**Name ……………………………..………...…………. Adm. No …………………**

**Class ………………………………………………... Date ………………..........**

**232/1**

**PHYSICS FORM THREE**

**PAPER 1**

**(THEORY)**

**TIME: 2 HOURS**

**HOLA SECONDARY SCHOOL**

**Mid Term Examinations- Term Two 2016**

**INSTRUCTIONS:**

 Write your name, class and admission number in spaces provided above

 Answer **ALL** the questions in the spaces provided

 Mathematical tables and electronic calculators may be used

 All working **MUST** be clearly shown where necessary.

***FOR EXAMINERS USE ONLY***

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION** | **QUESTION** | **MAXIMUM SCORE** | **CANDIDATES SCORE** |
| **A** | 1-11 | **25** |  |
| **B** | 12 | **11** |  |
|  | 13 | **14** |  |
|  | 14 | **9** |  |
|  | 15 | **8** |  |
|  | 16 | **13** |  |
| **TOTAL SCORE** |  | **80** |  |

*This paper consists of 8 printed pages.*

*Candidates should check to ensure that all pages are printed as indicated and no questions are missing*

**SECTION A (25 MARKS)**

1. Figure 1. Shows a glass beaker of cross sectional area 10.5cm2



**Beaker**

**Fig 1**

**Water**

When a metal block of mass 250 g is immersed into the water, the level of water rises by 3.5 cm. Determine the density of the metal block. Express your answer in S.I unit (3 marks)

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1. The figure 2 shows air flowing through a pipe of non-uniform cross sectional area. Two tubes **A** and **B** are dipped into the liquid as shown.



**Air flow**

**Fig 2**

**Tube B**

**Tube A**

 **Liquid**

 **Liquid**

1. Indicate the level of the liquid in tubes **A** and **B** (1 mark)
2. Explain your answer in part (a) above (1 mark)

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1. A motor cyclist wears a helmet in the inside with sponge. Explain how this minimizes injuries to the motorists head when involved in an accident. (2 marks)

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1. Why is it that boiling is not used for sterilization of clinical thermometer? (1 mark)

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1. The figure 3 shows a device for closing a steam outlet.



The area of the piston is 4.0 x 10-4 m2 and the pressure of the steam in the boiler is

2.0 x 105Nm-2. Determine the weight W that just holds the bar in the horizontal position shown. (4 marks)

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1. State two factors that lowers the stability of a body. (2 marks)

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1. State two factors that govern the strengths of a spiral of given material. (2 marks)

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1. A pupil blows a current of air over the surface of a sheet of paper held close to its mouth. State and explain what happens to the paper. (3 marks)

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1. An object dropped from a height h attains a velocity of 6m/s just before hitting the ground, find the value of h. (g = 10 ms-2) (3 marks)

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1. Figure 4 shows two corks **P** and **Q** fixed on a polished and a dull surface with wax.



**Cork fixed with wax**

**Cork fixed**

**with wax**

**Fig 5**

**2N**

**3N**

**Heater**

**Fig 4**

**Polished surface**

**Dull surface**

Explain the observation, when the heater is switched on for a short time given that the heater is equidistant from the two surfaces. (2 marks)

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1. State the reason why it is easier to separate water into drops than to separate a solid into smaller pieces. (1 mark)

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**SECTION B (55 MARKS)**

1. (a) State the law of conservation of energy. (1 mark)

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1. Define work and state its SI unit. (1 mark)

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(c) A load of 50N is raised by pulling it along an inclined plane of length 2.0m

 F22N 2.0m 0.5m

Determine

1. The work done by the force F (3 marks)

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1. The work done on the load. (3 marks)

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1. The efficiency of the system. (3 marks)

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1. (a) Use the table below to answer the questions that follow:-

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mass m(g) | 50 | 100 | 150 | 200 | 250 | 300 |
| Force F (N) | 0.5 |  |  |  |  |  |
| Extension, e(cm) | 0.16 | 0.31 | 0.47 | 0.63 | 0.78 | 0.94 |

1. Complete the table by filling in the values of force F. (2 marks)
2. On the grid below plot the graph of force( y-axis) against extension

 (4 marks)



1. From the graph determine the spring constant. (3 marks)

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 (iv) Why will the graph not be linear if a large mass is hung? (2 marks)

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(b) A spring with a spring constant of 25 Ncm-1 extends by 5cm when a certain force acts on it. Determine the work done by the force. (3 marks)

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1. a) i) A body is initially in motion. If no external force acts on the body, describe the subsequent motion. (2 marks)

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ii) A car of mass 1500 kg is initially moving at 25 m/s. Calculate the force needed to bring the car to the rest over a distance of 20 m. (3 marks)

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 b) Two trolleys of masses 2 kg and 1.5 kg are travelling towards each other at 0.25m/s and 0.40 m/s respectively. The two trolleys combine on collision.

 i) Calculate the velocity of the combined trolleys. (3 marks)

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 ii) In what direction do the trolleys move after collision? (1 mark)

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1. (a) Distinguish between solid and liquid states of matter in terms of intermolecular forces. (1 mark)

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b) In an experiment to estimate the diameter of an oil molecule, an oil drop of diameter

 0.06cm spreads over a circular patch whose diameter is 20cm. Determine:-

 i) The volume of the oil drop (2mks)

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 ii) The area of the patch covered by the oil (2mks)

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 iii) The diameter of the oil molecule (1mk)

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c) State any two assumptions made in b (iii) above (2mks)

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1. a) The figure below shows a velocity-time graph for the motion of a certain body.



 Describe the motion of the body in the region.

 i) **OA** (1 mark)

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 ii) **AB** (1 mark)

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 iii) **BC** (1 mark)

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b) A car moving initially at 15ms-1 decelerates at 2.5ms-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. (2 marks)

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

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