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

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

**PHYCICS PAPER 1 Date…………...........**

**Time: 2Hrs.**

**ELDORET DIOCESE EXAM 2021**

**The Kenya Certificate of Secondary Education**

**PHYSICS**

**Paper 1**

**Instructions:**

* *This paper consists of* ***TWO*** *Sections:* ***A*** *and* ***B****.*
* *Answer* ***ALL*** *the questions in sections* ***A*** *and* ***B*** *in the spaces provided.*
* ***ALL******workings******MUST*** *be clearly shown.*
* *Mathematical tables and electronic calculators may be used.*

**For Examiner’s Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum Score** | **Candidate’s Score** |
| **A** | 1 – 11  | 25 |  |
| **B** | 12 | 9 |  |
| 13 | 9 |  |
| 14 | 7 |  |
| 15 | 8 |  |
| 16 | 8 |  |
| 17 | 9 |  |
|  **TOTAL SCORE** | **80** |  |

**SECTION A (25 marks)**

Answer ALL the questions in the spaces provided.

**1.** A rectangular container measures 2cm by 3cm by 5cm. What is the weight of mercury that will fill the container to the brim. (Take g = 10N/kg and density of mercury = 13600 kg/m³). (3 marks)

**2.** A vernier calliper has a zero error of -0.02cm. Draw the section of the calliper scale when used to take an actual measurement of 4.85cm. (2 marks)

**3.** Figure one below shows a beaker placed on a bench. A block of ice is placed in a beaker as shown below.



 Fig 1

 State and explain the change in the stability of a beaker when ice melts. (2 marks)

**4.** Figure 2 below shows horizontal copper wire tightly fixed on two stands. A mass P is suspended from the wire using a string that can freely slide.



 Fig 2

 The copper wire is then heated for sometime. State and explain what happens to mass P.(2 marks)

**5.** Water flows through a pipe with different cross-section areas at a rate of 7.7 × 10-2 m³ / s. If the pipe has a diameter of 7mm, determine the velocity of water through the pipe at that particular section. (3 marks)

**6.** Apart from friction, name another factor that reduces efficiency in machine. (1 mark)

**7.** Two forces act on a trolley as shown below;



 Fig 3

 Find: the acceleration of the trolley. (3 marks)

**8.** State the factors that affect the rate of flow of heat through a metal conductor. (2 marks)

**9.** Sketch a graph of volume of a fixed mass of a gas against pressure on the axes below. (1 mark)



**10.** A form three student heats 5kg of water to a temperature of 80°C. When he added X kg of water at 15°C, the mixture attains a temperature of 40°C. Determine the value of X. (3marks)

**11.** A uniform rod of length of 5m and a mass of 6kg is pivoted at 3.8m mark. The rod is held horizontally by a vertical rope at 5m mark as shown in figure 3 below.



 Calculate tension on the rope. (3 marks)

**SECTION B: 55 marks)**

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

 ii) Explain why it is easier to use a thick screw driver than a thin one. (1 mark)

 b) The figure below shows a force-distance graph for a car being towed on a horizontal ground.



 i) Calculate the total work done. (3 marks)

 ii) If the velocity just before reaching point D is 0.6m/s, calculate the power developed by the source providing the force at this point. (1 mark)

c) An electric pump can raise water from a low level reservoir to a high level reservoir at a rate of 3.6 × 105 kg/h. The vertical height that water is raised is 400m. If the rate of energy loss in form of heat is 200kw, calculate the efficiency of the pump. (3 marks

**13.** a) State Newton's second law of motion. (1 mark)

 b) Why is it easier to stop a saloon car than a bus moving at the same velocity. (2 marks)

 c) A bullet of mass 20g moving at 200ms-1 hits and gets embedded in a wooden block of mass 450g that is suspended freely on a light inextensible string at a height of 5m above the ground. If the string breaks on impact, calculate:

 i) the velocity of the block immediately after impact. (2marks)

 ii) the time taken by the block to strike the ground. (2 marks)

 iii) the horizontal range of the block. (2 marks)

**14.** a) State two properties of mercury that makes it a suitable thermometric liquid. (2 marks)

 b) Figure below shows a six's maximum and minimum thermometer.



 i) What is the thermometric liquid in the thermometer (1 mark)

 ii) Give a reason why vapour in bulb B is saturated. (1 mark)

 iii) Describe how the thermometer above works. (3 marks)

 iv) At what points is reading of temperature taken from the thermometer. (1 mark)

**15.** a) State one factor that affects freezing point of distilled water. (1 mark)

 b) Figure below illustrates an experiment in which electrical energy is used to determine specific latent heat of fusion of ice.



 i) Complete the circuit to show connection of essential circuit components. (3 marks)

 ii) In the above experiment the following readings were obtained when heater was switched on for 10 minutes.

 Voltage - 8.0V

 Current - 2.25A

 Temperature rise - 10°C

 At the end of the experiment 400g of water at 0°C was collected in the beaker. Determine latent heat of fusing of ice. (3 marks

 iii) State any assumption made in (ii) above. (1 mark)

**16. a)**i) What is the importance of banking a road in corners? (1 mark

 ii) Explain why wet clothes put in a drum which has holes at the bottom get dried faster when the drum of drying machine is rotated at high speed. (2 marks)

 **b)** A turntable of a record player makes 60 revolutions per minute. Calculate.

 i) Angular velocity in rads/second. (2 marks)

 ii) The linear acceleration at a point 0.18M from the centre. (3 marks)

**17.a)** In an experiment to determine the density of a liquid, uniform metal cylinder of cross-section area 6.0cm² and length of 4.2cm was hang from a spring balance and lowered gradually into liquid. The graph below shows upthrust plotted against, lengths submerged.



 From the graph, determine:

 i) Value of upthrust when the cylinder is fully submerged. (1 mark)

 ii) The density of the liquid in SI units. (5 marks)

**b)** A solid displaces 5.0cm³ of paraffin when floating and 20cm³ when fully immersed in it. Given that the density of paraffin is 0.8g/cm³, calculate the density of the solid. (3 marks)