

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

SCHOOL..... CANDIDATE'S SIGNATURE.....

DATE.....

232/1

PHYSICS

PAPER 1

(THEORY)

JULY/AUGUST 2013

TIME: 2 HOURS

KIHARU/KAHURO DISTRICT JOINT EXAMINATION – 2013

Kenya Certificate of Secondary Education

PHYSICS

PAPER 1

(THEORY)

TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATE:

- Write your **name** and **index number** in the spaces provided above.
- Sign** and write the **date** of examination in the spaces provided above.
- This paper consists of **two** Sections **A** and **B**.
- Answer **all** the questions in sections **A** and **B** in the spaces provided.
- All working **must** be clearly shown in the spaces provided.
- Non-programmable silent electronic calculators and KNEC Mathematical tables and **may be** used.

FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidate's Score
A	1 – 10	25	
B	11	10	
	12	9	
	13	14	
	14	12	
	15	10	
Total Score		80	

SECTION A: (25 MARKS)

Answer **all** questions in this section in the spaces provided:

1. The diagram **below** shows a micrometer screw gauge used by a student to measure the thickness of a wire. If it has a zero error of -0.06mm , what is the actual thickness of the wire. (2 marks)

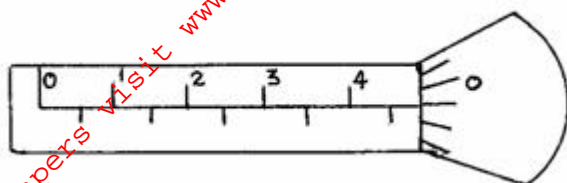


Fig.1

2. A spring extends by 2cm when a mass of 40g is suspended on it. What is the weight required to extend it by 2.5cm . (2 marks)

3. Use the diagram **below** to answer the question **below**.

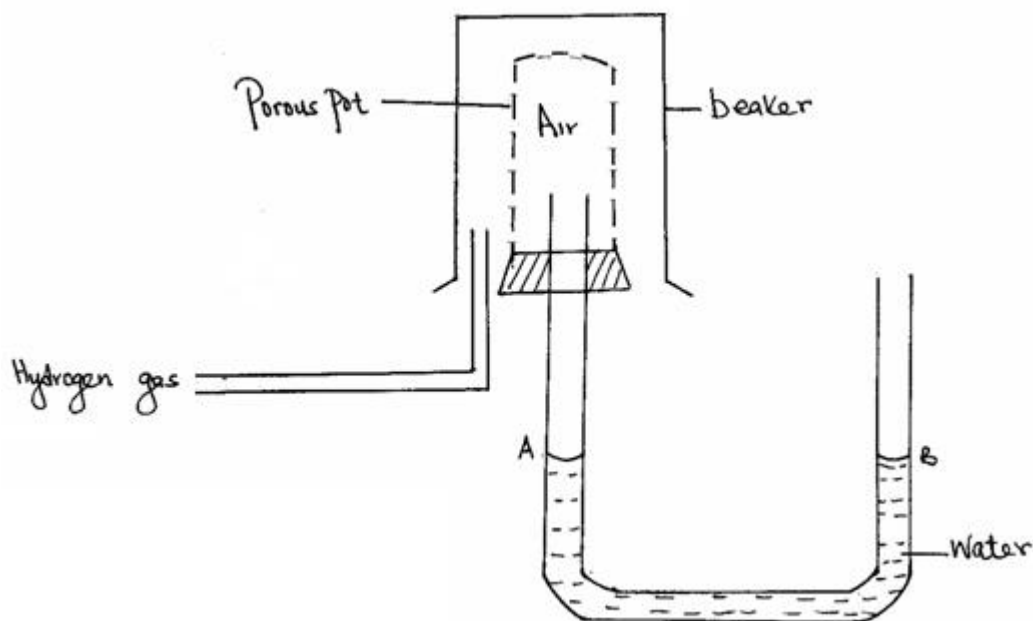


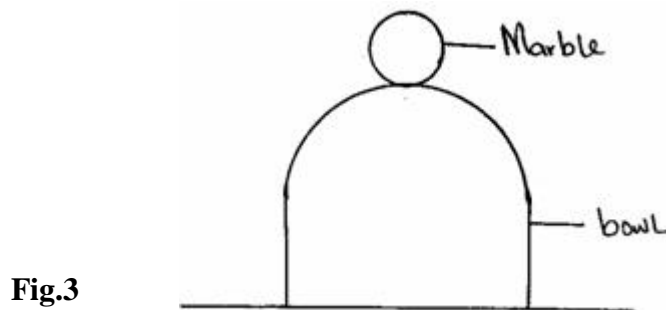
Fig.2

- (i) State the aim of this experiment. (1 mark)

- (ii) At the start of the experiment, the region below the beaker had no hydrogen gas. The hydrogen gas from a gas generator is now introduced for sometime. State the observation made. (1 mark)

- (iii) Give a reason for your answer. (1 mark)

4. Figure 3 below shows a marble placed on an inverted bowl.



- State and explain the type of equilibrium the marble is in. (2 marks)

5. (a) Define the moment of a force. (1 mark)

- (b) A uniform metre rule of mass 100g is balanced by suspending a 10g mass and a 20g mass on its ends as shown **below**.

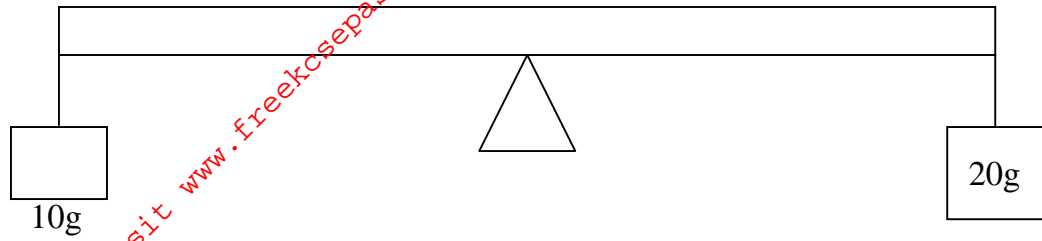


Fig.4

Determine the position of the pivot.

(3 marks)

6. Figure 5 below shows a simple bimetallic thermostat used for detecting fire.

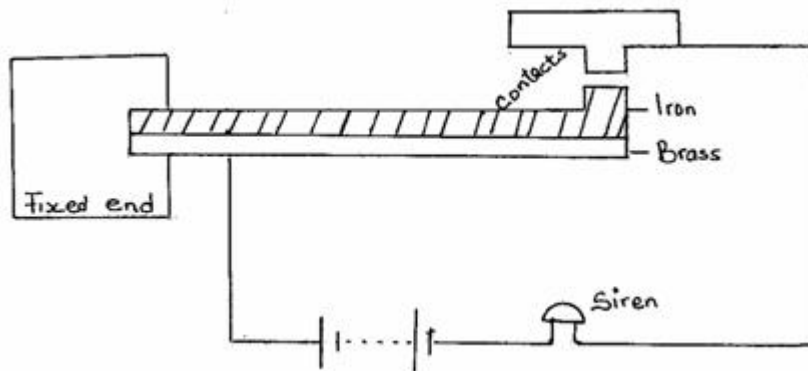


Fig.5

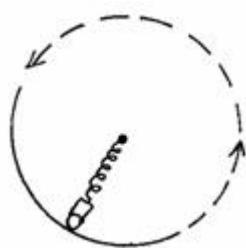
Describe how the fire alarm works.

(1 mark)

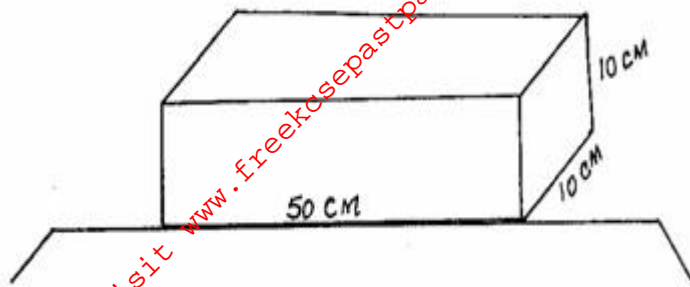
7. (a) State **one** assumption made in Bernoulli's fluid flow.

- (b) "Air flow over the wings of an aircraft causes a lift. Explain this statement with an aid of a well labelled diagram. (2 marks)

8. The following figure represents a spiral spring being rotated in a horizontal circle at uniform speed. The length of the spiral spring including a mass of 50g at its end is 0.2m. The spring constant is 0.5N/cm. Determine the extension produced when the spring rotates at a speed of 4m/s and radius 1m. (3 marks)



9. A concrete block of mass 50kg rests on the surface of the table as shown **below**.



What is the maximum pressure that can be exerted on the bench by the block?

(3 marks)

10. When an inflated balloon is placed in a refrigerator it is noted that its volume reduces. Use the kinetic theory of gases to explain this observation.

(2 marks)

SECTION B: (55 MARKS)

Answer question in this section in the spaces provided.

11. (a) State the pressure law of an ideal gas.

(1 mark)

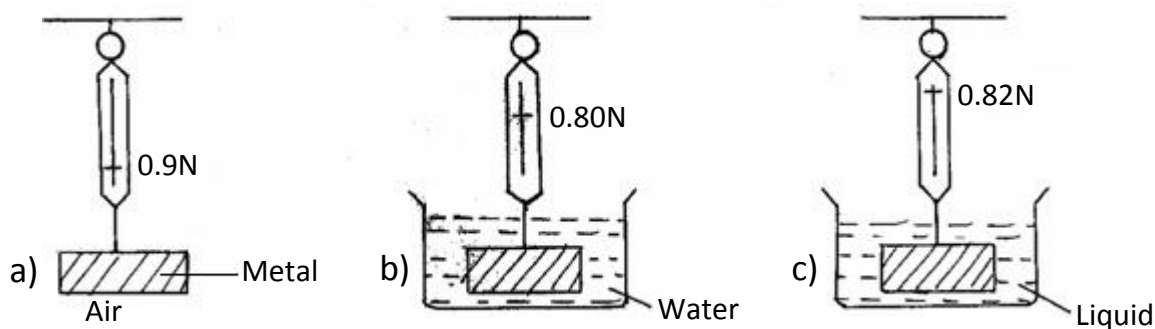
- (b) At 30°C the pressure of a gas is 100cm of mercury. At what temperature would the pressure of the gas fall by 20cm of mercury. Give the temperature in °C.

(2 marks)

- (c) A hole of area 4.0cm^2 at the bottom of a tank 5m deep is closed with a cork. Determine the force on the cork when the tank is filled with water. (Take $g = 10\text{ms}^{-2}$ and density of water $= 1000\text{kgm}^{-3}$). (4 marks)

- (d) A measuring cylinder of height 25cm is filled to a height of 15cm with water and the rest is occupied by kerosene. Determine the pressure acting on its base (density of water $= 1\text{gcm}^{-3}$ density of kerosene $= 0.8\text{gcm}^{-3}$ and atmospheric pressure $= 103,000\text{pa}$). (3 marks)

12. The figure **below** shows the same block weighed in air, water and liquid. Given that the reading of the level of water becomes 150cm^3 when the metal is fully immersed.



- (a) Determine:
(i) Density of the metal. (3 marks)

(ii) Water level before the solid was immersed. (2 marks)

(iii) Explain why the spring balance gives different reading in figure (b) and (c) with the same metal block. (2 marks)

13. (a) A boy throws a tennis ball vertically upwards from a truck moving at a constant velocity. Give the reason why the ball lands back exactly the same point where it was projected. (1 mark)

(b) Define impulse in terms of momentum. (1 mark)

(c) A trailer of mass 30 tonnes travelling at a velocity of 72km/hr rams onto a stationary bus of mass 10 tonnes. The impact takes 0.5 seconds before the two vehicles move off together at a constant velocity for 15 seconds. Determine.

(i) the common velocity. (3 marks)

(ii) the distance moved after the impact. (2 marks)

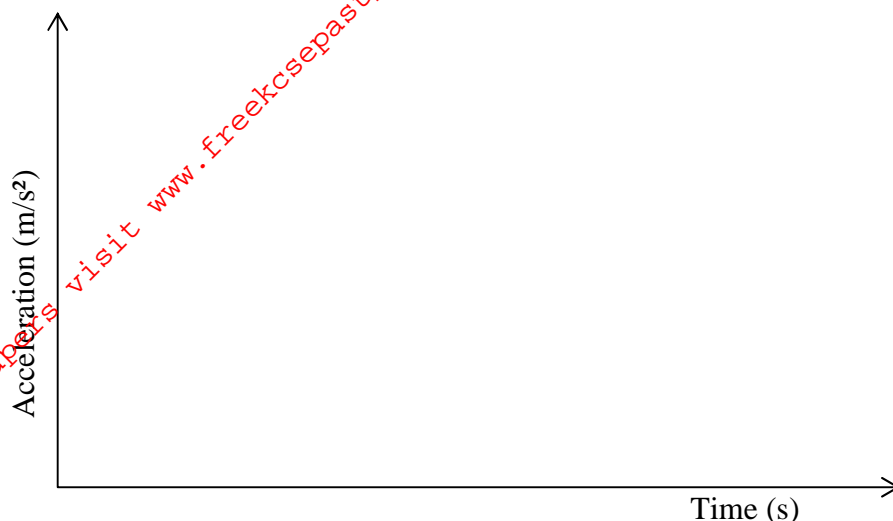
(iii) the impulsive force on the trailer on impact. (3 marks)

(d) Give the reasons why a safety seat belt used in a vehicle;
(i) should have a wide surface area. (1 mark)

(ii) should be slightly extensible. (1 mark)

(e) Give a reason why, when a passenger jumps from a floating boat, the boat moves backwards.
Give a reason for this. (1 mark)

- (f) A steel ball is dropped into a cylinder containing oil. Sketch on the axis given **below** a graph showing the variation of acceleration with time. (1 mark)



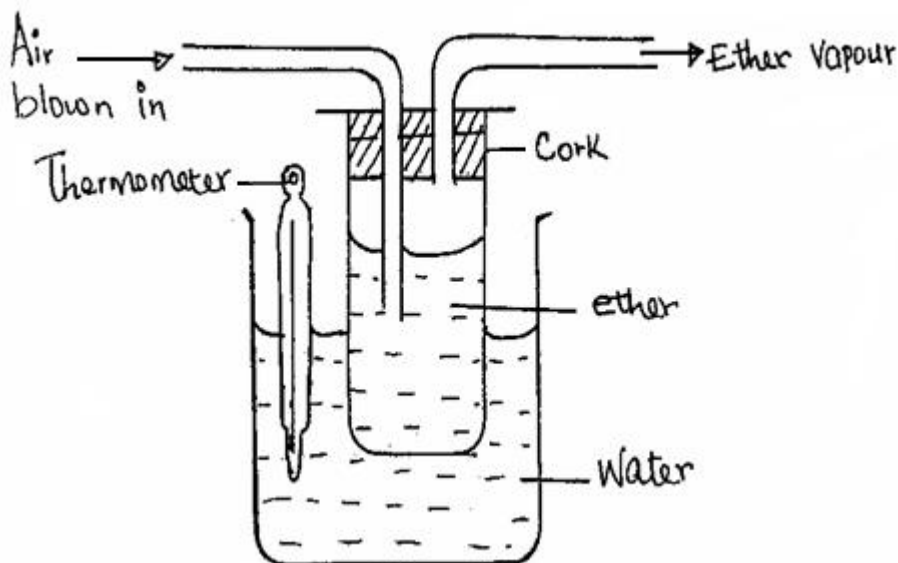
14. (a) State **two** ways through which the rate of evaporation of a liquid may be increased. (2 marks)

- (b) A metal of mass 10kg is heated to 120°C and then dropped into 2kg of water. The final temperature of the mixture is found to be 50°C. Calculate the initial temperature of the water. (Specific heat capacity of the metal and water is 450JKg⁻¹K⁻¹ and 4200JKg⁻¹K⁻¹ respectively). (3 marks)

- (c) Give the property of water which makes it suitable for use as a coolant in machines. (1 mark)

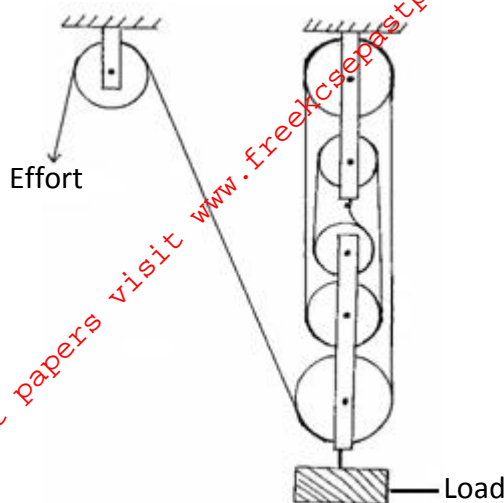
- (d) Formation of ice on roads during winter in cold countries is known to hamper vehicles. State **two** ways in which the melting point of ice may be lowered to solve this problem. (2 marks)

- (f) Some ether is put in a combustion tube and two glass tubes inserted into the tube through a cork as shown in the figure **below**. The combustion tube is then put into a small beaker containing some water and a thermometer dipped in the water. When air is blown into the ether as shown, the reading in the thermometer lowers. Explain this observation. (2 marks)



- (g) State **two** differences between heat and temperature. (2 marks)

15. The figure **below** shows a machine being used to raise a load. Use the information given in the figure to answer questions **below**.



- (a) Determine the velocity ratio (V.R) of the machine. (1 mark)
- (b) If a load of 800N is raised by applying an effort of 272N, determine the efficiency of the machine. (1 mark)
- (c) A crane lifts a load of 2000kg through a vertical distance of 3.0m in six seconds. Determine
- (i) work done. (2 marks)
- (ii) Power of the crane. (2 marks)
- (d) Name the transducer that is used to convert the following form of energies. (1 mark)
- (i) Electrical to sound.
- _____
- (ii) Electrical to kinetic. (1 mark)
- _____