**Name: …………………………………………………………… Index No. …………..…….……………**

**School: …………………………………………………….……. Candidate’s Sign. …………................**

**Date: …………………..……………….**

**232/1**

**PHYSICS**

**PAPER 1**

**TIME: 2 HOURS**

**NZAUI SUB COUNTY FORM 4 ENTRANCE EXAM 2015**

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

**232/1**

**Physics**

**Paper 1**

**TIME: 2 HOURS**

**INSTRUCTIONS TO CANDIDATES:**

* Write your **name** and **admission number** in the spaces provided above
* This paper consists of **two** sections **A** and **B.**
* Answer **all** questions in section **A** and **B** in the spaces provided.
* All working **must** be clearly shown in the spaces provided.
* Scientific calculators and KNEC Mathematical tables may be used.
* This paper consists of 8 printed pages. Candidates should check to ascertain that all 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** |  |
|  | **15** | **08** |  |
|  | **16** | **13** |  |
| **B** | **17** | **08** |  |
|  | **18** | **13** |  |
|  | **19** | **14** |  |
| **Total Score** | | **80** |  |

**SECTION A (25 MARKS)**

1. Determine the diameter of the object using the metre rule shown in figure 1 below. (1 Mark)

4

5

6

Fig 1

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1. A uniform metre rule is balanced at the 30 cm mark when a load of 0.8N is hung at the zero mark as shown in figure 2 below.

0.8N

10

20

30

40

50

60

70

80

90

0

100

Fig 2

(i) Calculate the weight of the metre rule (2 Marks)

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(ii) Indicate on the figure the position of the centre of gravity (1 Mark)

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1. In the figure 3 below, explain what makes the rubber sucker stick on the flat clean surface. (2 Marks)

Flat clean surface

Rubber sucker

Figure 3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A mass of 50g was suspended from the lower end of a spring. If the spring extended by 50mm and its elastic limit not exceeded, determine the spring constant. (2 Marks)

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1. In an experiment a student heated water containing a crystal of Potassium Permanganate as shown in figure four below.

Water

Heat

Beaker

Crystal of Potassium permanganate

Figure 4

(i) Indicate on the diagram the observations made. (1 Mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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(ii) Explain the observations made. (2 Marks)

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1. A log of wood of weight 1000N is being dragged along the ground at a constant speed by a horizontal cable in which the tension is 200N. What is the co-efficient of friction between the wood and the ground.

(2 Marks)

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1. When a mercury thermometer is used to measure the temperature of hot water, its is observed that the mercury level first drops before beginning to rise. State the reason for this. (2 Marks)

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1. Fig. 5 below shows air trapped by a mercury in a glass tube. The tube is inverted in a dish containing mercury.

Trapped air

Glass tube

Dish

Mercury

500mm

Given that the atmospheric pressure is 760mmHg and the height of mercury column in the table is 500mm, determine the pressure of the air trapped in the tube in mmHg (2 Marks)

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1. A person weighing 500N takes 11 seconds to climb upstairs to a height of 3.0m. What is the average power output? (2 Marks)

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1. Figure 6 below shows a marble resting on an inverted bowl.

Marble

Bowl

Figure 6

What is the state of equilibrium of the marble? (1 Mark)

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1. Explain why water stored in an earthen jar becomes cooler than that which is stored in a metallic jar.

(1 Mark)

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1. Name one factor that affects surface tension of a liquid other than presence of impurities. (1 Mar)

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1. The length of a block of wood was found to be 9.42mm. If the macrometer screw gauge used to take this reading had a zero error pf-0.08mm, what was the exact length of the block? (1 Mark)

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1. A ball rolls from a table 1.5m high at a horizontal velocity of 2m/s. Calculate the distance from the foot of the table at which the ball hits the ground. (2 Marks)

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**SECTION B (55 MARKS)**

1. A box mass 5.0kg is pulled from rest by a horizontal force of 2.0N for 2 seconds. Assuming there is no frictional force between the horizontal surface and the box;
2. Find the distance covered by the box. (3 Marks)

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1. Calculate the kinetic energy gained by the box. (3 Marks)

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1. Calculate work done in pulling the box. (2 Marks)

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1. (a) When 400 identical lead balls were carefully added to a measuring cylinder containing 35cm3 of

water, the level of water rose to 83.2cm3 mark. When 300 lead ball were removed the measuring cylinder and its remaining contents weighed 137.4g. The same cylinder weighed 32.5g when empty. Calculate:-

(i) the volume of one lead ball (2 Marks)

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(ii) the density of lead in g/cm3, correct to 2 d.p (3 Marks)

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(iii) the average density of 35cm3 of water mixed with 400 lead balls. (density of water = 1g/cm3)

(2 Marks)

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(b) A 180W heater is immersed in a copper calorimeter of mass 100g containing 200g of alcohol. When

the heater is switched on, after 36 seconds the temperature of calorimeter and its contents rises by

120C. If specific heat capacity of copper is 400J/kgk

Determine

(i) Heat lost by the heater (2 Marks)

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(ii) Heat gained by calorimeter and alcohol, if the specific heat capacity of alcohol is Ca  (2 Marks)

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(iii) The value of the specific heat capacity of alcohol Ca (2 Marks)

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1. A block of mass 2kg is accelerated steadily to a velocity of 10m/s from rest in 4 seconds. Calculate;

(i) the force needed to accelerate the block. (2 Marks)

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(ii) the energy gained by the block. (2 Marks)

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(iii) the momentum gained by the block. (2 Marks)

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(iv) the time needed to bring the block to rest under a constant opposing force of 2N. (2 Marks)

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1. (a) Define acceleration (1 Mark )

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(b) The figure below represents the velocity – time graph for a lift in Afya Centre House.

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5

10

15

20

5

10

15

20

A

B

C

Time (S)

Velocity

(m/s)

(i) Describe briefly the motion between:

I. OA (1 Mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

II. AB (1 Mark)

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(ii) Calculate

I. the acceleration of the lift between B and C (2 Marks)

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II. the total distance travelled by the lift. (2 Marks)

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(c) A pulley system has a velocity ratio of 3 and raises a load of 4.2N a distance of 10cm.

(i) What is the distance moved by the effort. (2 Marks)

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(ii) If the M.A of the pulley system is 2.5, what is the effort required to lift the load stated above?

(2 Marks)

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(iii) Calculate the efficiency of the system. (2 Marks)

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1. (a) A watchman uses a bow to throw an arrow of mass 0.2kg vertically upwards. He stretches the bow

by 0.15M with a maximum force of 100N.

Calculate

(i) the energy transferred to the bow. (3 Marks)

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(ii) the speed with which the arrow leaves the bow. (2 Marks)

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(iii) the greatest height attained by the arrow. (3 Marks)

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(iv) how long does the arrow remain in the air? (3 Marks)

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(b) A bicycle tyre is pumped to a pressure of 2.2 x 105N/m2 at 230C. After a race the pressure is found

to be 2.6 x 105/m2. Assuming the volume of the tyre did not change, what is the temperature of the

air in the tyre? (2 Marks)

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