Name: …………………………………….Class: ………………………… Adm.No. ……………

**232/1** Candidate’s Signature: …………………...

**PHYSIS THEOY**

**Paper 1**

**September 2022**

Time: 2 hours

MOKASA J O I N T E X A M I N A T I O N

**SEPTEMBER 2022**

# Kenya Certificate of Secondary Education PHYSICS

**PAPER 1**

**Instructions to Candidates**

* *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections;* ***A*** *and* ***B.***
* *Answer* ***ALL*** *the questions in the spaces provided.*
* *Mathematical tables and electronic calculators may be used.*
* *All working MUST be clearly shown.*
* *This paper consists of* ***11*** *printed pages.*
* *Candidates should answer the questions in English and check to ensure that no question(s) is missing.*

 **FOR EXAMINER’S USE ONLY**

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| --- | --- | --- | --- |
| **SECTION** | **QUESTIONS** | **MAXIMUM SCORE** | **CANDIDATE’S SCORE** |
| **A** | 1 – 12 | 25 |  |
| **B** | 13 | 11 |  |
|  | 14 | 09 |  |
|  | 15 | 11 |  |
|  | 16 | 06 |  |
|  | 17 | 08 |  |
|  | 18 | 10 |  |
| **TOTAL SCORE** | **80** |  |

## SECTION A (25Marks)

***Answer all questions in this section***

1. The figurebelow show parts of vernier callipers when the Jaws are closed without an object between them.

State the error of the vernier callipers above. (2marks)

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1. In the figurebelow, the U-tube contains two immiscible liquids P and Q. If the density of Q is 900kg/m3 and that of P is 1200kg/m3, calculate the height of liquid Q. (3marks)



1. The figure below shows a force pump used to draw water from a borehole



Describe how the force pump enables a continuous flow of water (2marks)

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1. The figure below shows an arrangement to demonstrate diffusion through a porous pot:-

**Beaker**

**Carbon (iv) oxide gas supplied**

**Porous pot**

**Glass tube**

**Basin Water**

The carbon (iv) oxide gas is supplied and water observed to rise in the glass tube. Explain

(2marks)

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1. The figure below shows a scalene triangular lamina. Locate the position of centre of gravity.

(1mark)



1. The figurebelow shows two rods of copper **A** and **B** of the same length but different thickness with candle wax attached to either end are heated as shown below.

# B

**A**

**Heat**

**Wax**

State and explain the observation made.

**Wax**

(2marks)

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……………………………………………………………………………………………………… 7. a). The figure below shows the variation of extension with force for a certain spring.

**Extension (m)**

**Force (N)**

On the same axis, **sketch** the variation of extension with force for another similar spring whose

cross section area is double the first spring (1mark)

b). A helical spring of length 10cm and elastic constant of 50${N}/{m}$.Calculate the work done in stretching the spring to 15cm (2marks)

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1. The figure below shows a pith ball being lifted in to a funnel end of a blower.

Explainthis observation (2marks)

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1. 100 drops of olive oil were released from the burette shown in figure below that was initially at level A to the new level shown. One drop was allowed to fall in a container containing water to form a patch of radius 7cm.

 **cm3**

48

50

49

A

1. Determine the volume of one drop of oil (1mark)

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1. Estimate the size of the molecule formed (2marks)

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1. A girl of mass 40kg takes 30s to walk up a flight of 10 steps. If each step is 40cm high.

Calculate the power developed by the girl (3marks)

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1. The figurebelow shows chains attached to a wheel of a truck during winter.



Explain the purpose of the chains (2marks)

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1. The figureshows a bar made of brass and wood wrapped with a piece of paper at the Joint

Brass

State and explain what was observed at the junction when a flame is passed at the joint

(2marks)

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## SECTION B

***(Answer all questions in this section)***

1. a). State the pressure law for an ideal gas. (1mark)

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b). The set up shows an arrangement to determine the relationship between temperature and pressure of a gas at constant volume.

1. State the measurements obtained in the experiment. (2marks)

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1. Explain how the measurements stated in (i) above can be used to verify pressure law

(3marks)

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1. A bicycle tyre is pumped to a pressure of 2.2 x 105Pa at 230C. After a race the pressure is found to be 2.6 x 105Pa. Assuming the volume of the tyre does not change, what is the

temperature of the air in the tyre? (2marks)

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1. State **one** basic assumption of the Kinetic Theory of gases. (1mark)

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1. Using the kinetic theory of gases. Explain the relationship between temperature and volume at constant pressure (2marks)

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…………………………………………………………………………………………………… 14. a). Define angular velocity. (1mark)

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 b). The diagram below shows the path followed by a body attached to a string of length 10cm and whirled in a vertical circle. The string snaps at point A and hits the ground at point B.

**A**

15cm

B

R

1. Calculate the linear velocity, given the mass of the body is 20g and the maximum tension on the string is 0.4N (3marks)

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1. Name the path followed by the projectile. (1mark)

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1. Calculate the time of flight (3marks)

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1. Calculate the range, R. (2marks)

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15.a).(i) Give the main reason why water is preferred for use as a coolant in factories. ( 1mark)

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(ii). A sample of water is found to boil above 100°C at sea level. At what temperature is it likely to freeze? Explain. ( 2marks)

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b). The circuit below is used to light a 3V, 0.2 A bulb from a 12 V d.c supply.



1. Determine the potential difference across the appliance R at normal operation of the bulb

 (1mark)

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1. Determine the rate at which electrical energy is converted into heat energy in the appliance R. (2marks)

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1. If the appliance R is an electrical heater and is used to convert 50g of ice at -10 ° C to water at 20° C, determine total energy spent. (3marks)

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1. The total time taken during the entire process of conversion (2marks)

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## Given that the specific latent heat of fusion of ice is 3.34× $10^{5}$J/kg, specific heat capacity of ice is 2100 J/ kgk , specif heat capacity of water is 4200 J/kg k and specific latent heat of vaporization of water is 22.6x $10^{5}$J/ kg.)

1. The figure below shows a body of mass 25g falling from a cliff of height 5m above the ground level

**A**

**5m**

**7m**

**B C**

* 1. Find the velocity of the body at point B (2marks)

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* 1. The body then rolls on the surface from point B then stops at C. Calculate
1. The net force causing the deceleration (3marks)

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1. The co-efficient of kinetic friction (1mark)

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1. A mason uses the inclined plane to lift a 70kg load through a height of 5.0m.

θ

 5.0m

 12.0m

* 1. Show that  (2marks)

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* 1. The frictional force between the surface and the load is 30N.Calculate
1. The work done against friction (2marks)

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1. The useful work done (2marks)

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1. The efficiency of the inclined plane (2marks)

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1. a). State the Archimede’s principle (1mark)

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b). The figure below shows a block of mass 50g submerged in a certain liquid of density 800 $kg/m^{3 }$and suspended from uniform horizontal beam by means of a string. A mass of 40g suspended from the other end of the beam puts the system in equilibrium.

 **32cm**

 **20cm**

**Liquid**

**40g**

**50g**

1. Determine the upthrust force acting on the block. (3marks)

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1. Calculate the density of the solid (3marks)

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c). A hydrometer of length 8.0cm when dipped in water, a length of 5.0cm is left above the water surface. Calculate the height not submerged when dipped in a liquid of density 800 𝑘𝑔/𝑚3 (Density of water 1000 𝑘𝑔/𝑚3) (3marks)