NAME:..... INDEX NO.....

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

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

BARINGO NORTH TRIAL EXAMINATIONS

The Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS

Take:

- Acceleration due to gravity g = $10ms^{-2}$
- Atmospheric pressure = 1.0×10^5 Pa
- Density of water = $100kgm^{-3}$
- Specific heat capacity of water = $4200Jkg^{-1}k^{-1}$

FOR EXAMINERS USE ONLY

SECTION	MAX SCORE	CANDIDATES SCORE
A	25	
B	55	
TOTAL	**80**	

SECTION A

1. A pharmacist measured the mass of a tablet and found to be 20µg. Determine the mass of the tablet in SI units giving your answer in standard form. (2marks)

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2. Fire fighter puts in suits made of asbestos material. State the property of asbestos that make it suitable for the services of extinguishing fires. (1mark)

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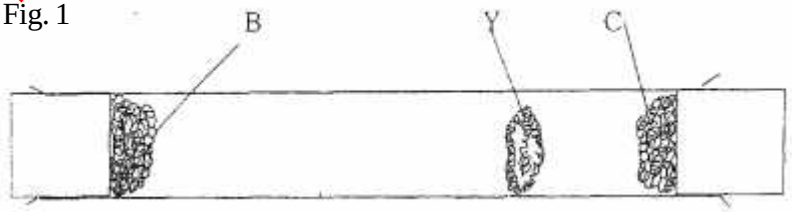
3. The set-up shown in figure 1 below is used to investigate the rate of diffusion of two gases. B and C are cotton wools soaked in hydrochloric acid and ammonia solution respectively.

Fig. 1



A white deposit Y is formed between B and C. Compare the densities of the two gases. (2marks)

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4. John placed a steel needle gently on surface of water in a beaker. State what he could do to increase the chances of needle sinking other than pushing it or stirring the water surface. (2marks)

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5. Figure 2. below shows a non uniform plank which weighs 12kg. The plank is balanced 60cm from one end by a weight of 72N.

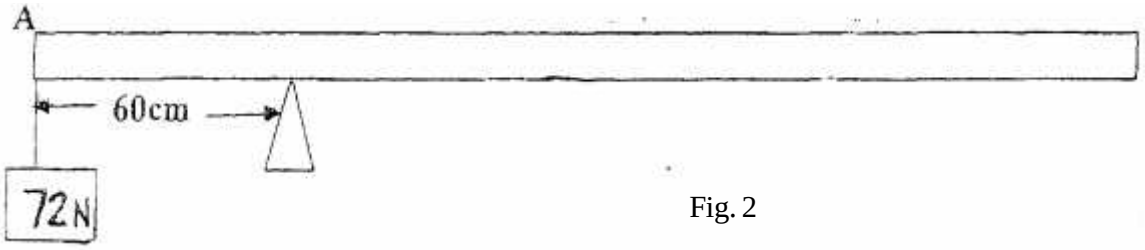

Fig. 2

Determine the position of the centre pf gravity from A. (3marks)

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6. Fifteen grams of common salt were added to 1000cm^3 of water. After all the salt had dissolved the volume of solution was found to be 998cm^3. Account for the decrease in volume of the solution. (2marks)

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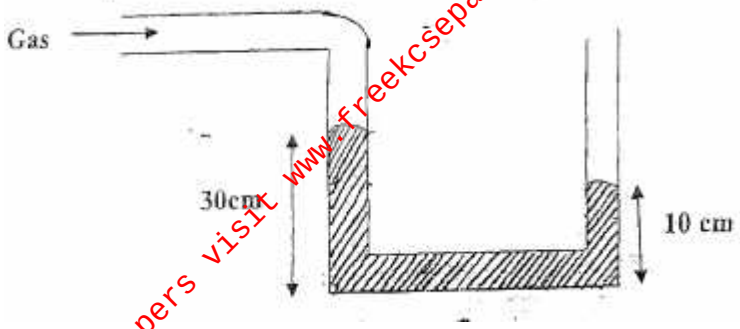
7. The figure below shows a liquid manometer connected to a gas supply.



If the pressure of the gas is 9.8×10^4Pa. Determine the density of the liquid. (3marks)

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8. Lang'at set up the apparatus as shown in figure 4 below

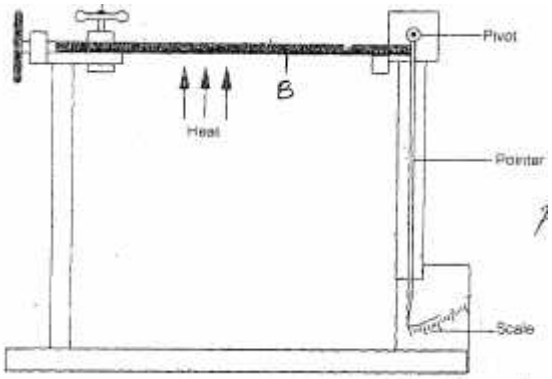

Fig. 4

He heated metal bar B and observed the deflection shown by scale. He then replaced B with another type of metal and repeated the prodedure.

a) State what the student was investigating. (1mark)

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b) Explain why a long pointer was fixed instead of a short one. (1mark)

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9. Three identical; springs A, B and C are arranged as shown in figure 5 below.

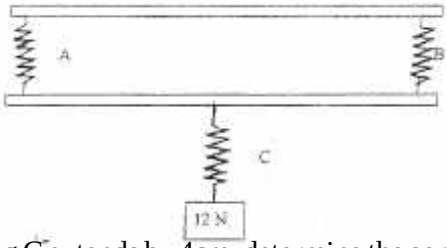

fig. 5

i) If spring C extends by 4cm, determine the spring constant of the system. (3marks)

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ii) What is the extension in spring A. (1mark)

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10. An air bubble of volume $0.8cm^3$ is released from the bottom of a pond of water of depth 2.5m. Determine its volume at the surface of the water just before the bubble explodes at the surface. (3marks)

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11. Figure 6 below shows two parallel plates held by very weak slinky springs.

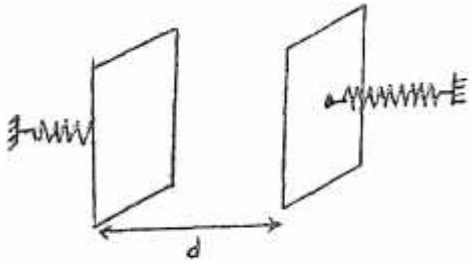

Figure 6

Air was blown between the plates at varying velocities. In the axes shown below sketch a graph of velocity of air against distance of separation. (1mark)

SECTION B (55 MARKS)

12. a) i) State the law of floatation . (1mark)

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ii) State the two forces that act on an object that is partially immersed in water. (2marks)

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iii) What third force would be in play if the object was to move inside the fluid. (1mark)

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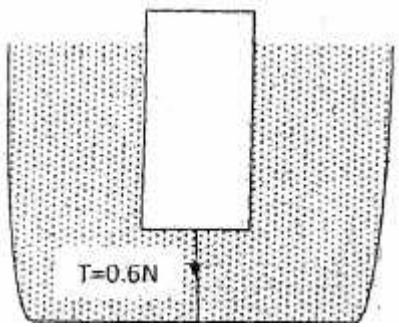
b) An object of mass 50g floats with 20% of its volume above the water surface as shown below.
The tension in the string is 0.6N (Take density of water = $1000kg/m^3$).



i) Calculate the up thrust experienced by the object. (3marks)

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ii) The volume of the water displaced. (3marks)

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iii) The density of the object. (3marks)

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iv) What could happen if the string was cut? (1mark)

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13. a) Define critical speed. (1mark)

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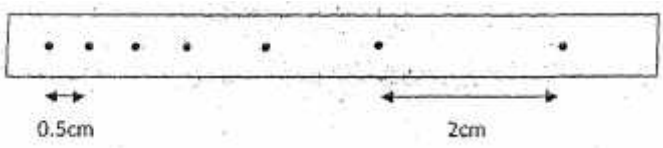
b) The section of the tape shown below was produced when a tape running down an incline plane was attached to a ticker-tape timer of frequency 50Hz.



i) Indicate the direction in which the trolley was moving. (1mark)

ii) What type of current was used to operate the ticker timer. (1mark)

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iii) Determine the initial velocity of the trolley. (2marks)

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iv) Determine the final velocity of the trolley. (2marks)

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v) Find the acceleration of the trolley in SI units. (3marks)

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c) A spear of mass 2.0kg moving at a speed Vms^{-1} strikes a heap of sand and sinks 1.5m into the sand. If the average force resisting its entry is 2,400N, determine the value of V. (3marks)

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14. a) Define the term heat capacity. (1mark)

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b) A person needs water for use at 50^{0}C. How much water at 80^{0}C should be added to 60kg of water at 10^{0}C to achieve the desired temperature? (4marks)

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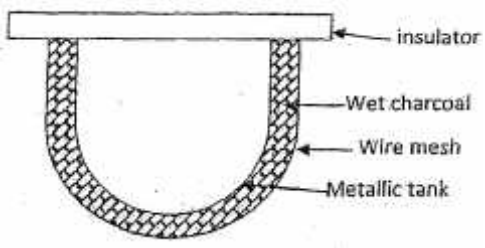
c) The diagram below shows a charcoal refrigerator.



Explain why charcoal is used and why it is sprinkled with water. (2marks)

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d) What is the role of the metallic tank and wire mesh. (2marks)

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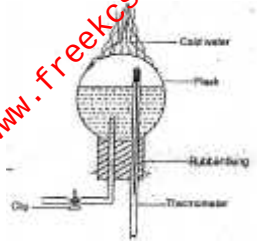
15. a) The figure below shows a round bottomed flask with water that was initially boiling.



When cold water was run over the top, the water started boiling. Explain. (2marks)

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b) Using the kinetic theory of matter, explain how the pressure of the gas increases when a gas is heated at constant volume. (2marks)

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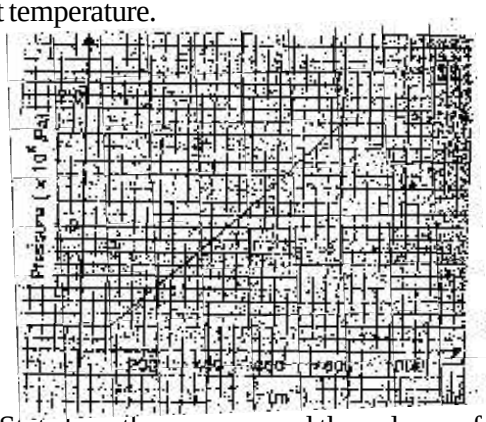
c) The graph below shows the relationship between he pressure if a gas and the reciprocal of its volume at constant temperature.



i) State how the pressure and the volume of the gas are related. (1mark)

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ii) Why would it not be practical for the value of V to go to zero? (1mark)

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iii) Given that PV = 0.82T, where T is the absolute temperature of the gas, determine the value of from the graph. (4marks)

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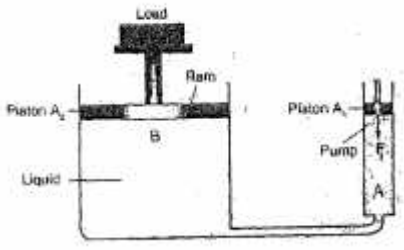
16. The following diagram shows a hydraulic machine.



a) State two ways of increasing the mechanical advantage of this machine. (2marks)

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b) If the cross section area of load piston if 20 times the area of the effort piston. Write an expression for the pressure exerted on liquid by effort position if F_1 is applied in the effort piston F_2 is the load. (2marks)

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c) A mechanic applies a force of 100N on the effort piston while rising the rear part of a car. Determine the maximum load that can be raised. (3marks)

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d) Give a reason why a gas is not suitable for use in the place of the liquid in a jack. (1mark)

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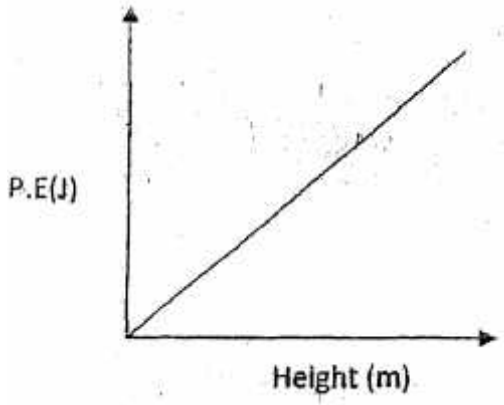
e) The figure below shows the potential P.E energy of a ball thrown vertically upwards, varies with height.



On the same axis, plot a graph of the kinetic energy of the ball. (1mark)

f) Determine the velocity ratio of the system below.