NAME: ……………………………………………………………..… ADM …………….

**JUJA GIRLS HIGH SCHOOL**

**MID TERM I EXAMINATIONS 2018**

**FORM THREE**

***Kenya Certificate of Secondary Education (KCSE)***

***232/1***

***Paper 1***

***Physics (Theory)***

***February 2018***

***2 Hours***

**Instructions**

* *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.*
* *Silent non programmable electronic calculators may be used.*

**For Examiner’s Use Only**

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| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum Score** | **Student’s Score** |
| **A** | 1-10 | 25 |  |
| **B** | 11 | 11 |  |
| 12 | 19 |  |
| 13 | 10 |  |
| 14 | 7 |  |
| 15 | 8 |  |
|  **Total Score** | **80** |  |

***SECTION A:[ 25 MARKS]***

1. A vernier calipers has an error of -0.07cm. It is used to measure the diameter of a boiling tube which is 0.0213m.
2. What would be the reading on the vernier calipers? (2mks)

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1. Draw a section of the vernier calipers showing the reading. (1mk)

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1. The level of water in a burette is 28.6cm3. 12 drops of water each of volume 0.3cm3 are allowed to flow through the tap. What is the final water level in the burette? (3mks)

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1. **Figure 1** represents a uniform metal rod balanced at its centre by different forces.

 35cm 40cm 10cm T

 4N 8N

 Determine the value of T. (3mks)

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1. You are provided with a hemispherical bowl, a flat bench and a spherical ball bearing. Make drawings to show the arrangement of the apparatus that would result to :
2. Stable equilibrium (1mk)

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1. Unstable equilibrium (1mk)

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1. Neutral equilibrium (1mk)

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1. A mass of 84kg has a weight of 420N on a certain planet. Calculate the acceleration due to gravity on this planet. (3mks)

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1. a)What is meant by critical velocity of a fluid? (1mk)

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b)**Figure 2** below shows a tube through which water is flowing horizontally from A to B. Two other pipes X and Y are joined to it as shown.

 X Y

A B

Indicate with a reason the levels of water in pipes X and Y. (2mks)

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1. **Figure 3** represents a U-tube manometer used to measure lung pressure.

 From lungs

 50cm

 Water

 Determine the lung pressure given that atmospheric pressure is 1.03×105 Nm-2 and density of water is 1000 kgm-3. (3mks)

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1. A stone tied to a string when whirled in a horizontal plane maintains a circular path. Which force is responsible? (1mk)

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1. Briefly explain what thermal physics deals with. (1mk)

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1. a)What is a toricellian vacuum? (1mk)

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b)What test would be done to confirm existence of the toricellian vacuum in a mercury barometer. (1mk)

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***SECTION B:[55 MARKS]***

1. In an experiment to determine the size of an oil molecule, an oil drop of diameter 0.5mm forms a circular patch on a clean water surface sprinkled with some lycopodium powder. If the diameter of the oil patch is 0.2m, calculate:
2. The volume of the oil drop. (2mks)

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1. The area covered by the oil patch. (2mks)

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1. The diameter of an oil molecule in SI units. [ Express your answer in standard form] (3mks)

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1. Why was it necessary to sprinkle some lycopodium powder on the water surface? (1mk)

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1. State ***three*** assumptions made in this experiment. (3mks)

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1. a) A certain design of jaguar sports car is capable of accelerating from rest to a velocity of 30ms-1 in only 6s. Find the acceleration of the car, hence the distance travelled in the 6s. (4mks)

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b) A ball is dropped from the top of a vertical cliff 45m high. Given that the velocity just before striking the sandy beach is 30ms-1 and the ball penetrates the sand to a depth of 10cm; determine its average retardation. (3mks)

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c) During a fracas, a policeman shot a bullet vertically upwards with an initial velocity of 50ms-1 to scare away the crowd. Calculate:

 i) The time taken by the bullet to reach maximum height. (2mks)

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 ii) The time of flight of the bullet. (2mks)

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 iii) The maximum height reached by the bullet. (2mks)

 [Take g = 10ms-2]

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1. A missile is launched horizontally from a defense tower which is 80m high above a horizontal ground. If the missile hits an enemy on the ground 96m from the foot of the tower, calculate the initial horizontal velocity of the missile.[Take g = 10ms-2]. (3mks)

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e) **Figure 4** below represents part of a tape pulled through a ticker-timer by a trolley moving down an inclined plane. If the frequency of the ticker-timer is 50Hz, calculate the acceleration of the trolley. (3mks)

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1. a) State Hooke’s law. (1mk)

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b) Table 1 below shows the extension of a spiral spring with the respective stretching force applied to the spring during an experiment.

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| Force, F (N) | 0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 |
| Extension, e (cm) | 0 | 0.8 | 1.5 | 2.3 | 3.1 | 3.9 | 4.6 |

 On the grid provided, plot a graph of extension(y-axis) against force. (5mks)

 c) From the graph, determine the extension of a force of 3.5N. (2mks)

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 d) Determine the spring constant of the spring. (2mks)

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 14) Figure 5 below shows a vacuum flask.

1. Explain how heat transfer by radiation is minimized in the thermos flask. (2mks)

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1. Which part is responsible for minimizing heat loss by both convection and conduction? (1mk)

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1. Name the material used to make S and U. (1mk)

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1. Name part R and state its importance. (2mks)

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1. Which part minimizes heat loss by evaporation? (1mk)

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15) **Figure 6** below is the set-up of apparatus used by a group of form one students to verify Brownian motion.

 Travelling microscope

Light bulb

 Lens

 Smoke cell

It was observed with the help of the microscope that bright specks were in constant random motion.

1. What are the bright specks? (1mk)

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1. Why do they appear bright? (1mk)

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1. Why do they move? (1mk)

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1. State the observation that would be made if the experiment was repeated at a higher temperature. Give a reason for your answer. (2mks)

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1. Why are small particles such as those of smoke preferred to large particles in Brownian motion experiments? (1mk)

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1. State the role of the following in this experiment:
2. Lighted bulb (1mk)

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1. Convex lens (1mk)

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