Name…… ……..…Index No:…….

Candidate's Signature ……..…… Date:……

232/1

PHYSICS PAPER 1 THEORY

MARCH/APRIL 2017

TIME: 2 HOURS

FORM 4 JOINT EVALUATION TEST

Kenya Certificate of Secondary Education (K.C.S.E.)

Physics Paper 1

2 hours

INSTRUCTIONS TO THE CANDIDATES:

- *Write your **name and index number** in the spaces provided above.*
- *Answer **all** the questions both in section **A** and **B** in the spaces provided below each question ,in **English.***
- *All workings **must** be clearly shown; marks may be awarded for correct steps even if the answers are wrong.*
- *Mathematical tables and non-programmable silent electronic calculators may be used.*

(*Take acceleration due to gravity g= 10ms^{-2} Density of water 1gcm^{-3}*)

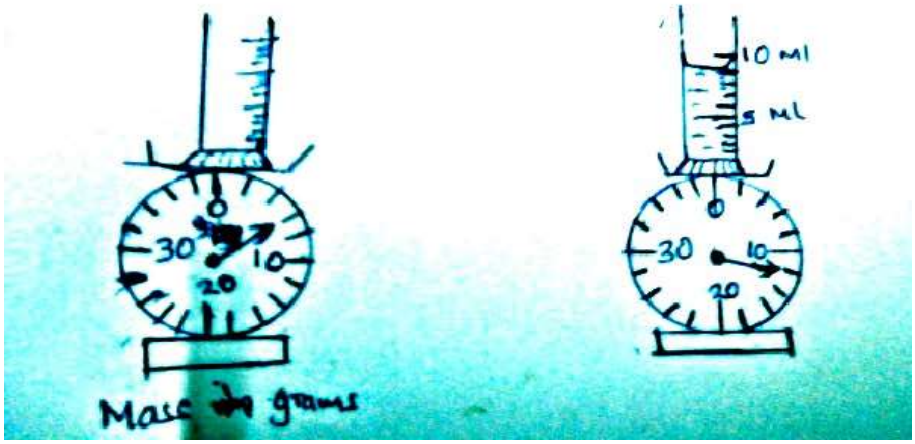
For examiners use only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Section A	1-13	25	
Section B	14	13	
	15	09	
	16	14	
	17	10	
	18	**09**	
	TOTAL	**80**	

THIS PAPER CONTAINS 12 PRINTED PAGES GO THROUGH AND ASCERTAIN THAT ALL PAGES ARE THERE

SECTION A: 25 MARKS

1. Fig. 1(a) and (b), below shows a set-up to determine the density of a liquid.



Determine the density of the liquid. (3 marks)

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2. A metal ball is cooled, state how the density of the ball will be affected. (1mark)

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3. When mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain. (2marks)

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4. A form two student in Afraha High school had two identical metal cans. Can A was painted dull black while B was shinny. She fitted on each of them a thermometer through the lids. She added equal volumes of hot water at 70°c simultaneously. State and explain the observation made after 20 minutes. (2marks)

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5. Distinguish between cohesive and adhesive forces. (2marks)

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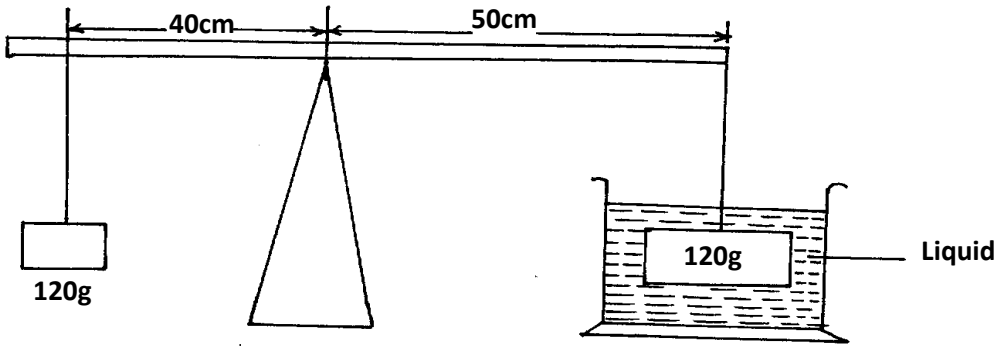
6. A uniform meter rule is balanced as shown in the figure 2 below



By displacement method, the immersed object is found to occupy 13.5cm^3.Determine the density of the liquid in SI units (3marks)

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7. State the law that relates the pressure and absolute temperature of an ideal gas. (1mark)

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8. Explain why a car feels lighter as it travels at a higher velocity. (2marks)

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9. A pipe of radius 0.4cm is connected to another pipe of radius 0.6cm. If water flows in the wider pipe at a speed of 5ms^{-1}. What is the speed in the narrower pipe? (2marks)

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10. A spiral spring whose spring constant is k is acted upon by a stretching force F. Show that the work done on stretching the spring is given by : work done = 1/2ke^2.
(2marks)

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11. Mechanics is a branch of physics dealing with motion under the influence of force. Apart from linear and circulatory motion name the other motion under this branch. (1mark)

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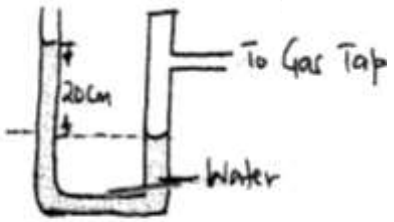
12. The figure 3 below shows a U-tube manometer containing water. One arm is connected to gas supply. Given that the atmospheric pressure is $1.0x10^5N/m^2$. Determine the height which could be supported if water was replaced with glycerine of density $1.26g/cm^3$. (3marks)



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13. A measuring cylinder contains $20cm^3$ of water. $10cm^3$ of salt is added and stirred. Explain why the volume is not $30cm^3$. (1mark)

SECTION B: 55 MARKS

14. a) A stone is dropped from a vertical cliff 60m high. Another stone is projected vertically upwards from the base with a velocity of 20m/s. Determine

    i) The time taken for the two stones to meet. (3marks)

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ii) The height from the base where the two stones met. (2marks)

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b) i) Define centripetal acceleration (1mark)

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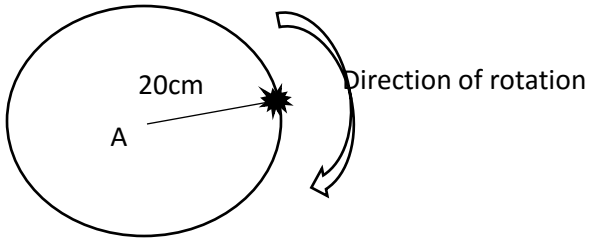
ii) An object of mass 400g revolves uniformly on a horizontal frictionless surface. It is attached by a cord 20cm long to a fixed point A as in the fig.4 below.



I) Mark and label on the diagram the direction of centripetal force, F and linear velocity, V. (2marks)

II) The object makes 2 revolutions per second. Determine the linear velocity of the object. (2marks)

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iii) A stone is tied to a light string of length 0.5m. If the stone has a mass of 20g and is whirled in a vertical circle with a linear velocity of 16m/s. calculate the maximum tension on the string. (3marks)

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15. a) State the law of floatation. (1mark)

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b) Explain why hydrometer has wide bulb with air in it. (2marks)

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c) A log of wood of mass 300kg floats on water, the density of wood is 750kg/m3. What is the maximum number of pupils of average weight 400N that can sit on this log without making it wholly submerge? (3marks)

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d) A wooden block of mass 300g and density 600kg/m^3 is held under water by tying it to the bottom of the container with a light thread. Determine the tension in the thread. (3marks)

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16. (a) State the law of conservation of energy. (1mark)

(b) A car of mass 1000kg travelling at a speed of 30m/s collides head on with a stationary van of mass 1500kg.The two vehicles embed on each other after the collision. Calculate

i) Total kinetic energy before collision (2marks)

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ii) Total kinetic energy after collision

(3marks)

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iii) Compare the kinetic energy before and after collision. Give a reason for the difference if any.

(1mark)

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c.i) Draw a block and tackle system with a velocity ration of 5. (2marks)

ii) The block tackle system above was used to lift 120kg of load. Given that the efficiency of the system is 80%. Calculate the effort applied to lift the load. (2marks)

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d. An effort of 60N is applied to the brake of a car jack whose hand moves through a circle of radius 17.5cm. The pitch of the screw is 2.5mm. Determine the velocity ratio of the screw Jack.

(3marks)

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17. a) Define the term Specific heat capacity (1mark)

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b) 100g of steam at 100°C was passed into cold water at 27°C. The temperature of the mixture became 50°C. Taking specific heat capacity of water as $4200Jkg^{-1}K^{-1}$ and specific latent heat of vaporization of water as $2260kJkg^{-1}$ and that heat losses were negligible. Determine

i) Quantity of heat lost by steam (3marks)

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ii) Quantity of heat gained by water. (3marks)

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iii) Mass of the cold water (3marks)

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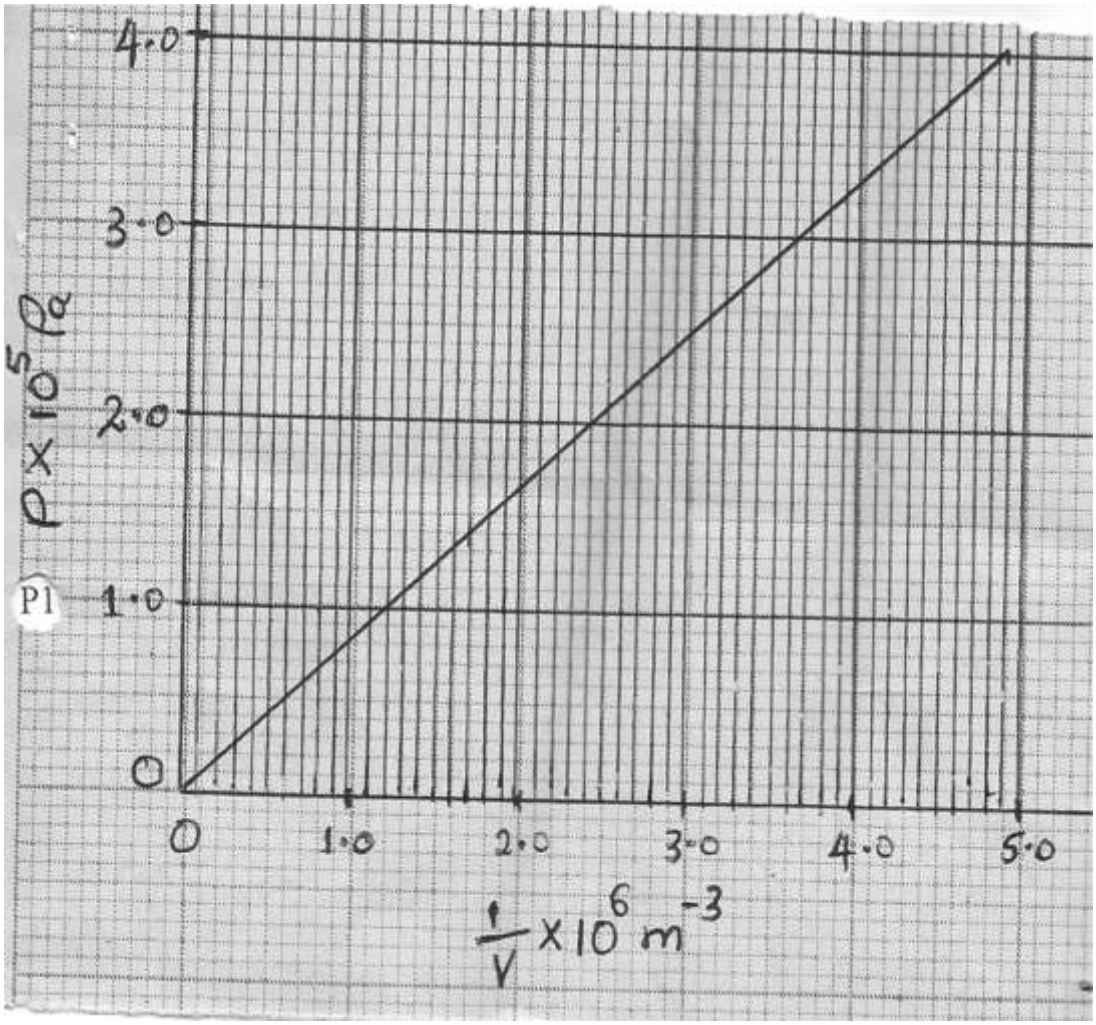
18. (a) State what is meant by an ideal gas (1mark)

(b) The pressure acting in a gas in a container was changed steadily while the temperature of the gas was maintained constant. The value of volume V of the gas measured for various values of pressure. The graph in the fig. 5 shows the relation between the pressure, P1 and the reciprocal of volume 1/V



(i) Suggest how the temperature of the gas could be kept constant (1mark)

(ii) Given that the relation between the pressure P1 and the volume, V1 of the gas is given by

PV = **k** ,Where k is a constant, use the graph to determine the value of **k** (3marks)

(iii) What physical quantity does **K** represent? (1mark)

(c) A gas occupies a volume of 4000 litres temperature of 37^0C and normal atmosphere pressure. Determine the new volume of the gas if it is heated at constant pressure to a temperature of 67^0C (normal atmosphere pressure, P = 1.01 x 10^5pa) (3marks)

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