**NAME: ………………………………………………..CLASS:….……ADMNO…..….….**

**DATE………………………………**

**232/1**

**Physics**

**Paper 1**

**JULY 2019**

**MOKASA II JOINT EXAMINATION**

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

**Physics Paper 1**

**Instructions to candidates**

* This paper consists of two sections ***A*** and ***B***.
* Answer **all** the questions in the two sections in the spaces provided after each question
* All working **must** be clearly shown.
* Electronic calculators and Mathematical tables may be used.
* All numerical answers **should be expressed** in the **decimal** notations.

**For Examiner use only**

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| --- | --- | --- | --- |
| **SECTION** | **QUESTION** | **MAX MARKS** | **CANDIDATE’S SCORE** |
| **A** | **1 – 14** | **25** |  |
| **B** | **15** | **12** |  |
| **16** | **10** |  |
| **17** | **09** |  |
| **18** | **14** |  |
| **19** | **10** |  |
| **TOTAL** |  | **80** |  |

***This paper consists of 14 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.***

**SECTION A (25 MARKS)**

***Answer all the questions in this section in the spaces provided.***

1. Figure 1. shows a micrometer screw gauge being used to measure the diameter of a ball bearing.



**Fig.1**

If the instrument has a negative zero error of 0.01mm, record the actual diameter of the ball bearing. (1 mark)

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2. Figure 2. shows drops of mercury and water on a glass surface,

**Mercury drop**

**Water drop**

**Fig. 2**

**Glass**

Explain the difference in the shapes of the drops. (2 marks)

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3. State why diffusion is faster in gases than in liquids. (1 mark)

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1. When a Bunsen burner is lit above a wire gauze, it is observed that the flame initially burns above the gauze shown in figure 3 (i). After sometime, the flame burns below as well as above the gauze as shown in figure 3(ii).



 **Gauze**

**Fig. 3**

**(ii)**

**(i)**

Explain the observation. (2 marks)

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5. In an experiment to demonstrate Brownian motion, smoke was placed in a smoke cell and observed using a microscope. The smoke particles were seen moving randomly in the cell. Explain the observation. (1 mark)

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6. A paper vane in a horizontal axis was placed above a Bunsen burner as shown in figure 4.

When the burner was lit, the paper vane begun to rotate. Explain the observation. (2 marks)

**List Candle**

**Fig. 4**

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7. An electric kettle with shiny outer surface is more efficient than one with a dull outer surface, give a reason for this. (1 mark)

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8. What is the reason why trailers carrying heavy loads have many wheels. (1mark)

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9. Two flasks **A** and **B** were placed on a horizontal surface as shown in figure 5.



 **Fig. 5**

**A**

**B**

**Water**

State and explain which flask is more stable. (2 marks)

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10. Figure. 6 below shows a metre rule balancing when a mass of 200g is hung at one end.

Determine the tension, T in the string. (3 marks)



**T**

**10cm**

**Fig. 6**

**200g**

11. State Newton’s second law of motion. (1 mark)

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12. A pipe of diameter 12mm is connected to another of diameter18mm. if water flows in the wider pipe at the speed of 2m/s, determine the speed of water in the narrow pipe. (3 marks)

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13. On the axes provided in the figure 7, sketch the graph showing variation in pressure with volume of a fixed mass of gas that obeys Boyle’s law. (1 mark)

**Pressure (pa)**

**Volume ( cm3)**

**Fig. 7**

14. An oil drop has a volume of 0.01mm3. When it is placed on the surface of water, it spreads out to form a circular patch of area 500cm2.

(i) Calculate the size of the molecule of the oil. (3 marks)

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 (ii) State **one** assumption made in (i) above. (1 mark)

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**SECTION B (55 marks)**

15. (a)Define angular velocity (1 mark)

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(b) the figure below shows an object of mass 0.2kg whirled in a vertical circle of radius 0.3m at uniform speed of 4m/s

D

A

**B**

c

(c) Determine the tension of the string at:

 (i) Position A (2 marks)

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 (ii) Position B (2 marks)

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 (iii) Suggest the point where the string is likely to snap. (1 mark)

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(d) The figure below shows the motion of a trolley on a ticker tape timer whose frequency is 100HZ

0.8cm

4cm

A

B

C

D

Determine:

(i) Initial velocity at points AB. (2 marks)

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(ii) Velocity at points CD (2 marks)

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(iii) Acceleration of the trolley during the motion. (2 marks)

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**16. (a)**Give the reason why a density bottle is more accurate than a measuring cylinder when used to measure volume of liquids. (1 mark)

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(b) State two precautions taken when using a density bottle. (2 marks)

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(c) A form one student wanted to determine the density of copper. She wrote the following procedure: Study it and answer the questions that follow.

* Measure the mass x1 (g) of a clean dry empty density bottle
* Fill the bottle partly with copper turnings and measure the mass x2(g)
* Fill the bottle with water up to the neck and measure its mass x3(g)
* Empty the bottle and rinse it.
* Fill it with water and replace the stopper. Measure the mass x4(g) of the bottle filled with water.

Write an expression for:

(i) Volume of the bottle (2 marks)

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(ii) Mass of copper turnings (1 mark)

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(iii) Volume of copper turnings. (2 marks)

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(iv) Density of copper. (2 marks)

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17. (a) State the law of floatation (1 mark)

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(b) A metal block weighs 0.8N is suspended by a string in water. If the block is completely immersed in water the tension in the string is 0.5N. Find

 (i) The upthrust on the block (1 mark)

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 (ii) The density of the block. (3 marks)

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 (c) The figure below shows a cork of mass 25g floating in water.

cork

Determine the minimum volume of copper that must be attached so that the two will just submerge.( Relative density of copper = 9.0, Relative density of cork= 0.25) ( 3marks)

Water

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 (d) Explain how a submarine can be made to.

 (i) Float on water (1 mark)

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18. (a) You are provided with the following apparatus:

 A filter funnel, a thermometer, a stop watch, ice at 0°C, an immersion heater rated P watts, a beaker, a stand, boss and clamp and a weighing machine.

 Describe an experiment to determine the specific latent heat of fusion of ice. Clearly state the measurements to be made. (3 marks)

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(b) 200 g of ice at 0°C is added to 400g water in a well lagged calorimeter of mass 40g. The initial temperature of the water was 40°C. If the final temperature of the mixture is X°C,(Specific latent of fusion of ice L = 3.36 x 105 Jkg-1, specific heat capacity of water, c = 4200Jkg-1K-1, specific heat capacity of copper = 400 Jkg-1K-1.)

 (i) Derive an expression for the amount of heat gained by ice to melt it and raise its temperature to X°C (2 marks)

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 (ii) Derive an expression for the amount of heat lost by the calorimeter and its content when their temperature falls to X°C. (2 marks)

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(iii) Determine the value of X. (3 marks)

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(c) A hydrogen balloon of volume 1.2 m3 is released at the ground level where the pressure is680 mmHg and a temperature of 20 °C. Determine the volume of the balloon at a height of2500m above the ground where the pressure drops to 500 mmHg and the temperature is 4°C. (4 marks)

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 19. A balloon seller has a cylinder of helium gas which he uses to blow up his balloons. The volume of the cylinder is 0.10m3. It contains helium gas at a pressure of 1.0 x 107Nm-2. The balloon seller fills each balloon to a volume of 1.0 x 10-2m3 and a pressure of 2.0 x 105N/m2

 (a) Explain in terms of particles how the helium in the cylinder produces a pressure (1 mark)

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 (b) Calculate the total volume that the helium gases occupy at a pressure of 1.2 x 105 N/m2. Assume the temperature of the helium does not change (3 marks)

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 (c) Calculate the number of balloons of volume 1.0 x 10-2m3 that the balloon seller can fill using the gas (2 marks)

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 (d) The graph below shows how the pressure of a gas trapped inside a sealed container changes with temperature. The pressure is caused by the gas particles continually hitting the sides of the container.



Figure 6

(i) Write down the name of the temperature at which the gas particles stop hitting the sides of the container (1 mark)

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(ii) What is the momentum of the gas particles at this temperature? Give reason for the Answer (2 marks)

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 (iii) Give the value of the temperature in Kelvin (1 mark)

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