Name.....Index Number...../.....

232/1
PHYSICS
Paper 1
(Theory)
Oct./Nov. 2010
2 hours

Candidate's Signature.....

Date.....

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

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) Mathematical tables and electronic calculators may be used.

Take: Acceleration due to gravity, g = $10ms^{-2}$
Density of water 1g cm^{-3}

(g) This paper consists of 14 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	10	
	16	11	
	17	12	
	18	10	
	19	12	
	Total Score	80	

P1 / 2010

SECTION A (25 marks)

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

1 **Figure 1** shows a vernier callipers being used to measure the internal diameter of a tube.

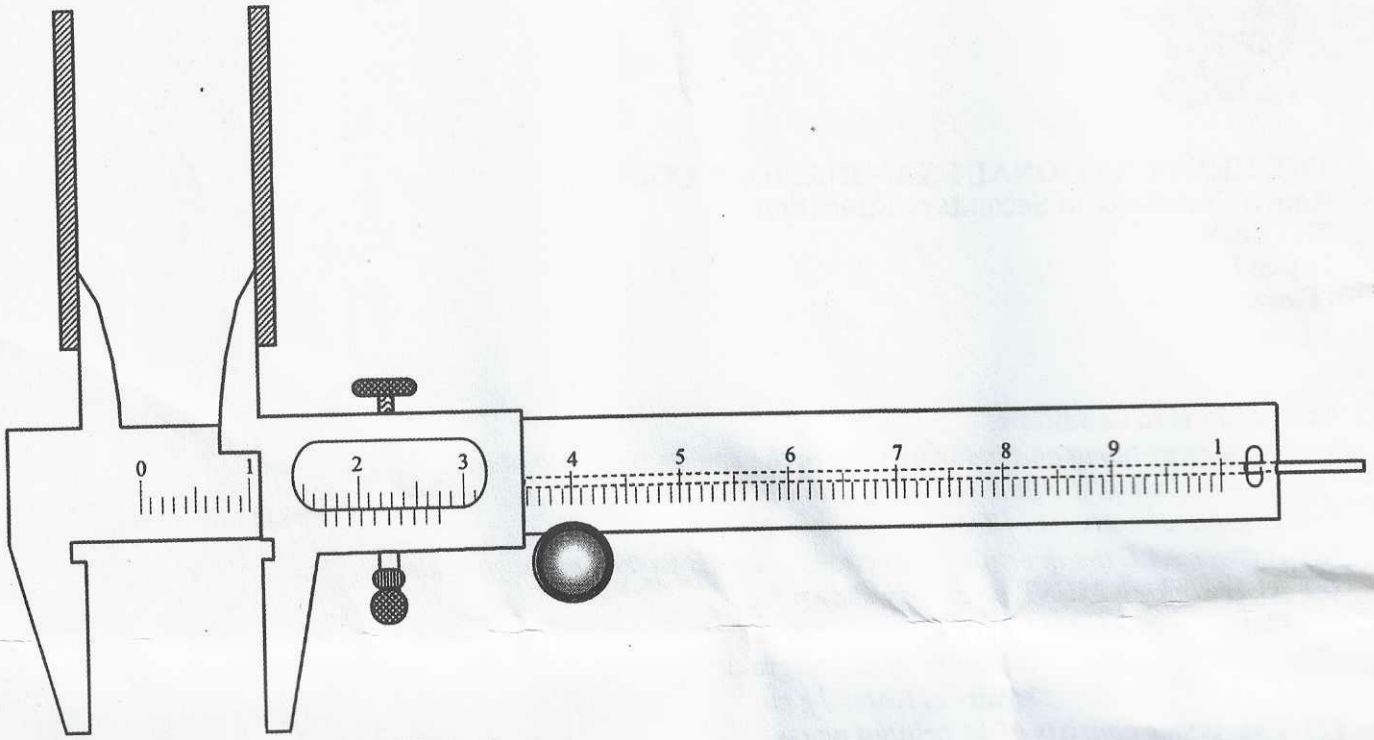

Figure 1

Record the diameter of the tube. (1 mark)

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2 A stopwatch started 0.50s after the start button was pressed. The time recorded using the stopwatch for a ball bearing falling through a liquid was 2.53s. Determine the time of fall.
(1 mark)

.....

3 Some water in a tin can was boiled for some time. The tin can was then sealed and cooled. After some time it collapsed. Explain this observation. (2 marks)

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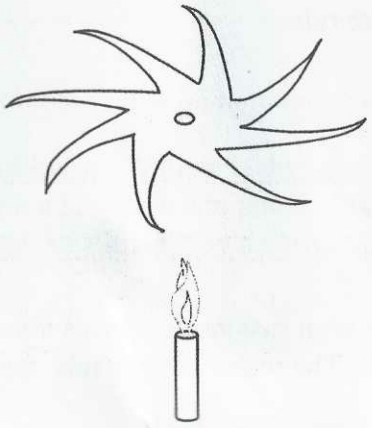
4 A paper windmill in a horizontal axis was placed above a candle as shown in **figure 2**.



Lit candle

Figure 2

When the candle was lit the paper windmill begun to rotate.

Explain this observation. (2 marks)

.....

.....

.....

5 When a liquid is heated in a glass flask, its level at first falls, then rises. Explain this observation. (2 marks)

.....

.....

.....

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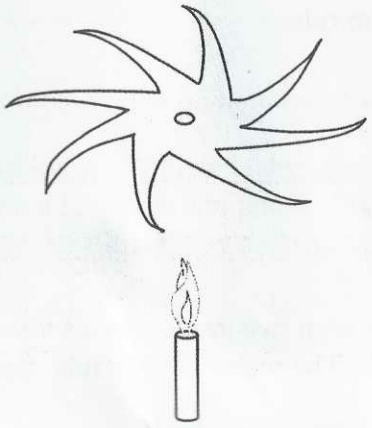

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8 A cart of mass 30kg is pushed along a horizontal path by a horizontal force of 8N and moves with a constant velocity. The force is then increased to 14N.
Determine:

(a) the resistance to the motion of the cart; (1 mark)

.....

.....

(b) the acceleration of the cart. (2 marks)

.....

.....

9 When a drop of oleic acid of known volume is dropped on the surface of water in a large trough, it spreads out to form a large circular patch. State **one** assumption made when the size of the molecule of oleic acid is estimated by determining the area of the patch.
(1 mark)

.....

.....

10 The weight of a solid in air is 5.0N. When it is fully immersed in a liquid of density 800Kg m^{-3}, its weight is 4.04N.

Determine:

(a) the upthrust in the liquid; (1 mark)

.....

.....

(b) the volume of the solid. (2 marks)

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11 When a bicycle pump was sealed at the nozzle and the handle slowly pushed towards the nozzle, the pressure of the air inside increased.
Explain this observation. (1 mark)

.....

.....

12 **Figure 5** shows a mass of 200g connected by a string through a hollow tube to a mass of 0.5kg. The 0.5kg mass is kept stationary in the air by whirling the 200g mass round in a horizontal circle of radius 1.0metre.

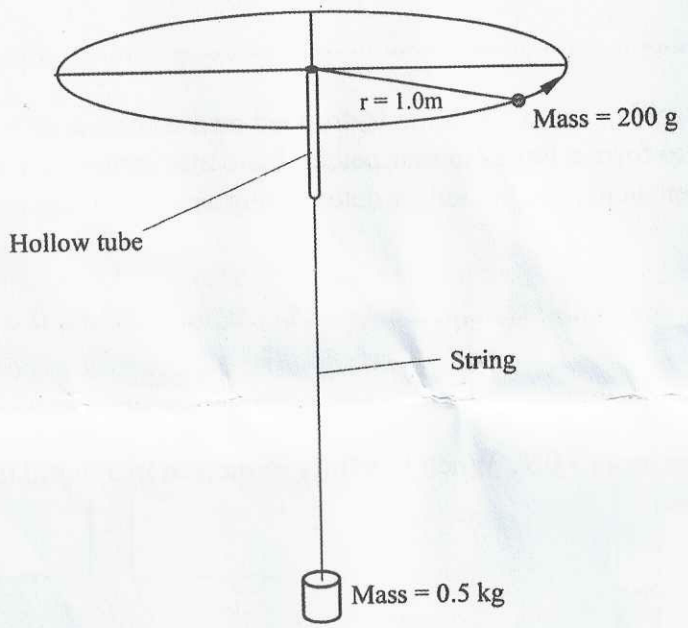

Figure 5

Determine the angular velocity of the 200g mass. (3 marks)

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13 State the SI unit of a spring constant. (1 mark)

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14 **Figure 6** shows an athlete lifting weights while standing with the feet apart.

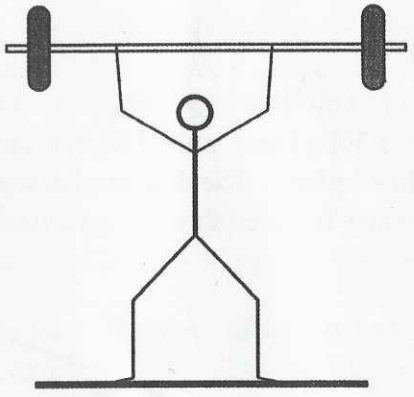

Figure 6

Explain why standing with the feet apart improves the athletes's stability. (1 mark)

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SECTION B (55 marks)

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

15 (a) A cyclist initially at rest moved down a hill without pedalling. He applied brakes and eventually stopped. State the energy changes as the cyclist moved down the hill.

(1 mark)

.....

(b) **Figure 7** shows a mass of 30kg being pulled from point P to point Q, with a force of 200N parallel to an inclined plane. The distance between P and Q is 22.5m. In being moved from P to Q the mass is raised through a vertical height of 7.5m.

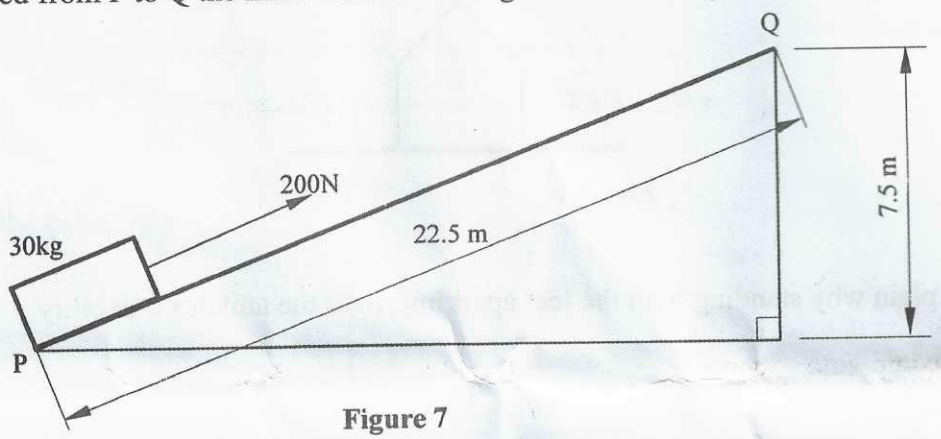

Figure 7

(i) Determine the work done:

I by the force; (2 marks)

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II on the mass; (2 marks)

.....

.....

III to overcome friction. (2 marks)

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(ii) Determine the efficiency of the inclined plane. (2 marks)

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(c) Suggest **one** method of improving the efficiency of an inclined plane. (1 mark)

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16 In an experiment to determine the density of sand using a density bottle, the following measurements were recorded:

Mass of empty density bottle	=	43.2g
Mass of density bottle full of water	=	66.4g
Mass of density bottle with some sand	=	67.5g
Mass of density bottle with the sand filled up with water	=	82.3g

Use the above data to determine the:

(a) mass of water that completely filled the bottle; (2 marks)

.....

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(b) volume of water that completely filled the bottle; (1 mark)

.....

.....

(c) volume of the density bottle; (1 mark)

.....

(d) mass of sand; (1 mark)

.....

(e) mass of water that filled the space above the sand; (1 mark)

.....

.....

(f) volume of the sand; (3 marks)

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.....

(g) density of the sand. (2 marks)

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17 (a) Explain why it is advisable to use a pressure cooker for cooking at high altitudes. (2 marks)

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(b) Water of mass 3.0kg initially at 20°C is heated in an electric kettle rated 3.0KW. The water is heated until it boils at 100°C. *(Take specific heat capacity of water* $4200Jkg^{-1}K^{-1}$, *Heat capacity of the kettle* $= 450JK^{-1}$, *Specific latent heat of vaporisation of water* $= 2.3mJkg^{-1}$)

Determine:

(i) the heat absorbed by the water; (2 marks)

.....

.....

(ii) heat absorbed by the electric kettle; (2 marks)

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(iii) the time taken for the water to boil; (3 marks)

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(iv) how much longer it will take to boil away all the water. (3 marks)

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18 **Figure 8** shows a stone of mass 4.0kg immersed in water and suspended from a spring balance with a string. The beaker was placed on a compression balance whose reading was 85N. The density of the stone was 3000kgm^{-3} while the density of the liquid was 800kgm^{-3} .

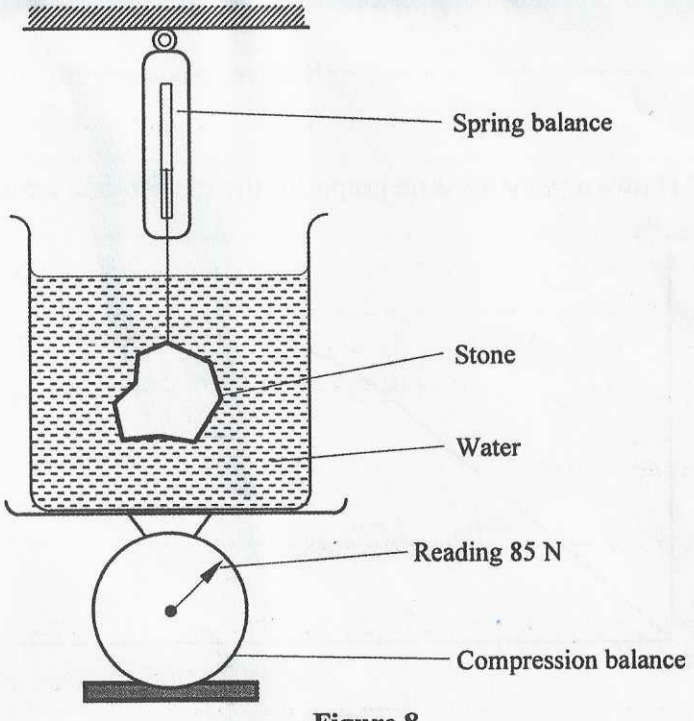

Figure 8

Determine the:

(a) volume of the liquid displaced; (2 marks)

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(b) upthrust on the stone; (4 marks)

.....

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(c) reading of the spring balance; (2 marks)

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(d) reading of the compression balance when the stone was removed from the water. (2 marks)

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19 (a) **Figure 9** shows a velocity-time graph for the motion of a certain body.

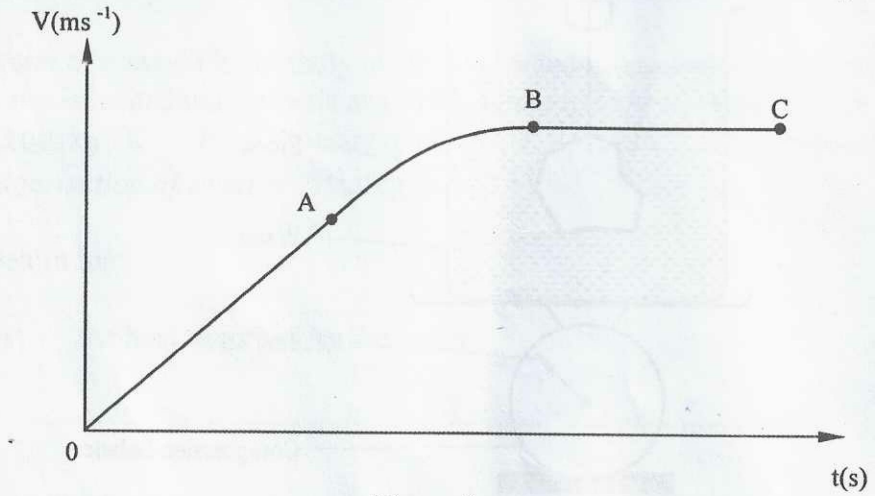

Figure 9

Describe the motion of the body in the region:

(i) OA; (1 mark)

.....

(ii) AB; (1 mark)

.....

(iii) BC. (1 mark)

.....

(b) A car moving initially at $10ms^{-1}$ decelerates at $2.5\ ms^{-2}$.

(i) Determine:

(I) its velocity after 1.5s; (2 marks)

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(II) the distance travelled in 1.5s; (2 marks)

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(III) the time taken for the car to stop. (2 marks)

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(ii) Sketch the velocity-time graph for the motion of the car up to the time the car stopped. (1 mark)

(iii) From the graph, determine the distance the car travelled before stopping. (2 marks)

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