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

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

**Date: ……………….…………..……………………………………..**

232/1

**PHYSICS**

Paper 1

(THEORY)

**Time: 2 Hours**

**MWAKICAN JOINT EXAMINATION 2016**

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

**PHYSICS**

Paper 1

**Time: 2 Hours**

**INSTRUCTIONS TO CANDIDATES:-**

* *Write your* ***name****,* ***index******number*** *and* ***school*** *in the spaces provided above.*
* *This paper consists of* ***two*** *sections;* ***A*** *and* ***B***
* *Answer* ***all*** *the questions in section* ***A*** *and* ***B*** *in the spaces provided*
* *All working* ***must*** *be clearly shown.*
* *Mathematical tables and electronic calculators may be used*
* *Take the earth’s gravitational field strength g = 10 m/s2.*
* *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 – 10** | **25** |  |
|  | **11** | **11** |  |
|  | **12** | **11** |  |
| **B** | **13** | **11** |  |
|  | **14** | **11** |  |
|  | **15** | **11** |  |
| **Total Score** | | **80** |  |

**SECTION A (25 MARKS)**

1. The micrometer screw gauge represented below in figure 1 has a thimble scale of 50 divisions. What is the true reading if it has zero error of -0.3mm? (2 Marks)

42

0

Figure 1

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1. The figure below shows the mercury in a container and a thin capillary tube inserted in it.

Tube

Glass beaker

Mercury

(i) Indicate the shape of meniscus and level of the mercury in the tube. (1 Mark)

(ii) Explain the shape of the meniscus and level of mercury in the tube in terms of cohesive and adhesive

force. (1 Mark)

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1. Two samples of coloured gas are put in different conditions, one in a vacuum and the other in air. State with a reason, condition in which the coloured gas will have travelled further after 15 minutes. (2 marks)

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1. State two factors that affect the spring constant of a certain spring made using a wire of a certain material and of a given thickness. (2 Marks)

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1. The figure below shows a uniform metre rule pivoted and supported as shown.

X

T = 16N

Pivot

If the mass of the rule is 2.40kg, find the distance x. (3 Marks)

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1. The figure below shows three identical springs each of spring constant K = 75N/M supporting a 20N load. If the connecting rod weigh 5N.

Load

C

B

A

Connecting rod.

Determine

(i) the total load supported by spring B. (1 mark)

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(ii) the total extension produced in the arrangement. (1 mark)

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1. Explain why it is not advisable to use boiling water to sterilize a clinical thermometer. (2 Marks)

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1. (i) State Bernoullis principle. (1 mark)

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(ii) the figure below shows a Bunsen burner.

Barrel

Air hole

Gas

Explain how air is drawn in through the air hole when the gas is switched on. (2 Marks)

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1. Distinguish between specific heat capacity and heat capacity. (2 Marks)

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1. A footballer kicks a ball of mass 0.6kg initially at rest using a force of 720N. If the foot was in contact with the ball for 0.1 sec. Determine the take off speed of the ball. (3 marks)

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**SECTION B (55 MARKS)**

1. (a) State Newtons first law of motion. (1 Mark)

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(b) The figure below shows a body of mass 800g being pulled along a surface by a force F and

connected to spring balance.

F

(i) Indicate in the system all the forces acting on the system. (2 Marks)

(ii) If the reading of the spring balance is 3.2N when the body just starts moving determine

(I) the coefficient of friction between the body and the surface. (3 Marks)

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(II) How will the reading on the spring balance be affected when the body is pulled at a constant

velocity. Explain (2 Marks)

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(III) If the body is now pulled with a force of 5.0N determine the acceleration of the body. (3 Marks)

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1. Using the pulley system shown, a mass of 10kg is raised 2m by an effort of 80N.

10kg

80N

(i) How much potential energy does the load gain? (1 Marks)

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(ii) How far does the effort end move in order to raise the load by 2m. (1 Mark)

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(iii) How much work is done by the effort. (1 Mark)

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(iv) What is the efficiency of these pulleys. (2 Marks)

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(v) If all the wasted energy is used to lift the bottom pulley, how much does the pulley weigh?

(1 Mark)

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(b) The figure below shows a wheel and axle being used to raise a load W by applying an effort E. The

radius of the large wheel is R and that of the small wheel is r as shown.

r

R

F

W

(i) Show that the V.R of the machine is given by (2 Marks)

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(ii) Given that r = 5cm and R = 8cm. Determine the effort required to raise a load of 20N if the

efficiency of the machine is 80% (3 Marks)

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1. The diagram represents the features of a vacuum flask.

B

Cork

A

(i) Name the parts labelled A and B (2 Marks)

A……………………………………………………………………………………………………………

B……………………………………………………………………………………………………………

(ii) Explain how the heat losses are minimized when hot liquid is poured onto the flask. (3 Marks)

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(iii) Boiling water is poured onto two identical vacuum flask A and B. Flask A is partially filled while

flask B is completely filled. Both are closed tightly. State with reason the flask in which the water is

likely to have a higher temperature eight hours later. (3 Marks)

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(b) 5kg of water at 290K falls through a vertical height of 315m. What would be its temperature after the

fall if there is no heat exchange with the air or the ground. (Cw = 4200jkg-1, k-1) g = 10N/kg)

(3 Marks)

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1. (a) Define specific latent heat of fusion of ice. (1 Mark)

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(b) In an experiment to determine the specific latent heat of vapourisation of liquid the following set up

of a apparatus was used.

Stop watch

V

A

Steam through condenser

Liquid

Heater

0.1KW

Condensed vapour

(i) State the quantities that were measured during the experiment. (3 Marks)

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(ii) Describe how the apparatus could be used to determine the specific latent heat of vaporization of the

liquid. (4 marks)

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(iii) If the heater is switched on for 5 minutes and the reading of the weighing machine (balance)

Recorded 20g of the condensed vapour, determine the specific latent heat of vaporization of the liquid. (3 Marks)

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1. (a) (i) State the pressure law of an ideal gas (1 Mark)

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(ii) The pressure of a fixed mass of a gas at a constant temperature T = 300K is varied continuously.

The corresponding values of P and the volume V of the gas are shown below.

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| --- | --- | --- | --- | --- | --- | --- |
| Pressure P x 105pa | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
| Volume V (m3) | 0.025 | 0.020 | 0.017 | 0.014 | 0.012 | 0.011 |

Given that PV = 2RT where a is a constant. Plot an appropriate graph and use it to determine R

(8 Marks)



(b) A tin closed with air tight lid contain air of a pressure of 1.0 x 105 pa and temperature 120C. The tin

is heated in a water bath until the lid opens. If the temperature at which the lid opens is 880C. Determine the pressure attained by the gas. (2 Marks)

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