

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

232/1
PHYSICS
PAPER 1
JULY/AUGUST 2010
TIME 2 HOURS

KENYA CERTIFICATE OF SECONDARY EDUCATION
FORM FOUR EVALUATION EXAMINATION

INSTRUCTION TO CANDIDATES

- a) Write your name and index number in the spaces provided above
- b) This paper consist of TWO sections A &B
- c) Answer ALL the questions in section A and B in the space provided.
- d) ALL working MUST be clearly shown.
- e) Mathematical tables and silent electronic calculators may be used
Take Acceleration due to gravity $g=10\text{m/s}$

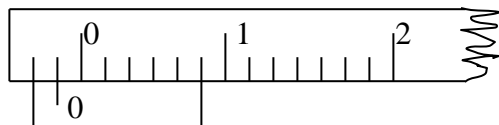
FOR EXAMINERS USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 10	25	
B	11	15	
	12	15	
	13	13	
	14	12	
	TOTAL SCORE	80	

SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided.

1. The figure below shows parts of a vernier callipers when the jaws are closed without an object between the jaws.



- a) State the error of the vernier callipers. (1 mark)

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- b) A student used the vernier callipers to measure the diameter of a test tube whose actual diameter was 2.13 cm. What was the reading of the vernier callipers? (2 marks)

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2. Explain why a hole in a ship near the surface is less dangerous than one near the bottom. (2 marks)

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3. A block measuring 20cm by 10cm by 4cm rests on a flat surface. The block has a weight of 6N. Determine:

- (i) The minimum pressure it exerts on the surface. (2 marks)

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- (ii) The density of the block in kg/m^3 (3 marks)

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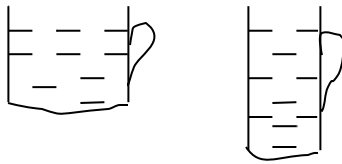
4. The figure below shows a uniform cardboard in the shape of a parallelogram.



Locate the centre of gravity of the cardboard.

(1 mark)

5. The diagram below shows two cups of tea containing equal volumes of hot tea. The cups have different diameters.



State giving reasons, the cup whose tea will cool faster than the other.

(2 marks)

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6. A non-uniform plank of wood of mass 5kg balances on a point k, 0.15m from end A, when a 2.4kg mass is suspended from one end as shown.

Determine the distance of the centre of gravity of the plank from end A.

(3 marks)

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7. A certain solid of volume 60cm^3 displaces 20cm^3 of a liquid (density 600kg^{-3}) when floating. Determine the density of the solid. (3 marks)

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8. Two samples of bromine vapour are allowed to diffuse separately under different conditions, one in a vacuum and the other in air. State with reasons the conditions in which bromine diffuse slower. (2 marks)

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9. State what is meant by absolute zero temperature. (1 mark)

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10. A turntable of radius 10cm is rotating at 43 revolutions per second. Determine the linear speed of a point on the circumference of the turntable (3 marks)

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SECTION B (55 MARKS)

Answer all the questions in this section in the spaces provided.

11. The table below shows values of pressure P in fresh water at different depth.

Pressure P (kpa)	110	140	180	200	220
Depth h (m)	1	4	8	10	12.2

- (i) On the grid provided, plot a graph of pressure (y-axis) against depth (x-axis) (5 marks)
- (ii) Given that the equation $p = p_0 + pgh$, determine from the graph.

(a) The value of p_0 (1 mk)

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(b) The density of fresh water. (4 marks)

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(c) The mass of a density bottle is 20g when empty 70g when full of water and 695g when full of another liquid.

(i) Calculate the density of the other liquid (take density of water as 1g/cm^3) (3 marks)

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(ii) Mass of 20cm^3 of the liquid (2 marks)

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12. (a) What is work as defined in physics. (1 mark)

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(b) A pulley system has two pulleys on the lower block and one pulley on the upper block. In order to raise the load of 6N, an effort of 2N is applied.

(i) Draw a sketch to show the pulley system. (3 marks)

(ii) Calculate the efficiency of the pulley system (3 marks)

(iii) If the lower block weighs 0.4N what friction force opposes the motion. (3 marks)

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c) A workshop has the following simple machines for lifting heavy loads; A wheel and axle and a movable pulley. The wheel has a diameter of 30cm while the axle has a diameter of 3cm. Assuming that the machines are perfect, calculate the mechanical advantage for each of the machines and show which machine is more advantageous in lifting loads. (5 mark)

13. (a) What is meant by specific latent heat of Vaporization?

(2 marks)

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b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100°C was passed into water contained in a well lagged copper calorimeter.

The following measurements were made:

Mass of calorimeter = 50g

Initial mass of water = 70g

Initial temperature of water = 5°C

Final mass of water + Calorimeter + condensed steam = 123g

Final temperature of mixture = 30°C

Specific heat capacity of water = 4200 J kg⁻¹ K⁻¹

Specific heat capacity of copper = 390 J kg⁻¹ K⁻¹

(i) Determine the

(i) Mass of condensed steam

(2 marks)

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(ii) Heat gained by water and calorimeter

(2 marks)

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(ii) Given that L is the specific latent heat of vaporization of steam

(i) Write an expression for the heat given out by steam

(1 mark)

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(ii) Determine the value of L

(2 marks)

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c) 500g of water at 20°C is mixed with 200g of water at 55°C . Find the final temperature of the mixture.

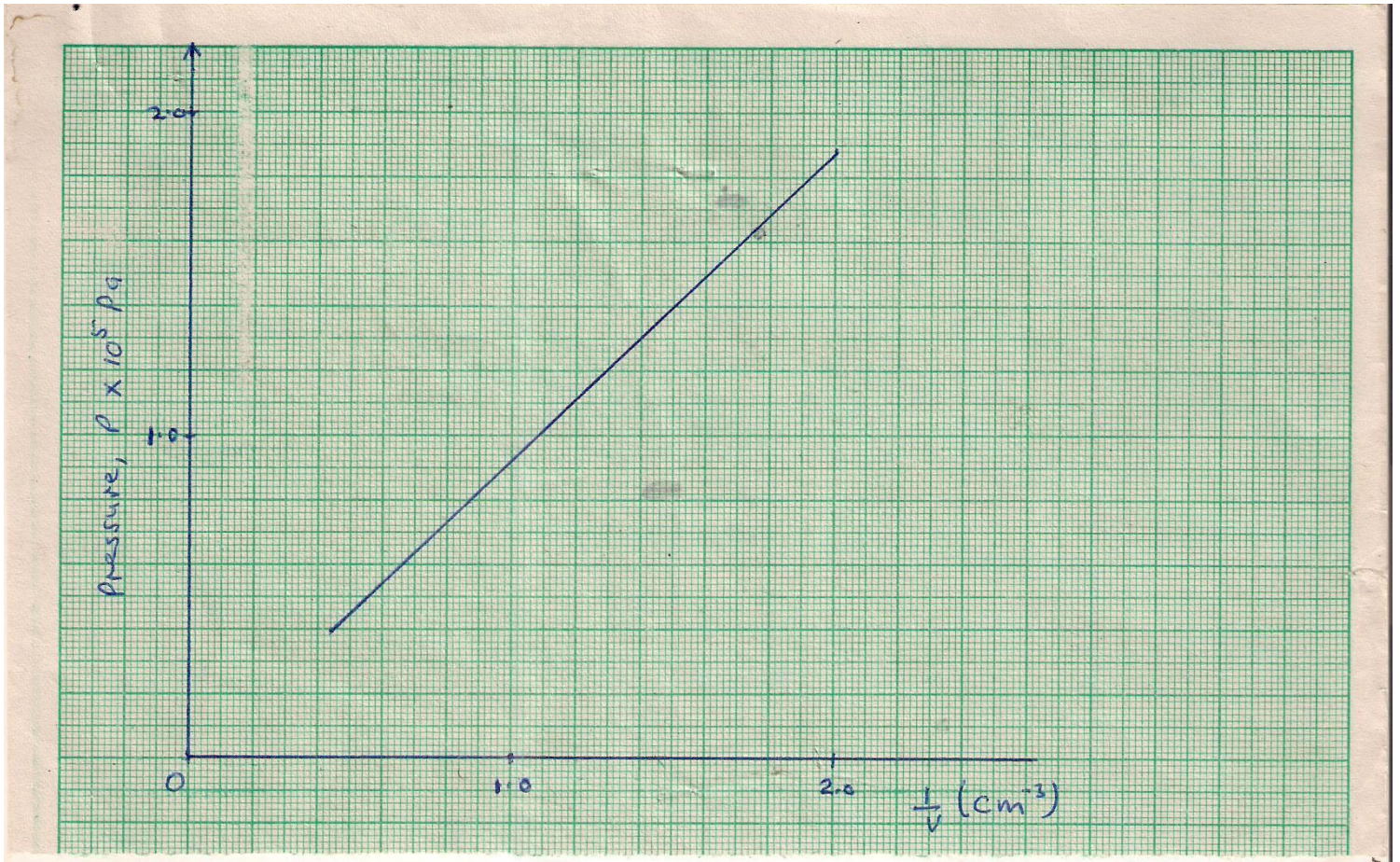
(4 marks)

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14. a) State the pressure law for an ideal gas (1 mark)

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b) An air bubble is released at the bottom of a tall jar containing a liquid. The height of the liquid column is 80cm. The volume of the bubble increase from 0.5cm^3 at the bottom of the liquid to 1.15cm^3 at the top. The figure below shows the variation of pressure p , on the bubble with the reciprocal of volume $1/v$ as it rises in the liquid.



- (i) State the reason why the volume increases as the bubble rises in the liquid column. (1 mark)

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- (ii) From the graph, determine the pressure on the bubble (i) At the bottom of the liquid column; (2 marks)

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- (ii) At the top of the liquid column. (1 mark)

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- (iii) Hence determine the density of the liquid in kgm^{-3} (3 marks)

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- (iv) What is the value of the atmospheric pressure of the surrounding? (1 mark)

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b) A rubber tube is inflated to a pressure of 2.7×10^5 pa and volume 3800cm^3 at a temperature of 25°c . It is then taken to another place where the temperature is 15°c and the pressure 2.5×10^5 pa. Determine the new volume. (3 marks)

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