Name..... **Index No**...../.....

232/1
PHYSICS
Paper 1
(Theory)
Oct./Nov. 2012
2 hours

Candidate's Signature.....

Date: .....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
PHYSICS
Paper 1
(Theory)
2 hours

232/1 - Physics Paper 1	
Friday	8.00 am - 10.00 am
9/11/2012	1st session

Instructions to Candidates

(a) Write your name and index number in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided above.
*(c) This paper consists of **two** sections: **A** and **B**.*
*(d) Answer **all** the questions in sections **A** and **B** in the spaces provided.*
*(e) **All** working **must** be clearly shown.*
(f) Non programmable silent electronic calculators may be used.
*(g) **This paper consists of 15 printed pages.***
*(h) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 - 14	25	
B	15	11	
	16	14	
	17	11	
	18	10	
	19	09	
Total Score		80	

SECTION A (25 marks)

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

1 **Figure 1** shows a measuring cylinder containing some water.

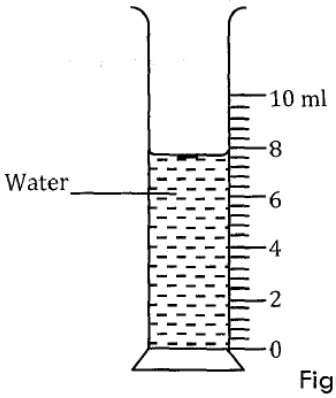

Figure 1

Determine the reading on the measuring cylinder, after three drops of water each of volume 0.6 cm^3 are added. (2 marks)

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2 A student pulls a block of wood along a horizontal surface by applying a constant force. State the reason why the block moves at a constant velocity. (1 mark)

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3 A solid weighs 16.5 N on the surface of the moon. The force of gravity on the moon is 1.7 Nkg^{-1}. Determine the mass of the solid. (3 marks)

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4 A bottle containing a smelling gas is opened at the front bench of a classroom.
State the reason why the gas is detected throughout the room. (1 mark)

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5 **Figure 2** shows a flat bottomed flask containing some water. It is heated directly with a very hot flame.

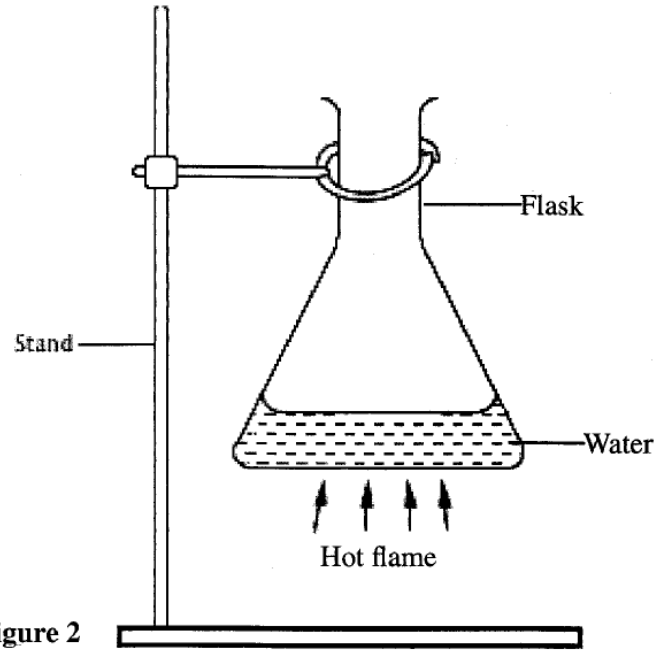

Figure 2

Explain why the flask is likely to crack. (2 marks)

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6 State **two** environmental hazards that may occur when oil spills over a large surface area of the sea. (2 marks)

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7 A balloon is filled with a gas which is lighter than air. It is observed to rise in air upto a certain height. State a reason why the balloon stops rising. (1 mark)

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8 In verifying the pressure law of gases, the temperature and pressure of a gas are varied at constant volume. State the condition necessary for the law to hold. (1 mark)

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9 State the reason why a steel sphere resting on a horizontal surface is said to be in neutral equilibrium. (1 mark)

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10 **Table 1** shows the results of an experiment carried out to study the properties of a spring.

Table 1

Force (N)	0	10	20	30	40
Extension (cm)	0	2	4	6	8

State with a reason whether the experiment was done within the elastic limit of the spring. (2 marks)

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11 **Figure 3** shows a graph of velocity against time for a moving body.

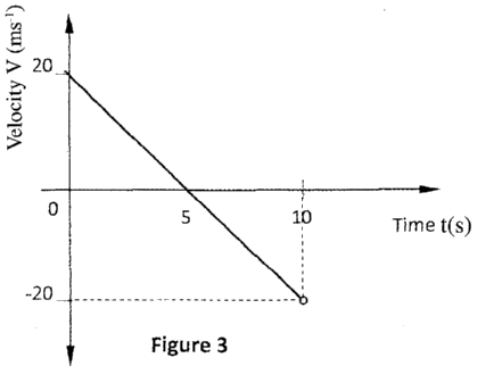

Figure 3

Describe the motion of the body during the 10 seconds. (2 marks)

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12 State **two** reasons why the efficiency of a pulley system is always less than 100%. (2 marks)

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13 **Figure 4** shows a graph of temperature against time when pure melting ice at 0° C is heated uniformly.

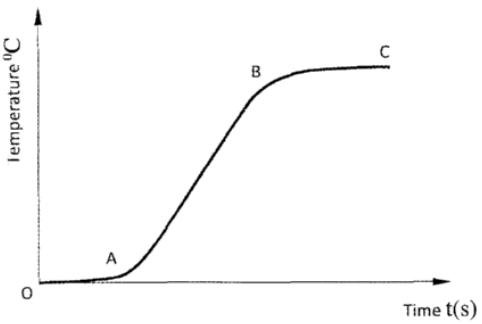

Figure 4

Explain what happens between parts:

(i) OA: .....

.....

(1 mark)

(ii) AB: .....

.....

(1 mark)

14 (a) An aeroplane is moving horizontally through still air at a uniform speed. It is observed that when the speed of the plane is increased, its height above the ground increases. State the reason for this observation. (1 mark)

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(b) **Figure 5** shows parts A, B and C of a glass tube.

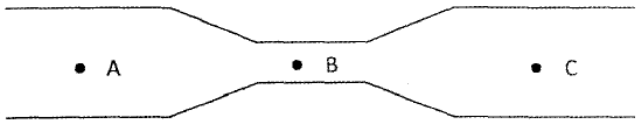

Figure 5

State with a reason the part of the tube in which the pressure will be lowest when air is blown through the tube from A towards C. (2 marks)

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SECTION B: (55 marks)

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

15 (a) **Figure 6** shows a graph of volume against temperature for a given mass of gas.

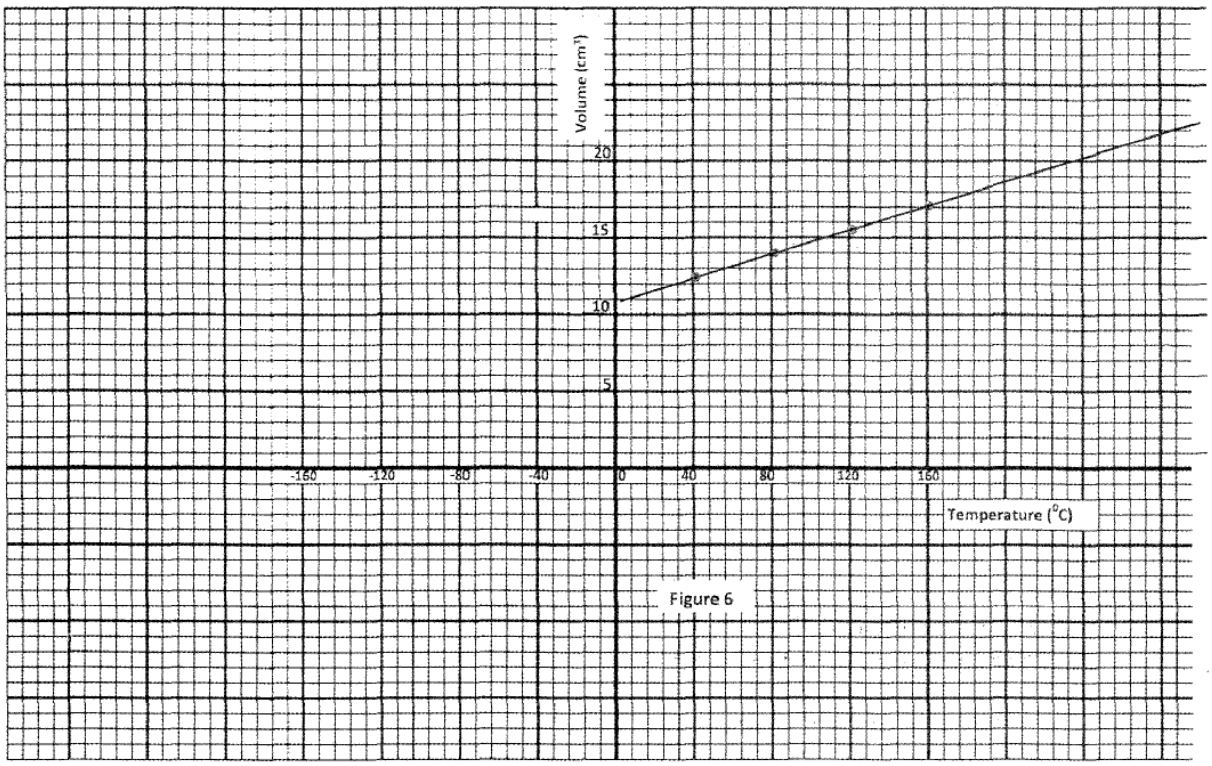

Figure 6

Use the graph to determine the absolute zero temperature in °C. (2 marks)

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(b) **Figure 7** shows a horizontal tube containing air trapped by a mercury thread of length 24 cm. The length of the enclosed air column is 15 cm. The atmospheric pressure is 76 cm Hg.

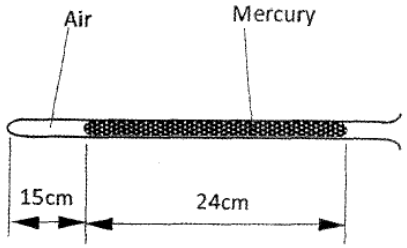

Figure 7

(i) State the pressure of the enclosed air. (1 mark)

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(ii) The tube is now held in a vertical position with the open end facing upwards as shown in **Figure 8**.

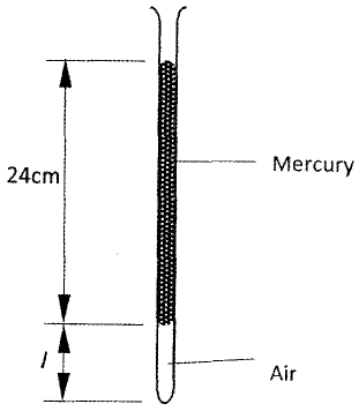

Figure 8

Determine:

(I) The pressure of the enclosed air. (1 mark)

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(II) The length (ℓ) of the enclosed air column. (3 marks)

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(c) In an experiment to demonstrate atmospheric pressure, a plastic bottle is partially filled with hot water and the bottle is then tightly corked. After some time the bottle starts to get deformed.

(i) State the purpose of the hot water. (1 mark)

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(ii) State the reason why the bottle gets deformed. (1 mark)

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(iii) Explain your answer in c (ii) (2 marks)

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16 (a) **Figure 9** shows a trolley on a smooth surface being pulled by a constant force F.

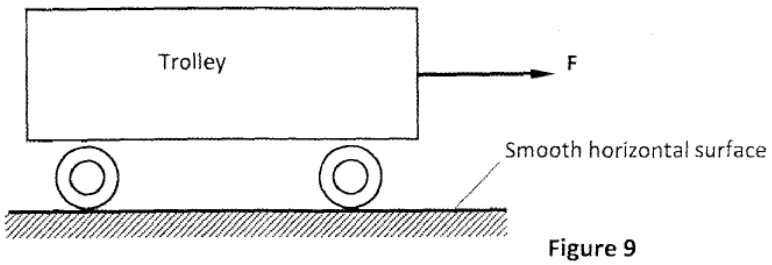
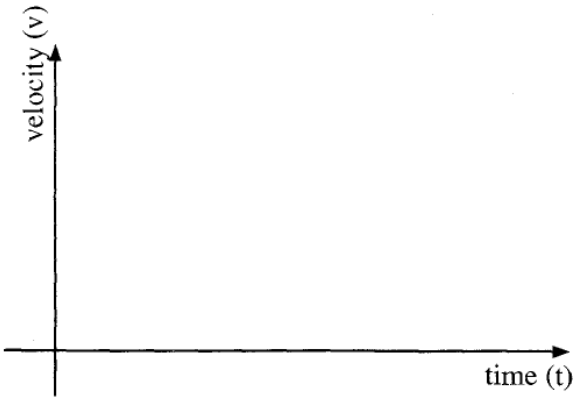


Figure 9

(i) On the axis provided, sketch the velocity-time graph for the motion of the trolley. (2 marks)



(ii) A parachute falling through the air attains terminal velocity after a short-time. State the reason why it attains terminal velocity. (1 mark)

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(b) A ball of mass 200 g is thrown vertically upwards with velocity of 5 ms^{-1}. The air resistance is 0.4 N.

Determine;

(i) the net force on the ball as it moves up;

(take acceleration due to gravity g = 10 ms^{-2}) (2 marks)

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(ii) the acceleration of the ball; (3 marks)

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(iii) the maximum height reached by the ball. (3 marks)

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(c) **Figure 10** shows the path of an object of mass m attached to a string of length r when whirled in a vertical circle at a constant speed V. A is the highest point on its path.

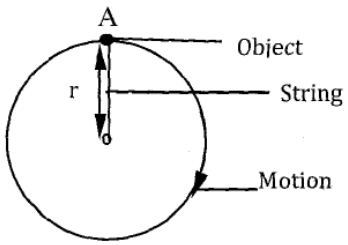

Figure 10

(i) State the forces that provide the centripetal force on the object when it is at point A. (2 marks)

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(ii) Indicate with an arrow on the diagram the direction of the net force F acting on the object when it is at A. (1 mark)

17 (a) **Figure 11** shows how an underground room was ventilated. It had two vents, one at A and the other at B. A fire was lit at point C.

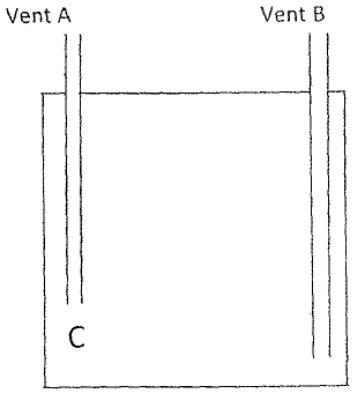

Figure 11

Explain what happened to the ventilation when the fire was lit. (3 marks)

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(b) Explain how a vaccum flask minimizes loss of heat through radiation. (1 mark)

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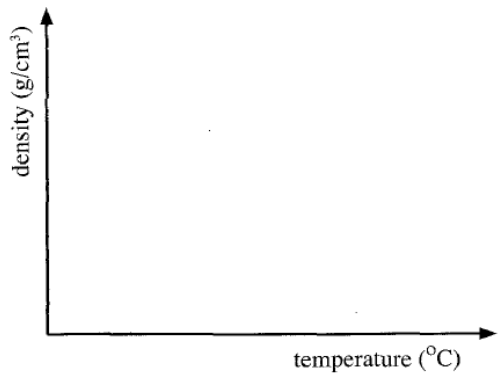
(c) In an experiment to investigate the unusual expansion of water, a fixed mass of water at 0 °C was heated until its temperature reached 20 °C. On the axis provided, sketch a graph of density against temperature of the water from 0 °C to 20 °C. (2 marks)



(d) An immersion heater rated 2.5 kW is immersed into a plastic jug containing 2 kg of water and switched on for 4 minutes. Determine;

(i) the quantity of heat gained by the water; (2 marks)

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(ii) the temperature change for the water; (3 marks)
(take specific heat capacity of water as 4.2 x 10^3 $Jkg^{-1}K^{-1}$).

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18 (a) **Figure 12** shows a set up used to determine the mass of a solid S. The rod is pivoted at its centre of gravity C.

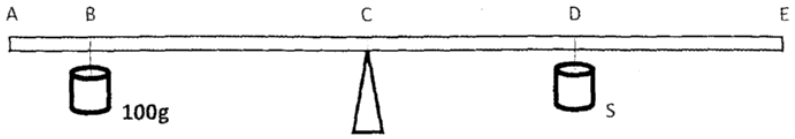

Figure 12

(i) State **two** measurements that need to be made to determine the mass of solid S. (1 mark)

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(ii) Write an expression to show how the measurements in (i) above are used to obtain the mass of S. (2 marks)

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(b) **Figure 13** shows a log of wood of mass 20 kg submerged in water in a pond and held in position by a string fixed to the bottom of the pond.

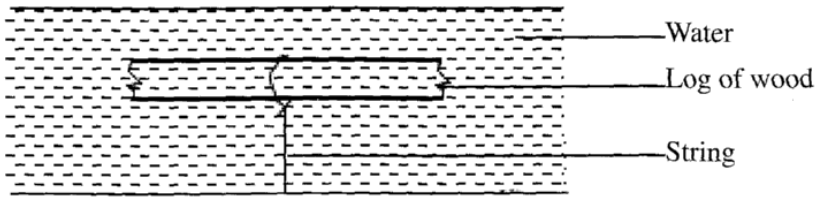

Figure 13

Given that the density of water is 1000 kgm^{-3} and that of wood is 800 kgm^{-3}, determine the:

(i) Volume of the log. (3 marks)

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(ii) Upthrust on the log. (2 marks)

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(iii) Tension in the string. (2 marks)

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19 (a) **Figure 14** shows a lift pump.

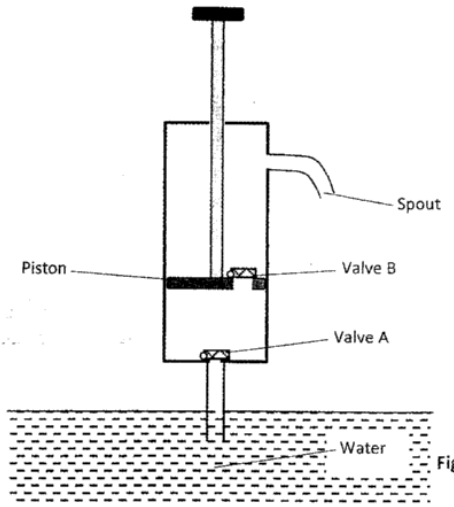

Figure 14

Explain why, when the piston is:

(i) pulled upwards, valve A opens while valve B closes. (2 marks)

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(ii) pushed downwards, valve A closes while valve B opens. (2 marks)

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(b) After several strokes, water rises above the piston as shown in **Figure 15**.

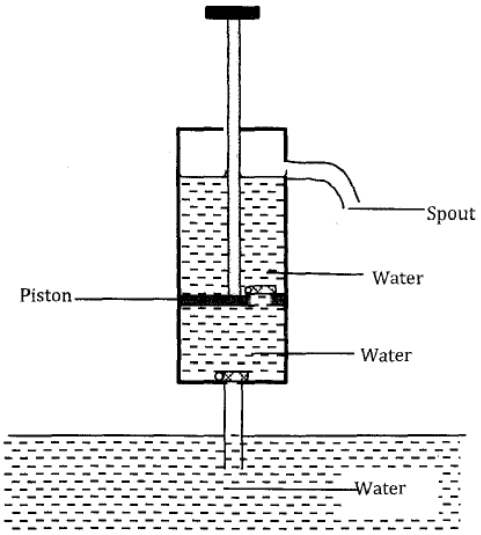

Figure 15

State how water is removed from the cylinder through the spout. (1 mark)

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(c) A lift pump can lift water to a maximum height of 10 m. Determine the maximum height to which the pump can raise paraffin.
(take density of paraffin as 800 kgm^{-3} and density of water as 1000 kgm^{-3}). (3 marks)

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(d) State **one** factor that determines the height to which a force pump can lift water. (1 mark)

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