

Name:Adm. No:
 School: Stream:
 Candidate's Signature:.....Date:.....

232 / 1
PHYSICS
PAPER 1 (THEORY)
TIME: 2 HOURS

NYAHOKAKIRA CLUSTER II EXAMINATION
Kenya Certificate of Secondary Education - 2024

JULY/AUGUST EXAMINATION
PHYSICS
Paper 1

INSTRUCTIONS TO CANDIDATES

- ❖ Write your name and admission number in the spaces provided above.
- ❖ Sign and write the name of your school, stream and the date of the examination in the spaces provided.
- ❖ This paper consists of **two** sections; A and B.
- ❖ Answer **ALL** questions in sections A and B in the spaces provided.
- ❖ All your answers must be written in the spaces provided in this question paper.
- ❖ All working must be clearly shown.
- ❖ Silent non-programmable silent electronic calculators and KNEC mathematics table may be used except where stated otherwise.
- ❖ Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- ❖ Candidates should answer the questions in English.

For Examiner's Use Only.

Section	Question	Maximum Score	Candidates' Score
A	1 – 13	25	
B	14	10	
	15	09	
	16	10	
	17	15	
	18	11	
TOTAL SCORE		80	

SECTION A: (25 MARKS)

Answer ALL Questions in this section.

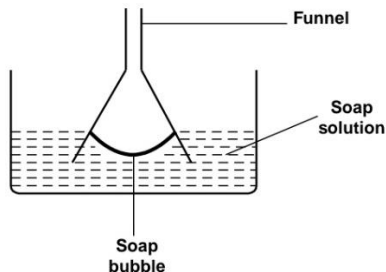
1. Vernier calipers with a zero error of -0.02 gave the diameter of a marble as 3.46cm.

(i) Define the term zero error (1mark)

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(ii) Use the above information to sketch the reading on the Vernier calipers. (2marks)

2. The figure below shows a funnel dipped into a liquid soap solution



Explain the observation when the funnel is removed from the soap solution. (2marks)

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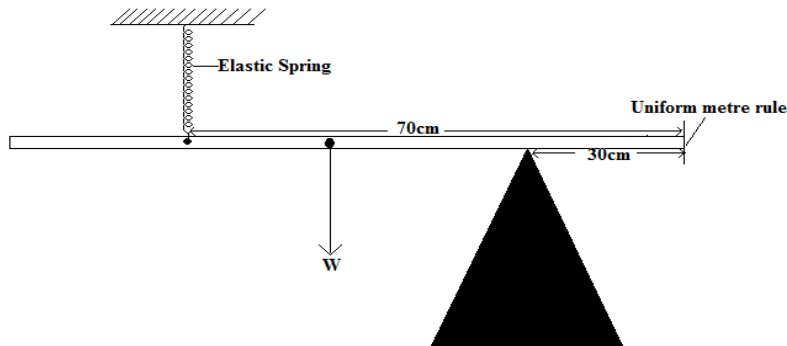
3. Using kinetic theory of matter, distinguish between solids and liquids states of matter in terms of intermolecular forces (1mark)

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4. A non-drip candle is lit and placed on a level bench. State and explain the changes in the stability of the candle as it continues to burn. (1mark)

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5. The figure shows a uniform metre rule of mass 200g balanced by a spring balance placed 70cm from one end. The pivot is placed 30cm away from the same end. Study the diagram and answer the questions that follow



Determine tension T on the spring (2 marks)

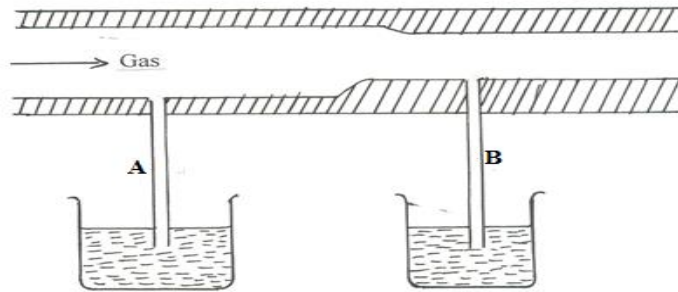
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6. The figure below shows gas flowing along a pipe of non-uniform cross-sectional area. Two pipes A and B are dipped into liquids as shown below.



Indicate the levels of the liquids in A and B giving a reason for your answer (2marks)

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7. When the temperature of a gas in a closed container is raised, the pressure of the gas increases. Explain how the molecules of the gas cause the increase in pressure. (2marks)

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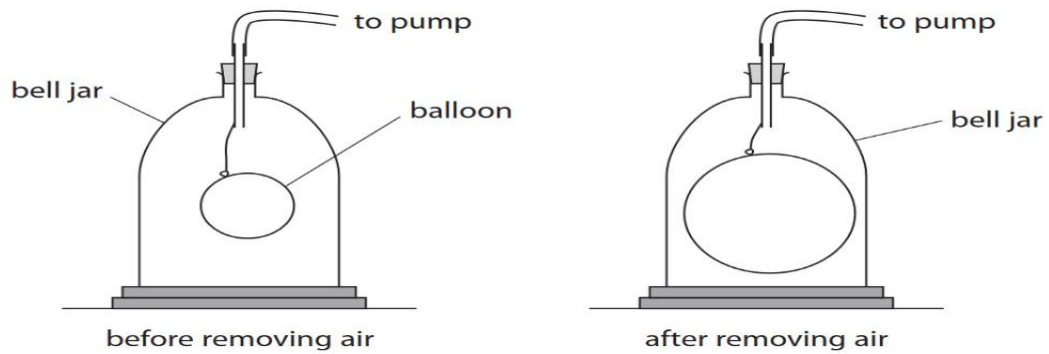
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8. An electric kettle with shiny outer surface is more efficient than one with a dull outer surface, give a reason for this. (1mark)

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9. The figure shows an experiment that was used to study the relationship between pressure and volume.



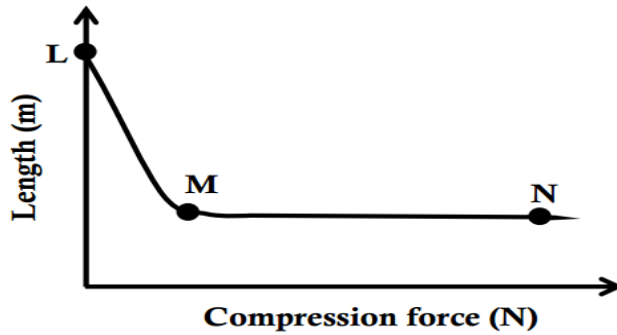
When air was pumped out from the bell jar, it was observed that the volume of the balloon increases. Explain this observation. (2 marks)

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10. The figure below shows a graph of length of a spring against compression force on the spring which obeys Hooke's law.



Explain the shape of the graph between:

- i. LM (1mark)

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- ii. MN (1mark)

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11. Between mercury and alcohol, state with a reason, which of the two liquids is used in a thermometer to measure temperature in areas where temperatures are below -40°C . (2 marks)

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12. A passenger bus is travelling uniformly at 20 m/s when the driver observes a police roadblock ahead. The driver takes 1.0 s before applying brakes which brings the bus to rest with a uniform retardation of 5.0 m/s^2 .

(i) Sketch a velocity-time graph for the bus from the instant the driver notices the roadblock until the bus comes to rest. (2 marks)



(ii) Determine the distance travelled by the bus from the time the driver observed the roadblock until the bus comes to rest. (3 marks)

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13. Thermodynamics is a branch of physics. State what it deals with (1mark)

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SECTION B: (55 MARKS)

Answer ALL Questions in this section.

14. (a) State the law of flotation.

(1 mark)

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(b) The figure below shows a metallic rod of length 10 cm and uniform cross-sectional area 4 cm^2 suspended from a spring balance with 7.5 cm of its length immersed in water. The density of the material is 2.5 g/cm^3 (Take the density of water = 1.0 g/cm^3).

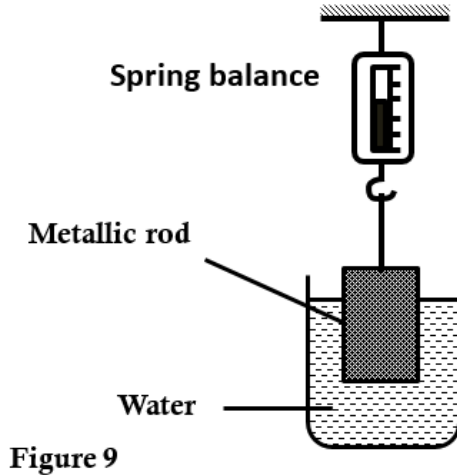


Figure 9

Determine;

(i) The mass of the metallic rod.

(2 marks)

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(ii) The up thrust acting on the metallic rod.

(2 marks)

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(iii) The reading of the spring balance.

(2 marks)

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(iv) The reading of the spring balance when the rod is wholly immersed in water.

(2 marks)

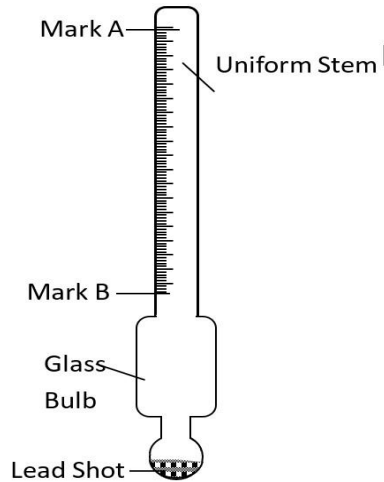
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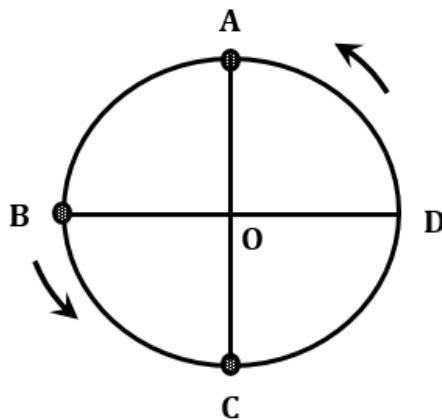
(c) The figure below shows a simple hydrometer which is suitable for measuring density of liquids varying between 0.8 g/cm^3 and 1.2 g/cm^3 .



Indicate on the diagram the mark corresponding to 0.8 g/cm^3 and 1.2 g/cm^3 .

(1 mark)

15. An object of mass 800 g is attached to one end of a light inextensible string and whirled in a vertical circle of radius 1.2 m and center O as shown in the figure



(a) State two forces acting on the stone as it is whirled in the vertical circle.

(2 marks)

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(b) Sketch, on the axes below, a graph of the magnitude of the tension in the string in a complete revolution through point A, B, C and D. (1 mark)



(c) If the tension in the string when the object is at the lowest point C is 45 N, calculate the:

(i) Tangential velocity v of the object. (3 marks)

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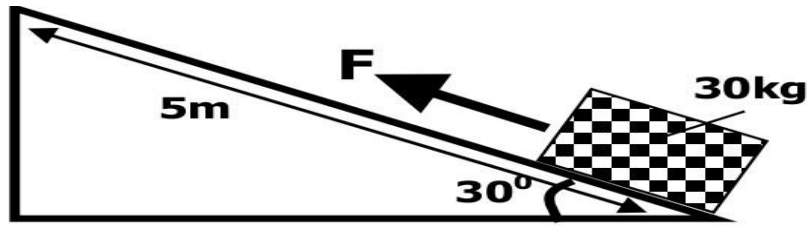
(ii) The tension in the string when the object is at point A of the circle. (2 marks)

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(d) Identify the point where critical tangential velocity must be maintained for the stone to remain on the vertical circle. (1 mark)

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16. (a) A person pulls a box of mass 30kg up an inclined plane 5m long at a constant speed as shown in figure below.



If the friction force between the plane and the block is 100N, Find:

(i) The effort that must be exerted on the box for it to move up the incline at a constant speed (2marks)

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(ii) The gain in potential energy of the box while at the top of the incline (2marks)

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(iii) The work done by the person in pulling the box (2marks)

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(iv) The efficiency of the system (2marks)

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(b) A body is released from a height, h . Sketch a graph of potential energy against kinetic energy as the body falls to the ground (2marks)

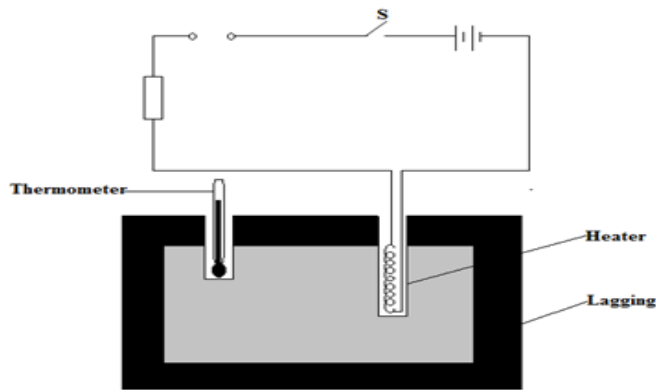
17. a) A warm bottle of soda placed in ice at 0°C cools faster than when the same soda is placed in water at the same temperature. Explain this observation (2 marks)

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b) The figure shows an incomplete circuit set up that can be used in an experiment to determine the specific heat capacity of a solid block by electric method. Study the diagram and answer the questions that follow



i. State the purpose of the rheostat in the experiment (1 mark)

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ii. Complete the diagram by inserting the missing components for the experiment to work (2marks)

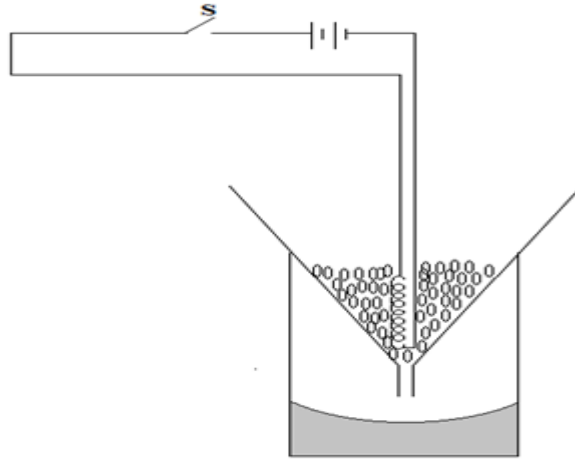
iii. Other than temperature, state three measurements that should be taken (3 marks)

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c) The figure shows a set-up of apparatus used in an experiment to determine the specific latent heat of fusion of ice. Study the diagram and answer the questions that follow



The following readings were noted after the heater was switched on for 8 minutes

- *Mass of the beaker* = 120g
- *Mass of the beaker + melted ice* = 140g

Determine

i. The energy supplied by the 12W heater in the 8 minutes (3 marks)

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ii. The specific latent heat of fusion of the ice (3 marks)

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iii. The experiment value for the specific latent heat of fusion of ice obtained is less than the theoretical value. Give one reason for this observation (1 mark)

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18. (a) State Newton`s second law of motion

(1mark)

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(b) A bullet of mass 30g moving at 400m/s strikes a block of wood of mass 3.5kg initially at rest. The bullet sticks into the wood and the two move off together on a horizontal rough surface, with a frictional force of 8N acts between them and the surface.

(i) Determine the initial common velocity of the bullet and the block of wood (3marks)

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(ii) Determine the distance the block moves before coming to rest (3marks)

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(iii) Give a reason why it`s important for passengers in the vehicle to put on the seat belts

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(c) When a steel ball is allowed to fall freely in a viscous fluid, it is observed to attain terminal velocity after some time.

i. Sketch the velocity time graph for the motion (2marks)

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ii. State the reason why the ball attains terminal velocity (1 mark)

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