MASENO SCHOOL MOCK – 2022

Kenya Certificate of Secondary Education

232/1 **Paper 1**

PHYSICS

(Theory)

Sept. 2022 – 2 Hours

Name …… Admission Number …….

Class …… Date ……Candidate's Signature……...

Instructions to candidates

a) *Write your name and admission number in the spaces provided above.*

b) *Write your class, the date of examination and sign in the spaces provided above.*

c) *This paper consists of **two** sections **A** and **B.***

d) *Answer **all** the questions in sections **A** and **B** in the spaces provided.*

e) ***All** working **must** be clearly shown.*

f) *Silent non-programmable electronic calculators may be used.*

g) ***This paper consists of 12 printed pages.***

h) ***Students should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

i) ***Students should answer the questions in English. Take g = 10m/s²***

For Examiner's Use Only

Section	Questions	Maximum Score	Candidate's Score
A	1-14	25	
B	15	11	
	16	11	
	17	12	
	18	10	
	19	11	
	Total Score	**80**	

SECTION A (25 MARKS)

1. Convert -105^0 C into Kelvin. (1 mark)

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2. Differentiate between distance and displacement. (1 mark)

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3. A student made a model flushing unit for his science project. He designed it to have two jericans placed at different heights and joined by a flexible rubber pipe. The upper jerican was full of water and the pipe had some water. It was observed that after a short time, water had flown to the lower jerican. Explain why;

(a) The pipe was first run with water (1 mark)

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(b) The Jeri cans were placed at different heights (1 mark)

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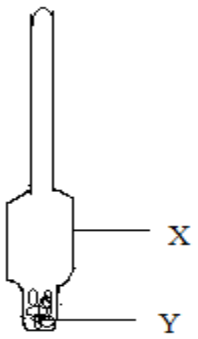
4. The **figure 1** below shows a hydrometer. Use it to answer the questions thereafter



(i) Why is part X enlarged? (1 mark)

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(ii) Some lead shots are added to part Y. State the reason (1 mark)

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5. A uniform metre rule of mass 120 g is pivoted at the 60 cm mark. At what point on the metre rule should a mass of 50 g be suspended for it to balance horizontally? (2 marks)

6. State two ways in which stability of a body can be increased. (2 marks)

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7. A vacuum flask has double silvered walls. State the mode of heat transfer that is minimized by this. (1 mark)

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8. A student of mass 70 kg boards a lift designed to accelerate upwards at $3m/s^2$ .Determine the reaction of the lift floor on his feet. (2 marks)

9. The moon goes round the earth on its orbit. State :

(a) Why the moon is said to be accelerating despite moving at constant speed. (1 mark)

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(b) What provides the centripetal force that keeps the moon in its orbit round the earth. (1 mark)

……

10. Two beakers contain equal volumes of water and ethanol. Crystals of potassium permanganate of same sizes are placed in the liquids at the bottom of each of the beakers simultaneously. In which beaker will the diffusion be slower if the two liquids are at the same temperature? Explain. (2 marks)

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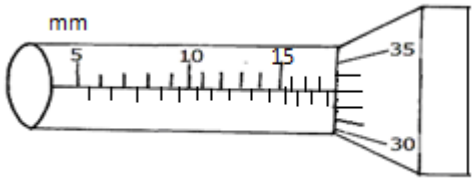
11. (a) The **figure 2** below shows a micrometer-screw gauge. Determine the reading shown. (2 marks)



(b) What do you understand by the term *zero error* for the device in (a) above. (1 mark)

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12. An object of mass 150 kg moving at 20 ms^{-1} collides with a stationary object of mass 90 kg. They couple after collision. Determine their common velocity after collision. (2 marks)

13. State an artificial and a natural body designed for streamline flow in air. (2 marks)

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14. State **one** precaution in using a density bottle. (1 mark)

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SECTION B (55 MARKS)

15. (a) State Hooke's Law. (1 mark)

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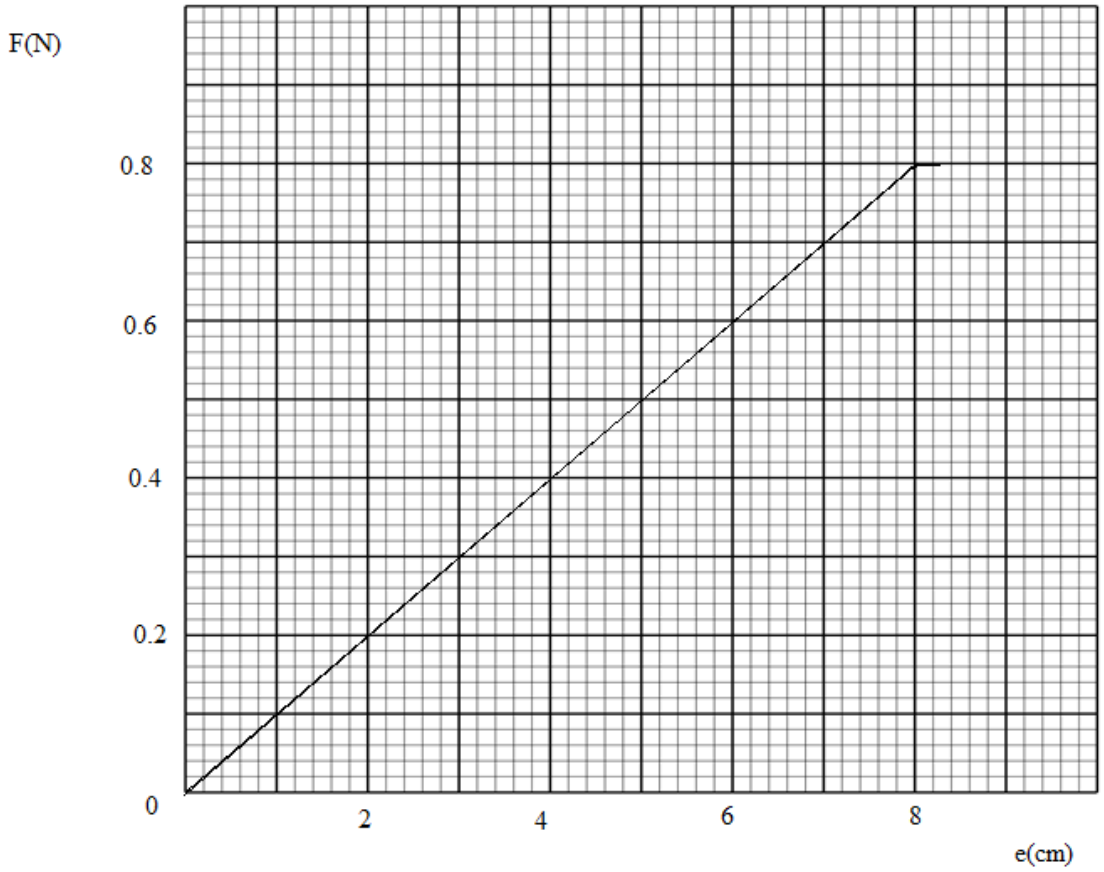
(b)The graph below shows results from an experiment investigating Hooke's Law.



(i) Determine the spring constant in SI unit. (2 marks)

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(ii) On the diagram, indicate the elastic limit using letter E. (1 mark)

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(iii) Calculate the energy stored in the experimental spring. (3 marks)

(c) Differentiate between elasticity and plasticity. (1 mark)

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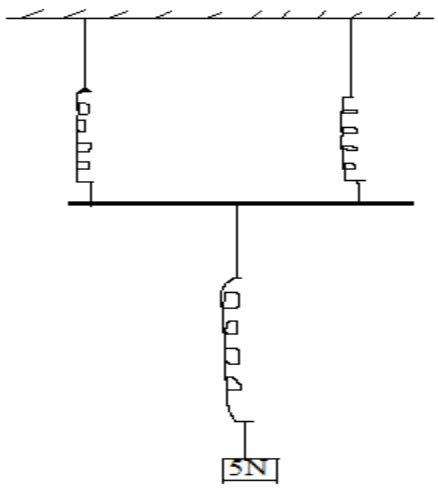
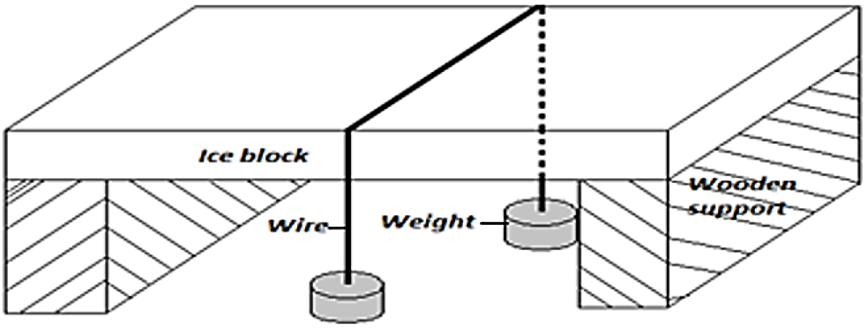
(d) Three identical springs of constant 100 N/m are arranged as shown in the **figure 3** below to support a 5 N load.



Determine the total extension in the arrangement. (3 marks)

16. In an experiment to determine the effect of pressure on the melting point of ice, the following set-up was used **(figure 4)**



(a) It is observed that the wire cuts its way through the ice block, but leaves it as one piece. Explain this observation (2 marks)

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(b) Give the reason why copper wire is preferred in the above set-up to other metals. (1 mark)

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(c) State two applications of the effects of pressure on the melting point of ice (2 marks)

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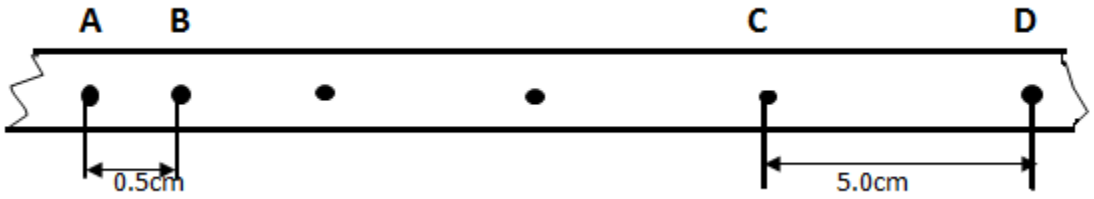
(d) (i) Calculate the amount of thermal energy required to change 0.005 kg of ice at -10^0 C to steam at 100^0 C (specific heat capacity of ice = 2100 $Jkg^{-1}K^{-1}$, specific latent heat of fusion of ice = 3.36×10^5 Jkg^{-1}, specific latent heat of vaporization of steam = 2.26×10^6 Jkg^{-1}, specific heat capacity of water 4200 $Jkg^{-1}K^{-1}$) (4 marks)

(ii) If the thermal energy in (i) above is supplied by an electric heater rated 300 W, how long will it take for the ice to turn to steam? (2 marks)

17. The **figure 5** below shows the motion of a trolley on ticker timer. The ticker has a frequency of 100 Hz.

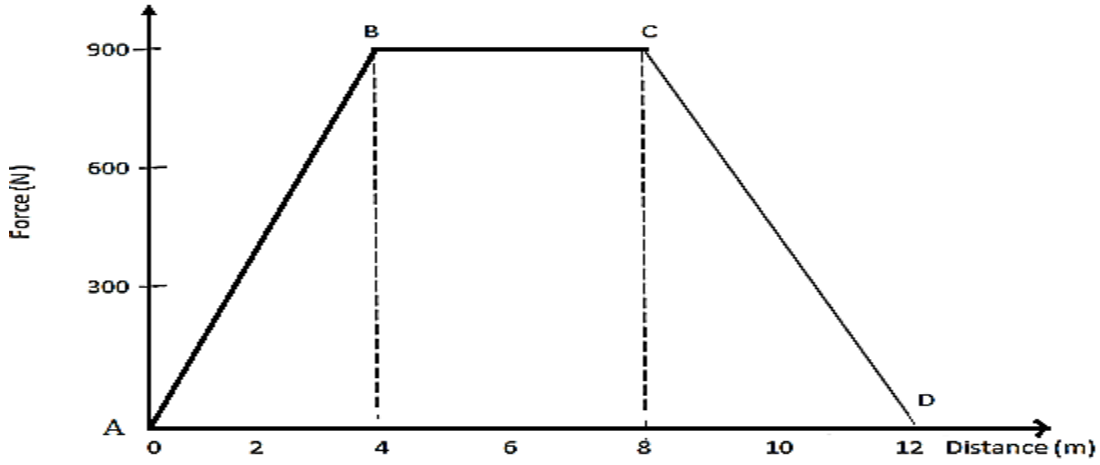


(a) (i) Calculate the initial velocity between A and B. (2 marks)

(ii) Calculate the final velocity between C and D. (2 marks)

(iii) Calculate the acceleration of the trolley during the motion. (3 marks)

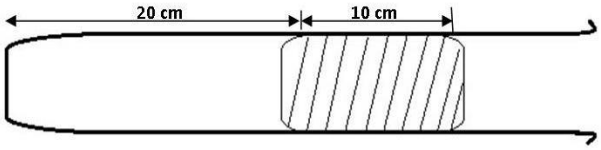
(b) **Figure 6** below shows a force-distance graph for a car being towed on a level ground.



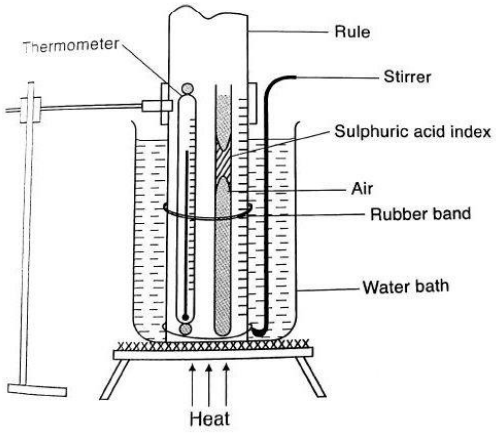
(i) Calculate the total work done. (3 marks)

(ii) If the velocity just before reaching point C is 0.6 m/s. Calculate the power developed by the engine at this point. (2 marks)

18. (a) A column of air 20 cm long is trapped in a horizontal narrow tube by 10 cm of mercury. Calculate the length of the air column when the tube is held vertically with the open end facing down. (Atmospheric pressure = 760 mmHg) **Figure 7.** (2 marks)



(b) A student arranged the apparatus as shown in **figure 8** below to investigate a law.



(i) Write the mathematical expression of the law being investigated. (1 mark)

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(ii) Sketch the graph of the quantities the student collected that verifies the law. (2 marks)

(iii) How did the student ensure that pressure remained constant throughout the experiment?
(1 mark)

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(iv) Using Kinetic theory, explain the law being investigated. (2 marks)

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(v) Define a real gas and give a reason why its volume cannot be reduced to zero by cooling
(2 marks)

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19. (a) State the Archimedes' principle. (1 mark)

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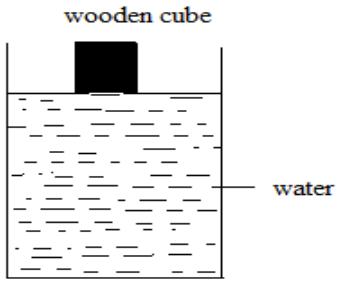
(b) A solid of density 3.5 gcm^{-3} is completely immersed in water in a measuring cylinder. The level of water rises from 38 cm^3 to 80 cm^3, determine its apparent weight. (3 marks)

(c) The **figure 9** below shows a cube of certain wood whose density is the same as that of water. The cube is pushed gently halfway into the water in a long cylinder.



State and explain what happens to the cube after it is left. (2 marks)

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(d) A solid copper sphere will sink in water while a hollow copper sphere of the same mass may float. Give a reason for this. (1 mark)

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(e) The hydrometer of mass 10 g is placed in paraffin of density 0.8 $g/cm^{3.}$ Determine the length of the paraffin if its bulb has a volume of 4 cm^3 and its stem has a cross section area of 0.5 cm^2.

(4 marks)

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