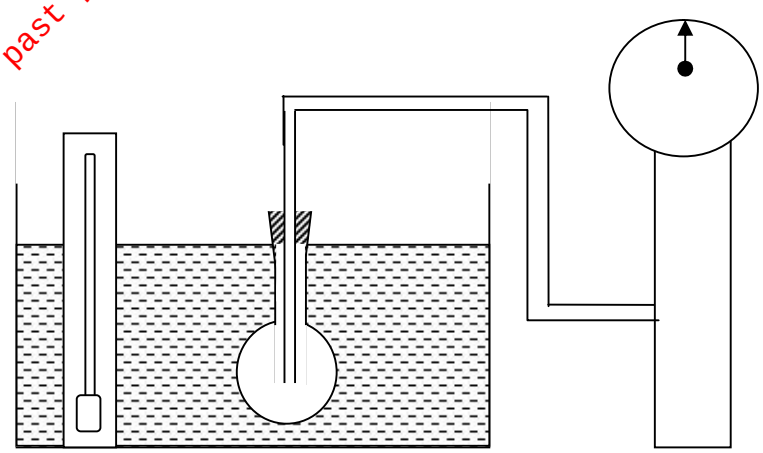
14.b. A driver driving a car of mass 1200Kg at constant speed of 72Km/h is flagged down by a traffic police officer. It takes him 2s to react to the police signal and bring the car to rest by applying a constant breaking force in 10s. Determine the minimum stopping distance and the constant breaking force (4MK)

14.c. An ordinary hydrometer of mass 20 g floats with 3cm o its stem out of water. The area of cross-section of the stem is $0.75cm^2$. find the total volume of hydrometer and the length above of surface when it floats in a liquid of relative density 1.4 (4MK)

15. a) State the difference between temperature measured in Kelvin scale and Celsius scale (1MK)

15. b) Using Kinetic theory of gases, explain how pressure of a gas rises when the gas is heated at constant volume (2MK)

15. c) Figure ii shows a set up that may be used to verify pressure Law.



15. d) Figure ii shows a set up that may be used to verify pressure law.

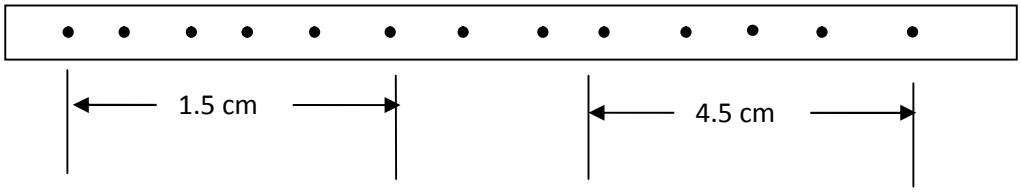
i). State the measurement that should be taken in the experiment (2MK)

ii). Explain how the measurements in (i) above may be used to verify Pressure Law (3MK)

iii). State one assumption of real gas laws (1MK)

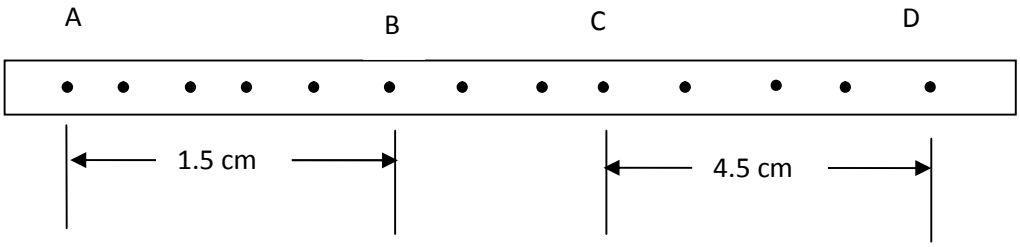
iv). At 20^0C, the temperature of a gas is 50cm of mercury. At what temperature would the pressure of the gas fall to 10cm of mercury?

16. a. Figure 12 below represents dots made on a tape by ticker timer. The dots were made at a frequency of 50 dots per second.



What is the time interval between the two consecutive dots (1MK)

16. b. Draw an arrow on the tape that indicates the dots made at t=0 , indicate in a similar way the dots at t=0.2s (1MK)

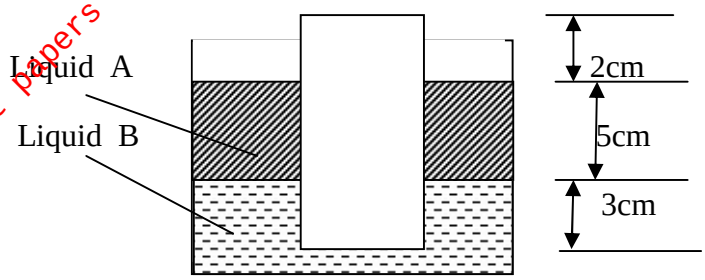


16. c. Determine the :

(i) Average velocity at intervals AB and CD (4MK)

(ii) Average acceleration of the tape (3MK)

16. d. Figure 13 below shows a rectangular block of height 10cm floating vertically in a beaker containing 2 immiscible liquids A and B of densities 800Kg/m^3 respectively. The dimensions of the block are 3cm long by 2cm wide by 10cm high.



If the length of the block in liquid A is 5cm and that in B is 3cm, determine

i). Weight of the liquid displaced (2MK)

ii). Weight of liquid B displaced (2MK)