



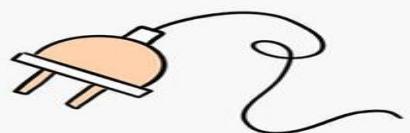
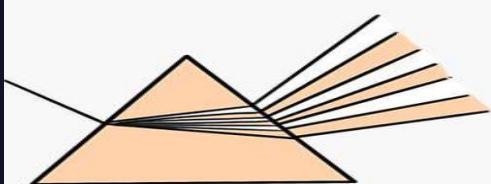
# SMARTFOCUS PHYSICS QUICK REVISION

## SERIES EXAMS 1-20

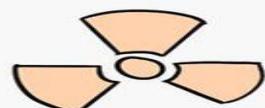
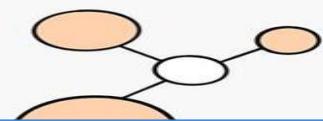
### PAPER 1



MR CHEPKWONY



# PHYSICS



**FOR MARKING SCHEMES AND MORE TOPICAL QUESTIONS AND ANSWERS CONTACT US ON 0724351706/0726960003**

Name ..... ADM No. ..... CLASS .....

232/1

Candidate's Signature .....

**PHYSICS**

Paper 1 (Theory)

Date .....

**Time: 2 Hours**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 1**

**CONTACT US ON: [0724351706/0726960003](tel:0724351706)**

**For marking schemes and more Post Mock papers for all subjects**

### **INSTRUCTIONS TO CANDIDATES**

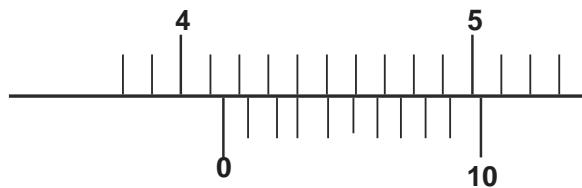
- \* Write your name and index number in the spaces provided above.
- \* Sign and write the date of examination in the spaces provided above.
- \* This paper consists of two sections; A and B
- \* Answer **all** the questions in section A and B
- \* All working and answers must be written on the question paper in the spaces provided below each question.
- \* Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

### **For Examiner's Use** **Only**

<b>Section</b>	<b>Question</b>	<b>Maximum</b>	<b>Candidate's</b>
<b>A</b>	<b>1 - 12</b>	<b>25</b>	
<b>B</b>	<b>13</b>	<b>10</b>	
	<b>14</b>	<b>12</b>	
	<b>15</b>	<b>11</b>	
	<b>16</b>	<b>12</b>	
	<b>17</b>	<b>10</b>	
<b>Total Score</b>		<b>80</b>	

## **SECTION I:**

1. Figure 1 below shows a scale of a Vernier calliper.



- a) Record the reading indicated. (1 mark)

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- b) Given that the instrument above had a zero error of negative 0.03cm. State the actual reading. (1 mark)

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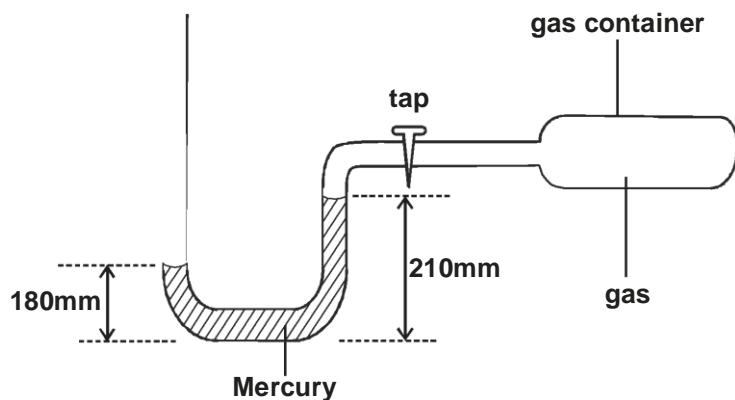
2. Figure 2 shows water drops on two surfaces. If the first is smeared with oil while the second is clean.



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

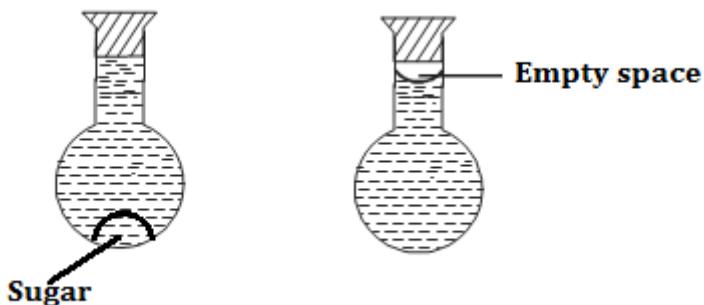
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3. A U-tube manometer is used to measure the pressure of gas in a container as shown below. (The liquid in the manometer is mercury of density  $13.6\text{g/cm}^3$ )



Find the pressure of the gas in the container. (Take atmospheric pressure as  $102,000\text{N/m}^2$  and  $g = 10\text{N/kg}$ ) (3 marks)

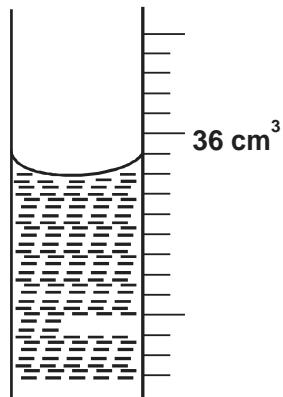
4. Sugar was put in a flask then water was added slowly until it was full then the flask was corked. The figure below shows the observation at the beginning of the experiment and at the end of the experiment.



Account for the empty space.

(1 mark)

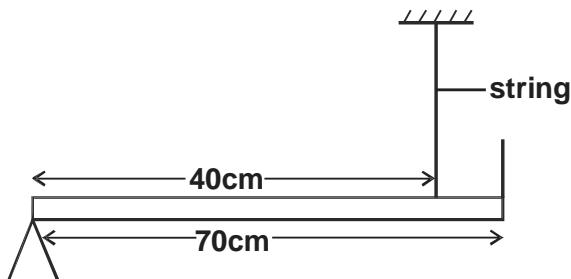
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5. In an experiment to measure the density of a liquid, a student filled a burette with a liquid to the  $0\text{cm}^3$  mark. The figure below shows a section of burette showing the level of the liquid after 109g of the liquid had been run out.



Determine the density of the liquid.

(3 marks)

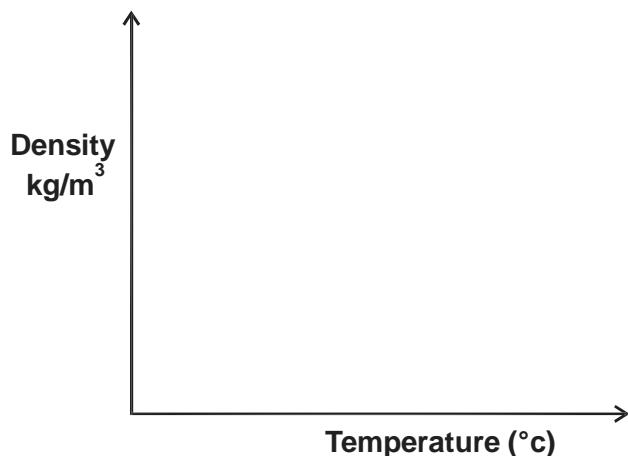
6. A uniform metal rod of weight 50N is balanced as shown below.



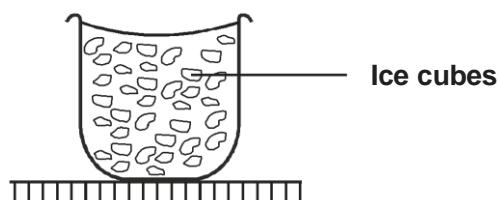
Find the tension on the string.

(3 marks)

7. On the axis provided plot graphs of density against temperature for water and mercury when they are heated from  $0^{\circ}\text{C}$  to  $10^{\circ}\text{C}$



8. The figure below shows a beaker containing ice at  $0^{\circ}\text{C}$ . The beaker is placed on a bench.



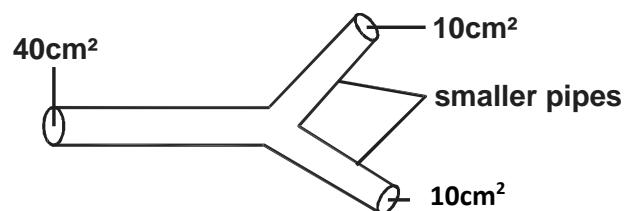
State and explain the changes in stability or beaker when ice melts to water.

(2 marks)

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**9.** Define elastic limit. (1 mark)

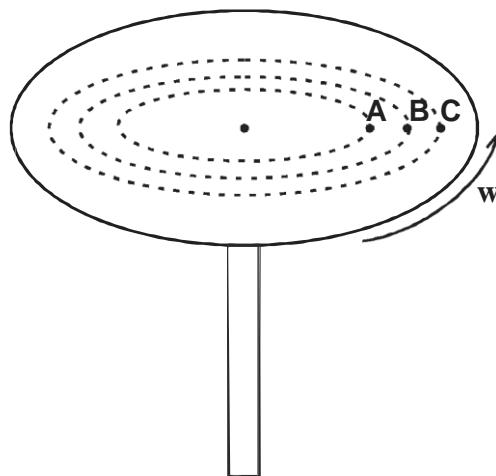
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**10.** Explain why it will feel cooler in a white car than a black one if both of them are left in the sun for a long time. (1 mark)

**11** The figure below shows a horse pipe of a cross-sectional area of  $40\text{cm}^2$ .



If the horse pipe is connected to two smaller pipes of cross section  $10\text{cm}^3$ . Calculate the velocity of water in each of the two pipes. (3 marks)

12. The figure shows masses A, B and C. Placed at different points on a rotating table.



State two factors that determine whether a particular mass slides off the table or not. (2 marks)

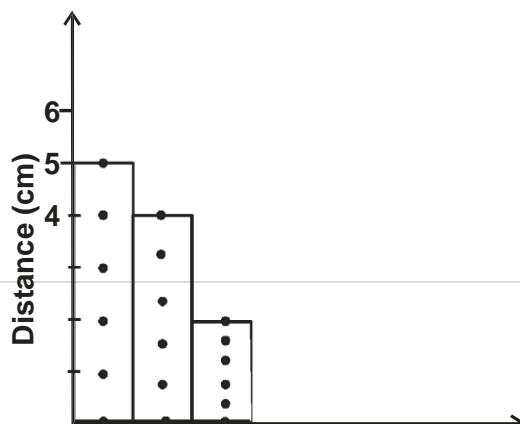
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## SECTION B

13. a) Define acceleration. (1 mark)

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- b) The figure below shows a tape chart from paper tape pulled through a 50Hz ticker timer by a trolley.

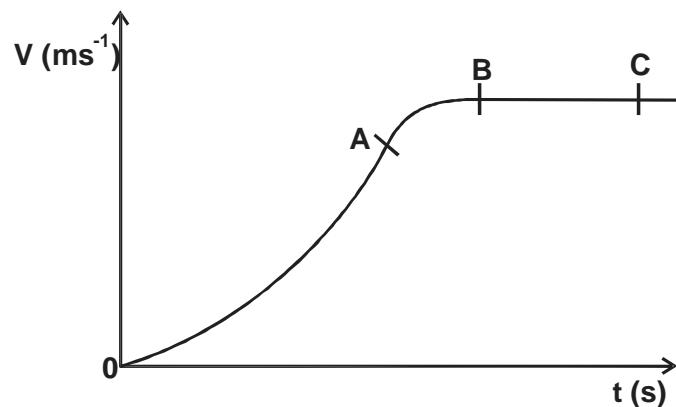




Calculate the acceleration of the trolley in  $\text{cm s}^{-2}$

(3 marks)

- c) The figure below shows a velocity-time graph for the motion of a certain body.



Describe the motion of the body in the region.

- i) OA (1 mark)
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- ii) AB (1 mark)
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**d)** A particle starts from rest and accelerates uniformly in a straight line. After 4 seconds it is 20m from the starting point. Determine the acceleration of the particle. (3 marks)

**e)** Sketch a displacement-time graph for a body, falling through a fluid. (2 marks)

**f)** Distinguish between elastic and inelastic collision. (1 mark)

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**14. a)** State the class of lever to which a fishing rod belongs. (1 mark)

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**b)** State two reasons why the efficiency of hydraulic machine cannot be 100%. (2 marks)

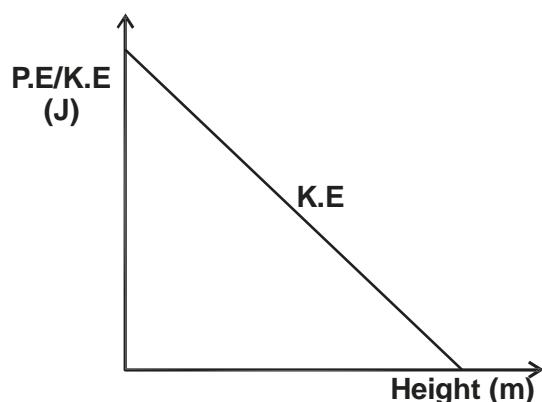
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**c)** A crane lifts a load through a vertical distance of 8m in 12 seconds.  
**i)** Given that the work done by the crane was 96000J. Calculate the amount of load lifted. (2 marks)

ii) Calculate the power developed by the crane. (2 marks)

iii) Given that efficiency of the crane was 80% and it was operated using an electric motor. Calculate the rating of the motor. (2 marks)

d) The figure below shows how kinetic energy (K.E) at a ball thrown vertically upwards varies with height.



On the same axis, plot a graph of potential energy of the ball. (1 mark)

e) Sketch a labelled diagram to show how an arrangement of a single pulley may be used to provide velocity ratio of 2. (2 marks)

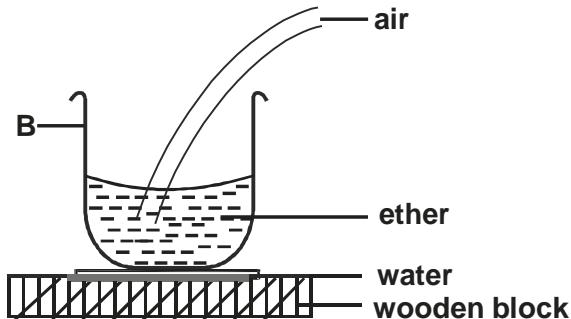
**15.** Akinyi wanted to determine specific heat capacity of iron. She was to use - metal block, thread, water, copper, calorimeter, stirrer, thermometer and cardboard cover, beaker and source of heat.

A metal block is dipped in water and water heated to a certain temperature and then transferred to a calorimeter containing some 50 grams of water.

- I. State two precautions to be taken to minimize heat losses to the surroundings. (2 marks)

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- II. The following figure shows a beaker B placed on a little water on a wooden block and some liquid ether (spirit) then poured into the beaker. Air is now blown into the ether with a foot pump.



- It was found after sometime, the water on the wooden block turned into ice. Explain. (3 marks)

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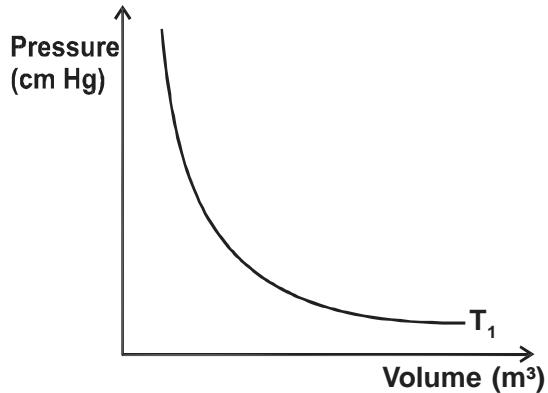
- III. A lump of copper of mass 0.75kg is placed in an oven for some time and then transferred quickly to a large block of ice at 0°C. When the temperature of the lump of copper reaches 0°C, 0.45kg of ice is found to have melted. Determine the temperature of the oven. (Take the specific heat capacity of copper as 400J/kg/k and the latent heat of fusion of ice as  $3.2 \times 10^5$ J/kg) (4 marks)

- b) Give two reason why the actual temperature of the oven may be higher than the above value.

(2 marks)

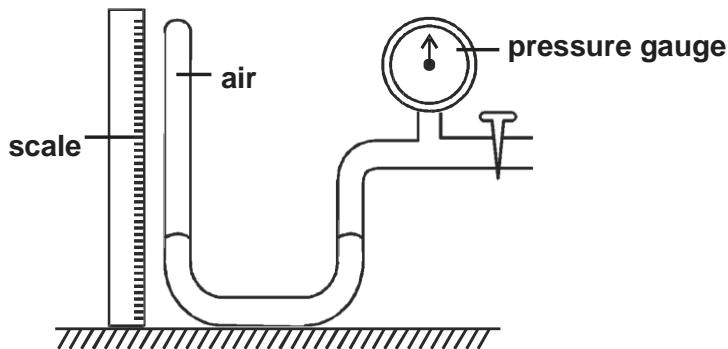
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- 16. a)** The figure below shows a graph of pressure against volume for a fixed mass of gas at constant temperature.



Sketch on the same axis, a graph for the same mass of gas with a temperature  $T_2$  lower than  $T_1$ .  
(1 mark)

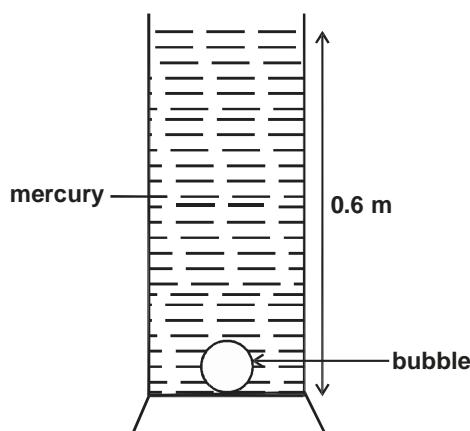
- b)** The figure below shows a simple set up for Boyle's law apparatus.



Describe how the apparatus may be used to verify Boyle's law.  
(5 marks)

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- c)** The diagram below shows a measuring cylinder with an air bubble at the bottom.



Determine the volume of the air bubble just before the surface of mercury if the atmospheric pressure is 76cmHg and volume of the bubble at the bottom is  $10\text{cm}^3$  (3 marks)

- d)** Using the kinetic theory of gases. Explain how a rise in the temperature of a gas causes a rise in the pressure of the gas if the volume is kept constant. (3 marks)

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- 17. a)** State Archimedes principle. (1 mark)

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- b)** Why is the hydrometer made of:

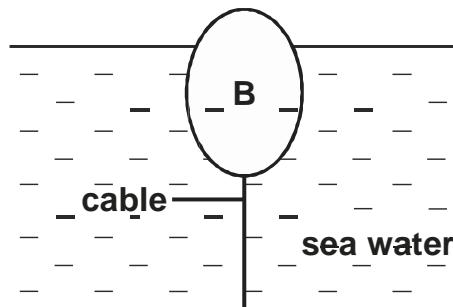
- i) wide bulb containing air (1 mark)

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- ii) a narrow stem (1 mark)

- c) A piece of metal weighs 4N in air and 2N when totally immersed in water. Determine the relative density of metal.(Density of water:  $1000 \text{ kg/m}^3$ ) (3 marks)

- d) The figure below shows a buoy B, volume  $5\text{m}^3$  and mass 2 tons. It is held in position in sea water of density  $1030\text{kg/m}^3$  by a light cable fixed to the bottom so that  $\frac{3}{5}$  of the volume buoy is below the surface of the sea water. Calculate the tension on the cable. (3 marks)



**SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS  
SERIES 2**  
**Kenya Certificate of Secondary Education**

**232/1**

**Paper 1**

**Physics**

***CONTACT US ON: 0724351706/0726960003***

***For marking schemes and more Post Mock papers for all subjects***

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Name ..... Adm Number.....

Candidate's Signature ..... Date .....

**INSTRUCTIONS TO CANDIDATES: -**

- (a) Write your name, Admission number and class in the spaces provided above.
- (b) This paper consists of two sections: A and B
- (c) Answer all the questions in section A and B in the spaces provided
- (d) All working must be clearly shown.
- (e) Mathematical tables and electronic calculators may be used
- (f) This paper consists of 13 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.
- (g) Candidates should answer the questions in English.

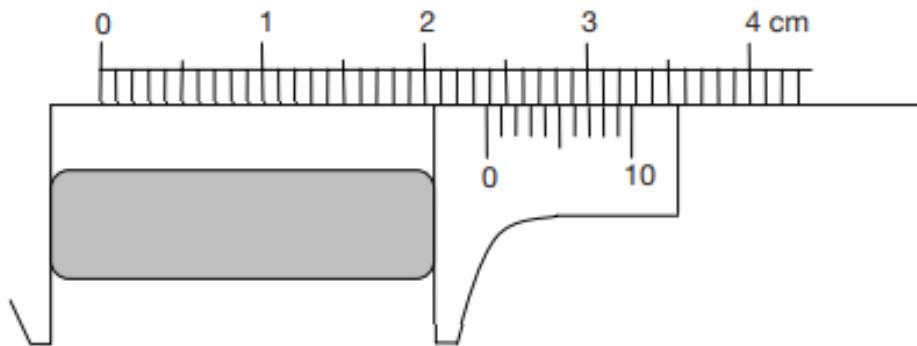
**For Examiner's Use Only:**

Section	Question	Maximum Score	Candidate's Score
A	1 – 11	25	
B	12	11	
	13	08	
	14	08	
	15	09	
	16	09	
	17	10	
	Total Score	80	

## **SECTION A (25 marks)**

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

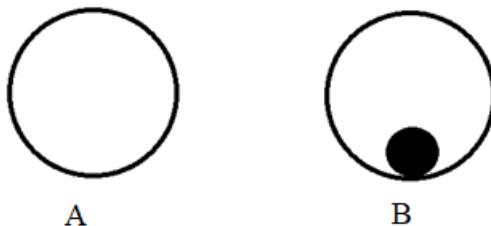
1. The diagram below show a vernier taking the length of a rod whose correct length is 25.4 mm. (Refer the figure below)



Determine the zero error.

(2 marks)

2. The figure below shows two drums A and B. Drum A is empty while drum B has a cylindrical rod.

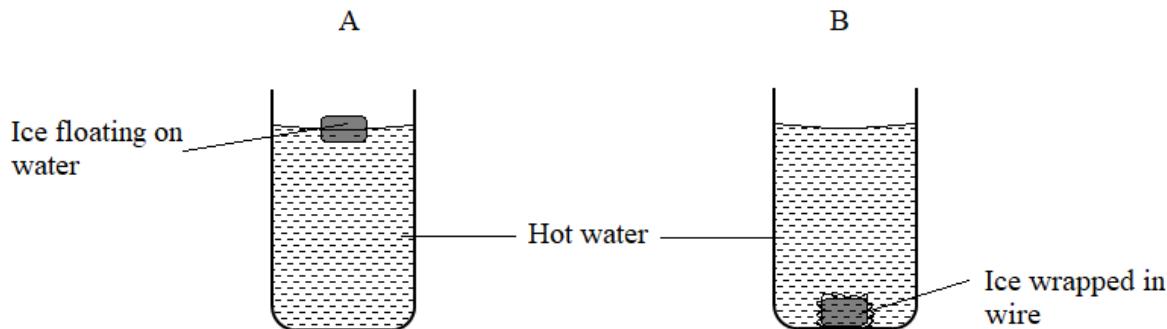


If the two drum are given the same rolling force, state and explain which drum stops first. (2 marks)

3. An astronaut weighs 500 N on earth and 80N on the surface of another planet. Given that the gravitational field strength of the earth is 10 N/kg, calculate the gravitational field strength of the planet. (2 marks)

4. In order to estimate the height of a tree, a student measured the length of its shadow and found it to be 3.2 metres. A metre rule that she had produced a shadow of length 240 centimetres. What is the estimation of the tree height? (3 marks)
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5. The figure below shows two identical containers A and B containing equal amounts of water and an identical ice block.



State with reason, which water cools faster, assuming the gauze absorbs negligible heat (2 marks)

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6. On the axes provided below,



- (i) Sketch a graph of pressure ( $P$ ) against reciprocal of volume ( $1/V$ ) of a fixed mass of an ideal gas at a constant temperature. (1 mark)

- (ii) State the physical quantity represented by the gradient. (1 mark)
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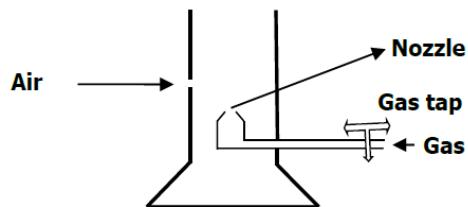
7. The figure below shows two pipes A and B of different expansivities tightly fitted onto each other at the junction. When some ice was placed at the junction, it became easy to separate the conductors.



Explain which of the two was a better conductor of heat.

(2 marks)

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8. The figure below shows a Bunsen burner.



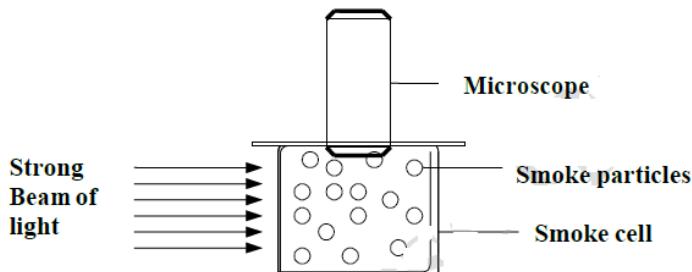
Explain how air is drawn into the burner when the gas tap is open.

(2 marks)

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9. (a) Define Brownian motion

(1 mark)

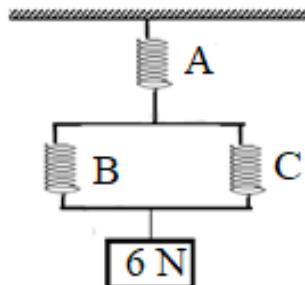
- (b) The figure below shows apparatus used to observe the behaviour of smoke particles in a smoke cell



State one reason why smoke is used in the experiment.

(1 mark)

10. Three identical springs each of spring constant 10N/m and weight 0.5N are used to support a load as shown.



Determine the total extension of the system

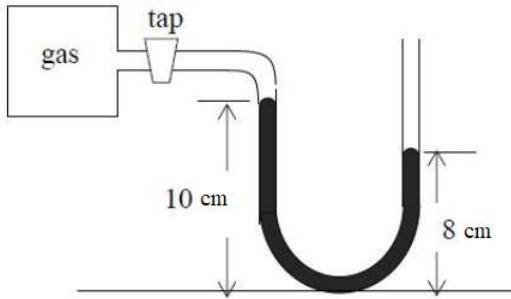
(2 marks)

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11. Other than the friction in a screw jack, state the reason it why it can't be 100% efficient. (1 mark)

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A U-tube containing mercury is used as a manometer to measure the pressure of a gas in a container. When the manometer has been connected and the tap opened, the mercury in the U-tube settles as shown in the diagram below.



If the atmospheric pressure is 760 mmHg and the density of mercury is  $13\ 600\ \text{kg/m}^3$ , calculate the pressure of the gas in Pascals.

(3 marks)

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**Section B (55 marks)**  
**Answer all questions in this section in the spaces provided**

14.

- a) State the two conditions necessary for a system of forces acting on a body to be in equilibrium (2 marks)

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- b) The figure shows a loaded wheelbarrow held in equilibrium by a gardener. The wheel of the wheelbarrow is in contact with the ground at point C



There are three vertical forces acting on the wheelbarrow P is the upward force applied by the gardener. Q is the upward force of the ground on the wheel at point C. W is the weight of the wheelbarrow and its contents. Explain why the force P is less than the force W

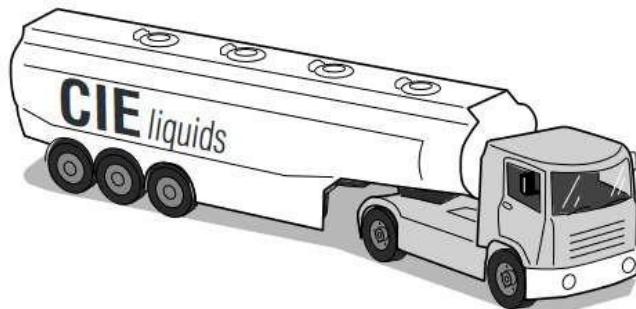
- i. By considering the forces P, Q and W, ( 2 marks)

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- ii. By considering the moments of the forces P and W about point C. (2 marks)

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- c) The figure shows a tanker lorry full of liquid. Study the diagram and answer the questions that follow



- i. The tanker delivers the liquid and drives away empty. Compare the acceleration of the empty tanker with the acceleration of the full tanker for the same resultant force (2 marks)

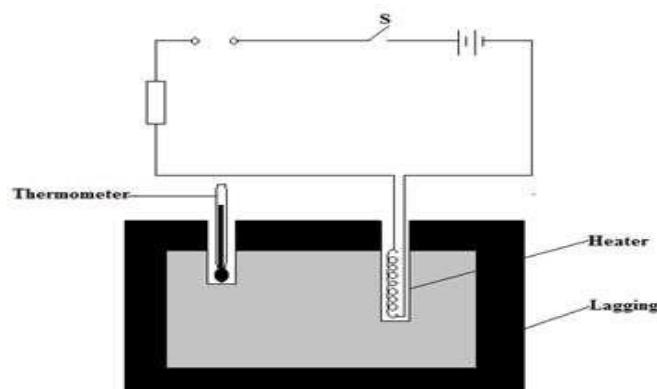
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15.

- a) A warm bottle of soda placed in ice at  $0^{\circ}\text{C}$  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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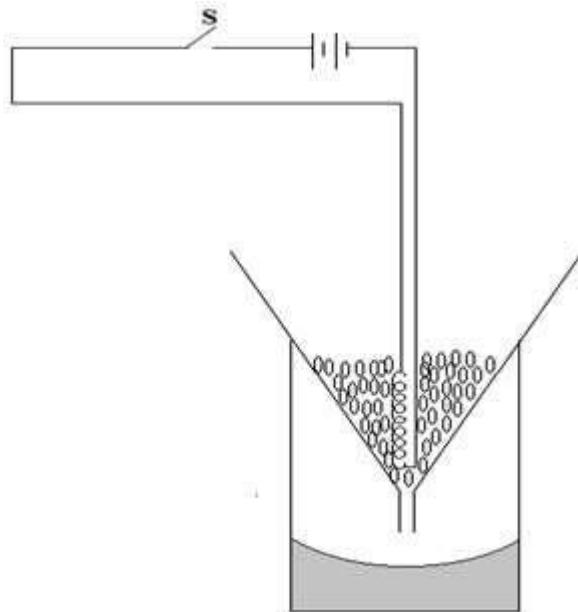
- ii. Complete the diagram by inserting the missing components for the experiment to work (2 marks)

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- 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 10 minutes

- **Mass of the beaker=260g**
- **Mass of the beaker +melted ice =280g**

Determine

- i. The energy supplied by the 120W heater in the 10 minutes (3 marks)

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

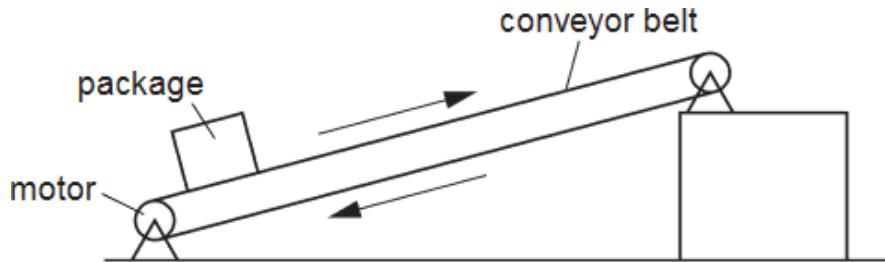
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- iii. The experiment value for the specific latent heat of fusion of ice obtained is less than the theoretical value.

Give one reason for this observation (1 mark)

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16. The figure shows a conveyor belt transporting a package to a raised platform. The belt is driven by a motor.



The mass of the package is 36 kg.

Determine

- a) The increase in the gravitational potential energy (G.P.E.) of the package when it is raised through a vertical height of 2.4 m. (2 marks)

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- b) The power needed to raise the package through the vertical height of 2.4 m in 4 s (2 marks)

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- c) The electrical power supplied to the motor is much greater than the answer to (b).  
Explain how the principle of conservation of energy applies to this system. (2 marks)

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- d) Assume that the power available to raise packages is constant. A package of mass greater than 36 kg is raised through the same height. Suggest and explain the effect of this increase in mass on the operation of the conveyer belt. (2 marks)

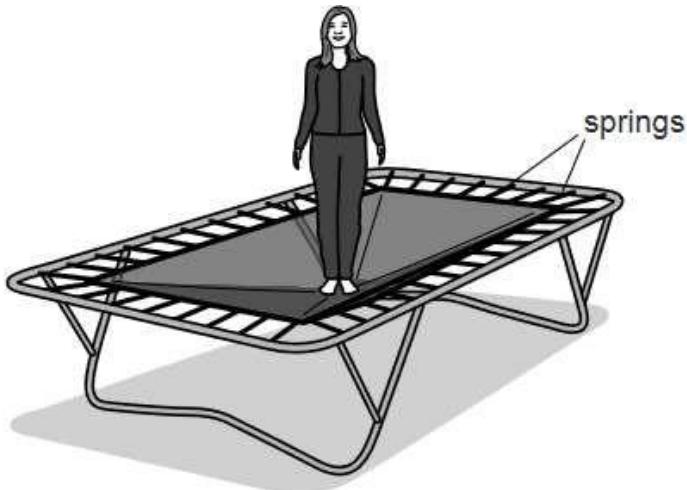
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17. An athlete of mass 64 kg is bouncing up and down on a trampoline.

At one moment, the athlete is stationary on the stretched surface of the trampoline as shown in the figure below.



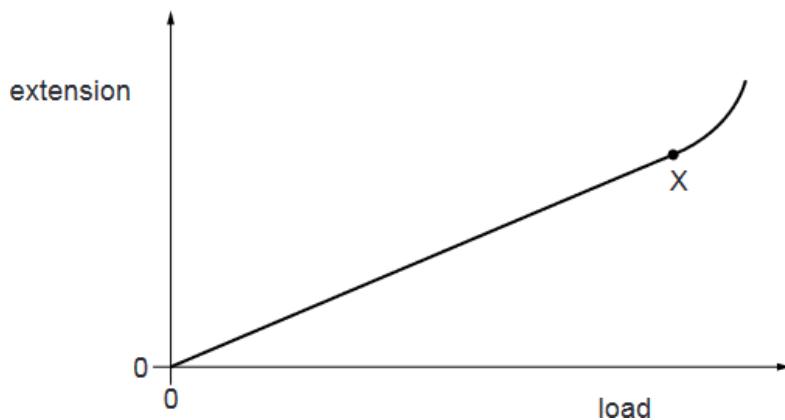
- a) State the form of energy stored due to the stretching of the surface of the trampoline. (1 mark)

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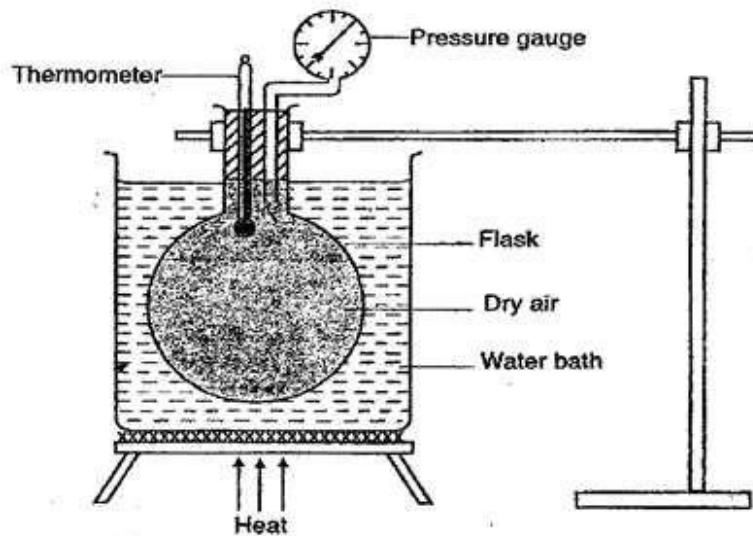
- b) The stretched surface of the trampoline begins to contract. The athlete is pushed vertically upwards and she accelerates. At time  $t$ , when her upwards velocity is  $6.0 \text{ m / s}$ , she loses contact with the surface. Determine
- Her kinetic energy at time  $t$ . (2 marks)  
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  - The height at which the kinetic energy will be zero (2 marks)  
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- c) In practice, she travels upwards through a slightly smaller distance than the distance calculated in (ii). Suggest why this is so. (1 mark)  
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- d) The trampoline springs are tested. An extension-load graph is plotted for one spring. Fig. 3.2 is the graph.



- i. On the same axes sketch a graph of another spring whose spring constant is higher than the trampoline spring (1mark)

18.

- a) The diagram below shows a set-up used to investigate a particular gas law. Study the diagram and answer the questions that follow



- i. State with a reason which gas law is being experimented by the set-up(2 marks)

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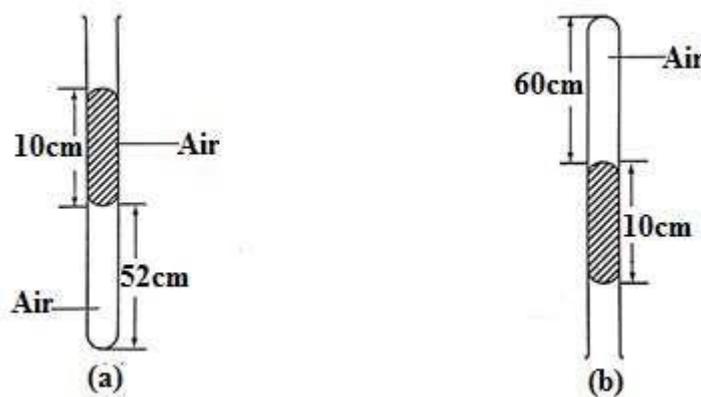
- ii. Name the two factors that are held constant in the experiment (2 marks)

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iii. Give the reason why heating is done through a water bath (1 mark)

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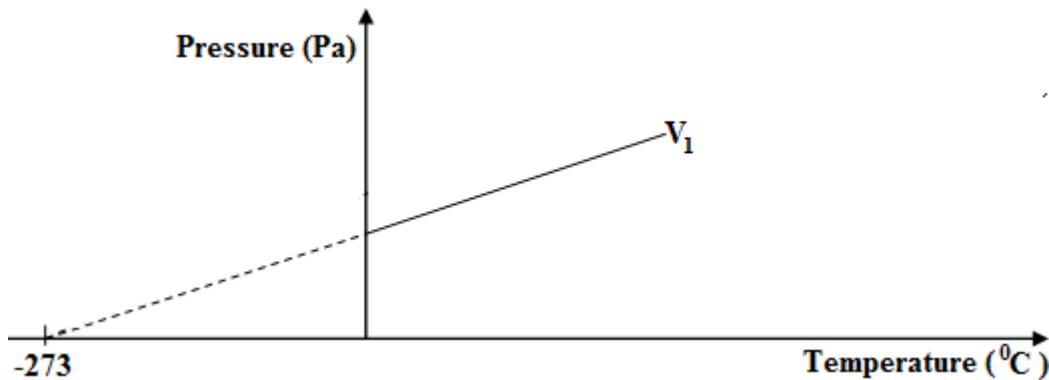
- b) Figure (a) shows 52cm of air trapped by a mercury column of 10cm while figure (b) shows the column of air when the glass tube is inverted



Determine the atmospheric pressure in mmHg (3 marks)

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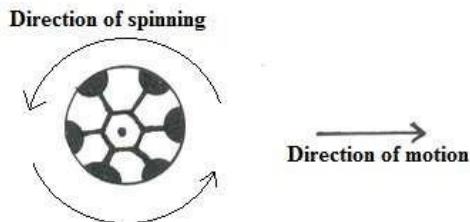
- c) The graph below shows the relationship between the pressure and temperature of a gas of volume  $V_1$



On the same axis sketch another graph for a gas of a larger volume. (1 mark)

d)

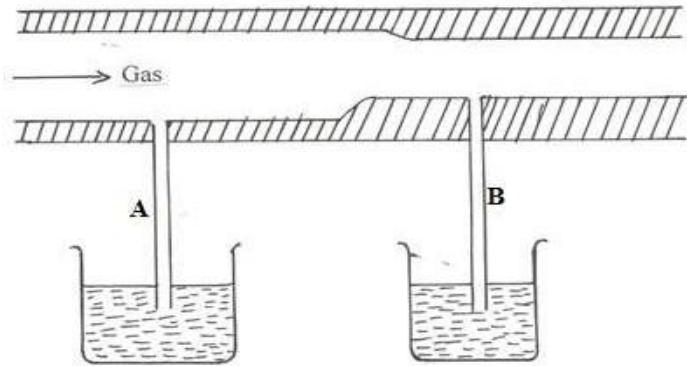
- i. The figure below shows a ball spinning in anticlockwise direction through still air



The horizontal distance covered by the ball is observed to be longer than when the ball is not spinned. Explain how the spinning increases the range of the ball (3marks)

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- ii. 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

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**SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS  
SERIES 3**  
**Kenya Certificate of Secondary Education**

**232/1**

**Paper 1**

**Physics**

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*For marking schemes and more Post Mock papers for all subjects*

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Name ..... Adm Number.....

Candidate's Signature ..... Date .....

**INSTRUCTIONS TO CANDIDATES: -**

- (a) Write your name, Admission number and class in the spaces provided above.
- (b) This paper consists of two sections: A and B
- (c) Answer all the questions in section A and B in the spaces provided
- (d) All working must be clearly shown.
- (e) Mathematical tables and electronic calculators may be used
- (f) This paper consists of 13 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.
- (g) Candidates should answer the questions in English.

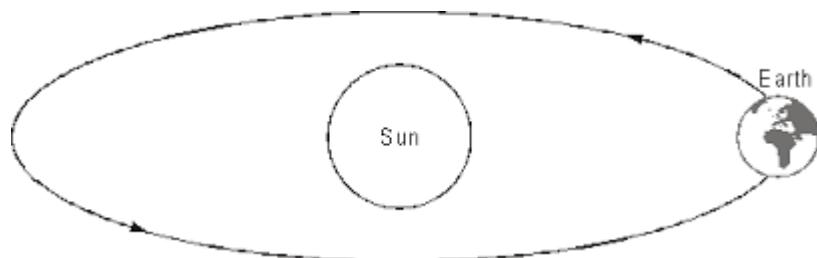
**For Examiner's Use Only:**

Section	Question	Maximum Score	Candidate's Score
A	1 – 11	25	
B	12	11	
	13	08	
	14	08	
	15	09	
	16	09	
	17	10	
Total Score		80	

## **SECTION A (25 marks)**

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

1. The diagram below shows the earth moving around the sun continually . State the branch of Physics that would be concerned with this. (1 mark)

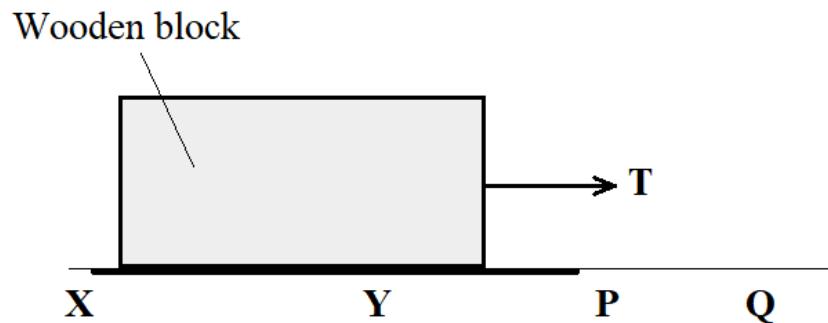


2. The diameter of a steel ball is measured using a vernier callipers which has divisions of 0.1cm on its main scale (MS) and 10 divisions of its vernier scale (VS) match 9 divisions on the main scale. Three such measurements for a ball are given as

S.No.	MS (cm)	VS divisions
1	0.5	8
2	0.5	4
3	0.5	6

If the zero error is – 0.03 cm, calculate then mean corrected diameter of the steel ball. (3 marks)

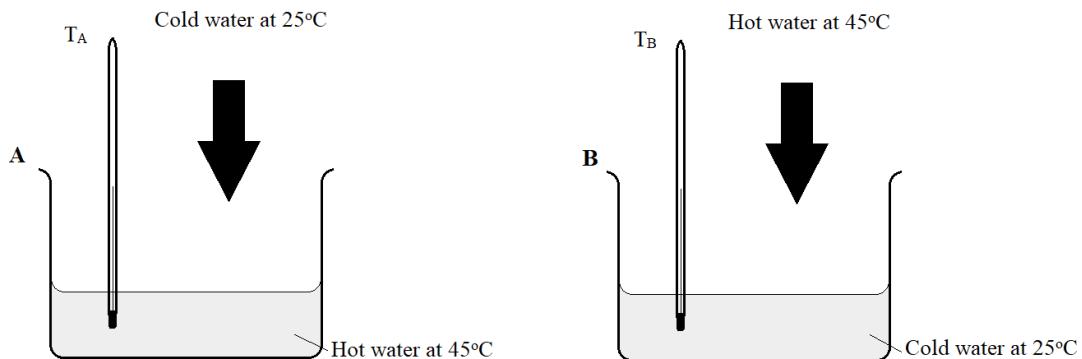
3. A wooden block on a horizontal surface is pulled by a constant horizontal force **T** as shown in the diagram below, at two different sections. The block moves with constant velocity along **XY**. Section **XYP** is rough, while **PQ** is smooth. Use the information to answer questions that follow.



- (a) Describe the motion of the block as it enters section **PQ**. (1 mark)
- .....  
.....

- (b) Give a reason for your answer. (1 mark)
- .....  
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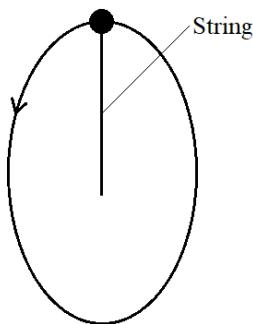
4. Two identical well lagged cans **A** and **B**, each has equal volumes of water and are fitted with thermometers **T<sub>A</sub>** and **T<sub>B</sub>** as shown in the figure below. Water in **A** is at 45°C, while water at **B** is at room temperature of 25°C. Cold water is poured carefully in **A** and simultaneously, an equal mass of hot water is poured in **B**.



- (a) State which of the thermometers record a lower reading after a short while (1 mark)
- .....

- (b) Give reason for your answer in (a) above (1 mark)
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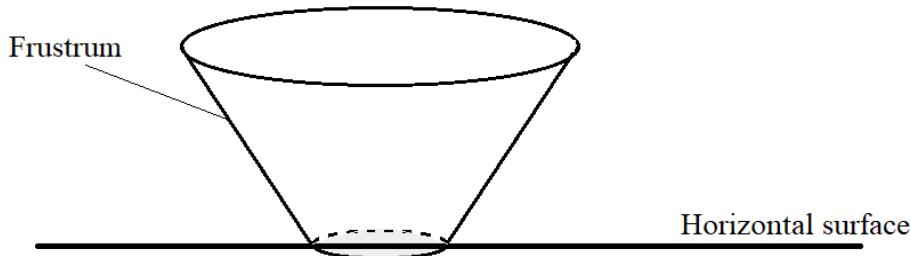
5. A stone of mass 200g is whirled on a vertical circle at constant speed of 3m/s, as shown in the diagram below.



Determine the tension  $T$  in the string when the stone is at its uppermost point shown, given that the string is 40cm long. (3 marks)

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6. Below is a solid frustum of a cone, resting on its narrow end on a horizontal flat surface. The solid is made of a uniform material.



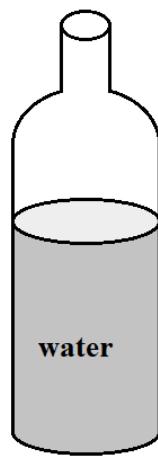
- (a) Name the state of equilibrium of the solid on the surface. (1 mark)
- .....

- (b) Locate the centre of gravity of the cone, and mark it  $M$  (2 marks)

7. Some pollen grains were placed in water to study Brownian motion in liquids. State and explain the nature of the observed motion. (2 marks)
- .....  
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8. When estimating the diameter of an oil molecule, a student measured the diameter of an oil drop using vernier callipers. State the assumption she made in this measurement. (1 mark)
- .....

9. A form one student at Upper Secondary School had a tin can half filled with water, as shown in the figure below.



She heated the water and let it to boil for some time. The open top was then sealed, and cold water poured on the can. The can was observed to crash in. State why:

- (a) The water was let to boil for some time. (1 mark)

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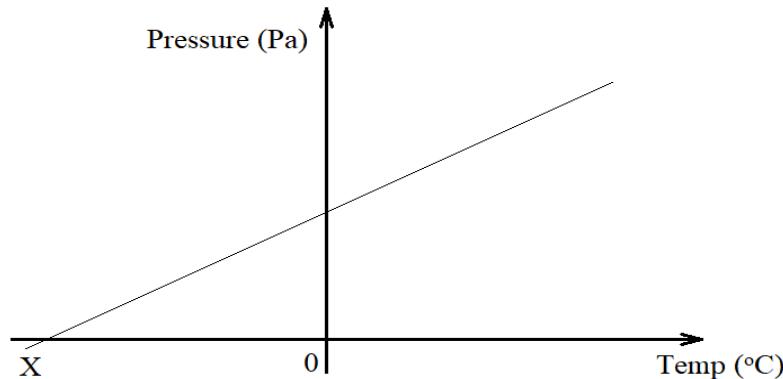
- (b) Cold water was poured on the can. (1 mark)

.....

- (c) Explain why the tin can crushed in (2 marks)

.....

10. The temperature if a gas in a container of fixed volume was gradually lowered, and the corresponding pressure measured. Below, is a sketch graph showing the variation of pressure with temperature from the experiment.



- (a) Define temperature **X** using kinetic theory of matter (1 mark)

.....

.....

- (b) State the reason why temperature **X** cannot be achieved (1 mark)

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11. A steel wire of length 20cm was coiled several times to make a spring. The spring was loaded with various weights and a graph of *Force* against *extension* plotted as indicated in *Fig i* below.

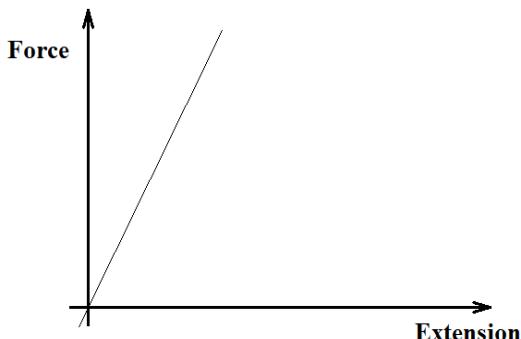


Fig i

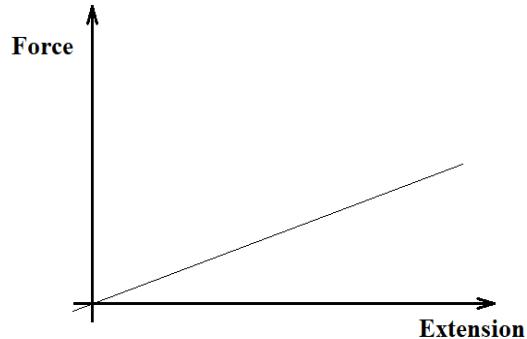


Fig ii

State any **two** changes that could be made on the spring to obtain the graph in *Fig ii* (2 marks)

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### **SECTION B (55 marks)**

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

12.

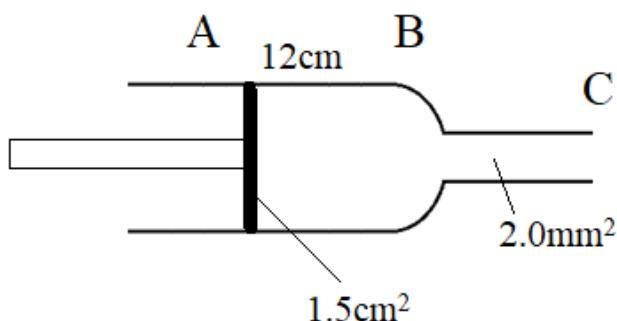
- (a) State Bernoulli's principle. (1 mark)

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- (b) In deriving the equation of continuity, it is assumed that the fluid is non-viscous. Explain the effect of increase in fluid viscosity on the type of flow. (2 marks)

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- (c) The figure below shows water in a horizontal tube of two different sections, **AB** and **BC**.



The cross-sectional area on the piston is  $1.5\text{cm}^2$  while that of section **BC** is  $2.0\text{mm}^2$ . If the piston moves 12cm from **A** to **B** in 3 seconds, calculate:

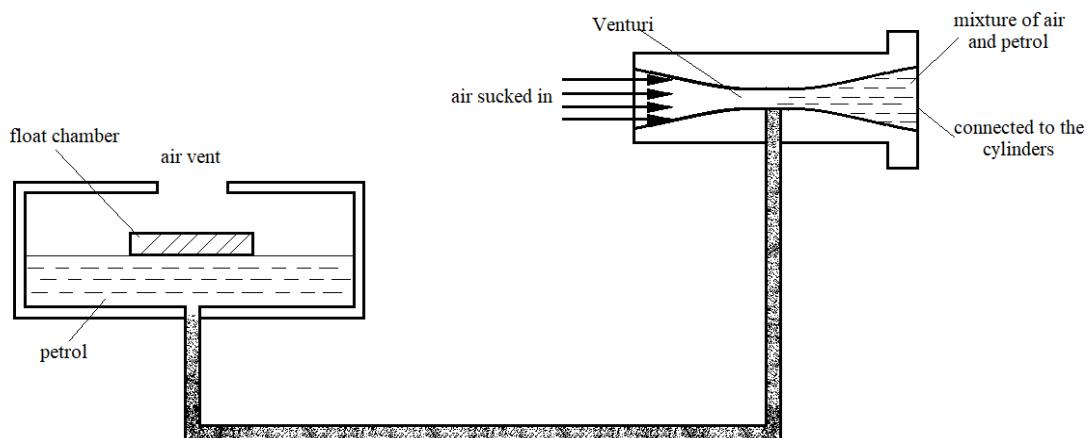
- i) The volume flux of water (3 marks)

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- ii) The speed of water through section **BC** (2 marks)

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- (d) Below is a cross-sectional diagram of a carburettor used to supply petrol for combustion in a car engine



Explain how this carburettor is able to draw petrol into the combustion cylinders (3 marks)

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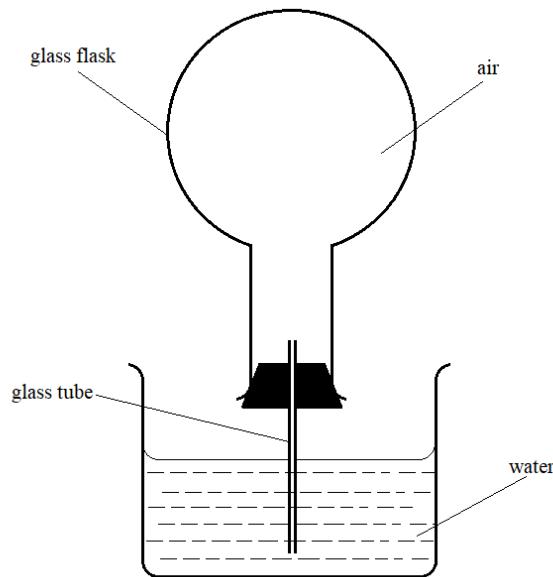
13.

- (a) A covid vaccine is only suitable when stored at a temperature of  $-40^\circ\text{C}$ . A nurse had a choice of measuring the temperature of this vaccine using either a mercury thermometer or an alcohol thermometer. Explain which of the two thermometers would be suitable.

(1 mark)

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- (b) Below is a glass flask fitted with a tube and inverted in water.



The temperature of the surrounding is slowly lowered.

- i) State the observation on the liquid level in the glass tube

(1 mark)

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- ii) Give a reason for the above observation

(2 marks)

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- (c) You have been provided with the following apparatus:

A glass bulb filled with mercury fitted onto a hollow stem, ice, boiling water in a can and a grid of equal squares. Use this apparatus to describe an experiment to make a graduated thermometer whose scale is in Celsius.

(4 marks)

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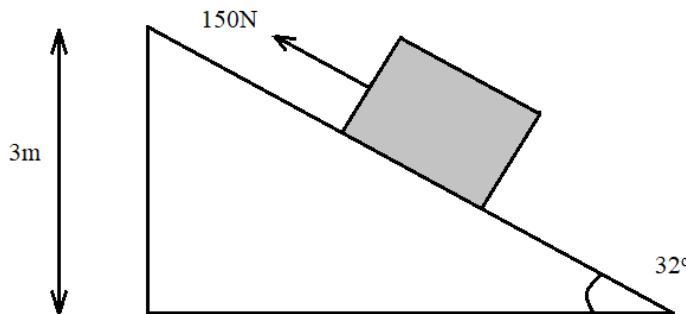
14.

- (a) Define velocity ratio as used in machines

(1 mark)

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- (b) The figure below shows a load of mass 20kg being pulled up an inclined plane with a constant force of 150N. The plane makes an angle of  $32^\circ$  with the horizontal, and a height of 3m.



Determine:

- i) The work done on the load (2 marks)

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- ii) Work done by the effort (2 marks)

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- iii) The efficiency of the system (2 marks)

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- iv) The work done against the friction between the plane and the block (1 mark)

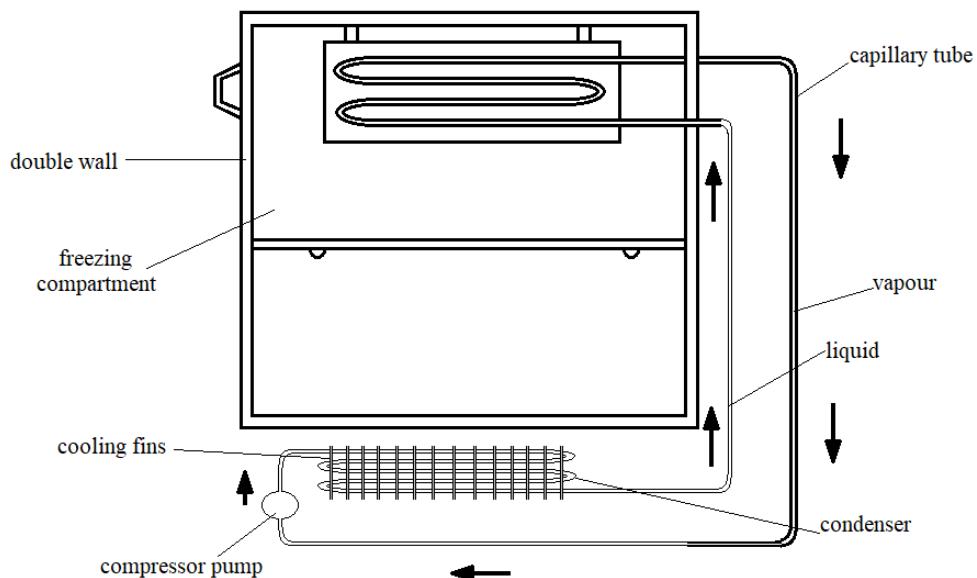
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15.

- (a) Distinguish between heat capacity and latent heat of fusion of a substance (1 mark)

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- (b) Below is a figure showing a common refrigerator used for domestic purposes. A volatile liquid circulates in the capillary tubes.



- i) State the reason why the diameter of the capillary tube is made wider at the freezing compartment. (1 mark)

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- ii) Explain the function of the compression pump. (2 marks)

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- iii) Give a reason why food items are placed below the widened copper tube (1 mark)

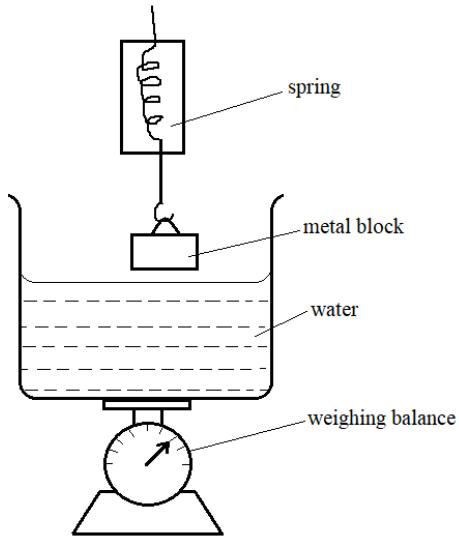
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- (c) In an experiment to determine specific latent heat of vaporization of water, steam of mass 12g at 100°C was passed into 80g of water initially at 23°C in a container of negligible heat capacity. The temperature of water rises by 74K. Use the information to determine specific latent heat of vaporization of water (take specific heat capacity of water as 4.2kJ/kg/K and boiling point of water as 100°C). (4 marks)

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16.

- (a) The figure below shows a weighing balance on which a beaker containing some water is placed. The reading of the weighing balance and the spring balance are initially 2.80N and 2.70N respectively.



- i) The metal block is gradually lowered into water. State the observation made on:

- A) The spring balance reading (2 marks)

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- B) The weighing balance reading

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- ii) The reading of the spring balance when the block is fully submerged in water is 2.36N. Determine the:

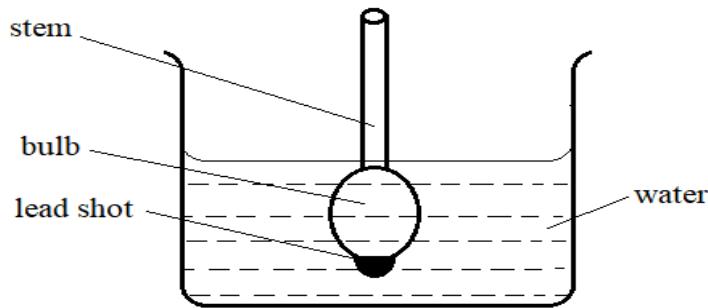
- A) Reading of the weighing balance (2 marks)

.....  
.....

- B) The density of the stone (2 marks)

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- (b) Below is a figure showing a hydrometer floating in water.



i) State the function of the following: (2 marks)

- A) Wide bulb

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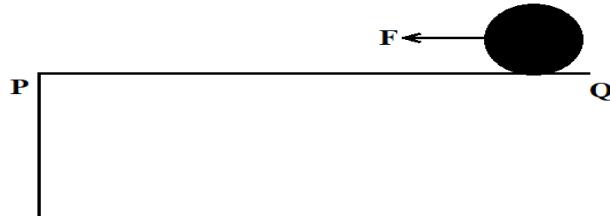
- B) Lead shot

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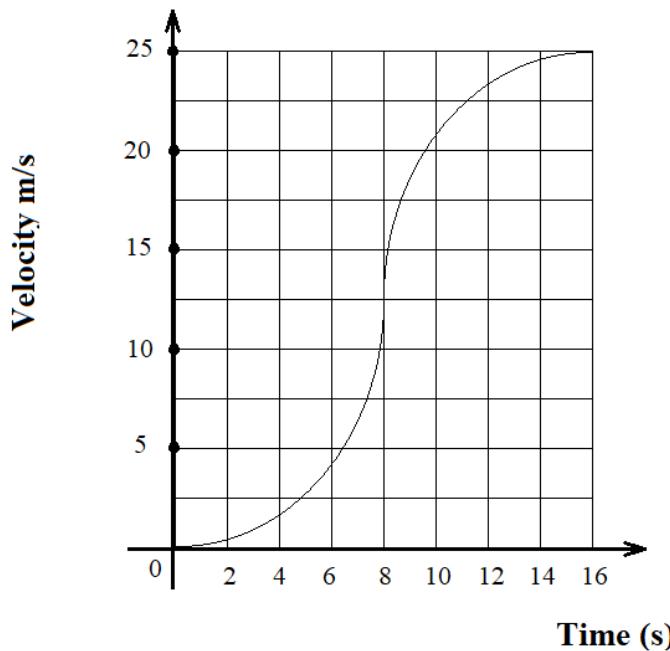
ii) Salt solution is added to the water. State the observation made on the hydrometer. (1 mark)

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17. A metal ball of mass 20kg at rest is pulled by a force and moves along a horizontal friction compensated table as shown below. The pull is withdrawn when the ball is at **P** after travelling 16 seconds from **Q**.



Below is a velocity-time graph for the motion of the ball as it moves along the tabletop.



- (a) Determine the distance **PQ** travelled along the tabletop. (3 marks)

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- (b) Calculate:

- i) The average acceleration between time  $t = 8$  seconds and  $t = 16$  seconds (2 marks)

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- ii) The average force acting between  $t = 8$ s and  $t = 16$ s. (2 marks)

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- (c) From **P** the ball falls to the ground a distance 22.5m from the foot of the table. Calculate the height of the table. (3 marks)

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# SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS

## SERIES 4

### Kenya Certificate of Secondary Education

#### Form Four Mock Evaluation Programme

Name..... Index Number.....

School..... Adm No..... Stream.....

Candidate's signature..... Date.....

#### PHYSICS

#### Paper 1 Theory

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*For marking schemes and more Post Mock papers for all subjects*

#### Instructions to the candidate:

- (a) Write your name, index number and school in the spaces provided above.
- (b) Sign and write the date of examination 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 in the spaces provided.
- (f) Mathematical tables and electronic calculators may be used.
- (g) This paper consists of 12 printed pages
- (h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

#### For Examiner's Use Only:

Section	Question	Maximum Score	Candidate's Score
A	1–14	25	
	15	08	
	16	13	
B	17	14	
	18	11	
	19	09	
Total Score		80	

**SECTION A: (25 marks):**

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

1. Figure 1 shows a section of a burette filled with a colourless liquid.



Figure 1 (a)



Figure 1 (b)

Figure 1

Figure 1(b) shows a magnified scale indicating new level of liquid in the burette after some volume  $x$  of the liquid has been removed.

- (i) State the new level of the liquid shown in figure 1(b). (1mk)

- (ii) Determine the value of  $x$ . (1mk)

2. A form one student set up the apparatus as shown in figure 2.

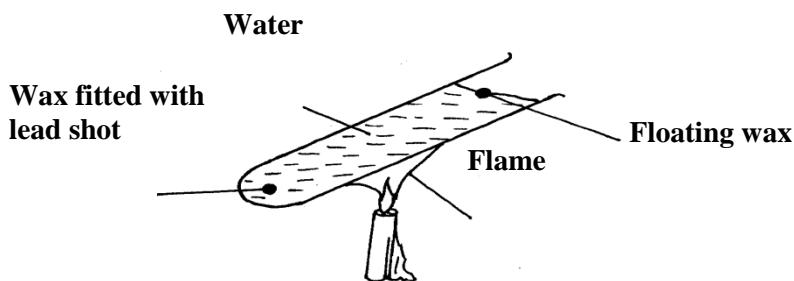


Figure 2

The boiling tube was heated in the middle as shown

- (i) Which wax melted? (1mk)

- (ii) Explain your answer in (i) above. (1mk)

3. State the SI unit of gravitational field intensity. (1mk)

4. Define force in terms of momentum (1mk)

5. A body is uniformly accelerated from rest to a final velocity of  $100\text{ms}^{-2}$  in 10s. Determine the distance covered. (2mks)

6. Figure 3 shows a siphon used to empty a tank.

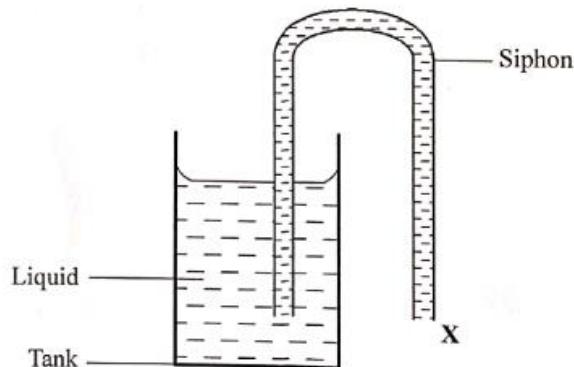


Figure 3

In order to start the siphon, give a reason why the tube must be filled with a liquid and end X must be below the level of the liquid in the tank. (2mks)

7. Explain how a piece of chalk can be used to demonstrate that matter is made up of tiny particles. (1mk)

8. The figure 4 shows a uniform meter rule of weight 1N with two weights of weight 0.18N and 0.12N suspend from its ends.

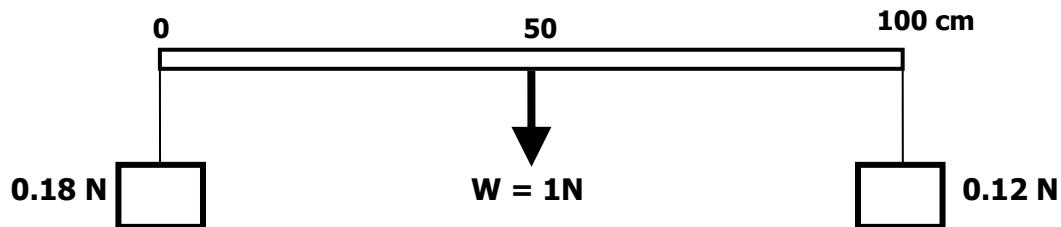


Figure 4

Determine how far from the 0.18 N weight a pivot should be placed in order to balance meter rule. (3mks)

9. State **any two** changes that can be made to a fluid flowing in a streamline flow to make it turbulent flow. (2mks)

10. The solid marble shown below is in a stable equilibrium. On the space provided, sketch the same marble in a neutral state of equilibrium (1mk)

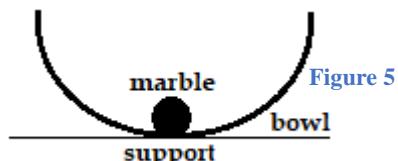


Figure 5

11. Show that the impulsive force on an object can be expressed as  $F = ma$ . (3mks)

12. Figure 6 shows a beaker full of water at  $90^{\circ}\text{C}$ . The beaker is fitted with two identical thermometers A and B and a cold wet cloth wrapped around the middle of the beakers as shown in the diagram.

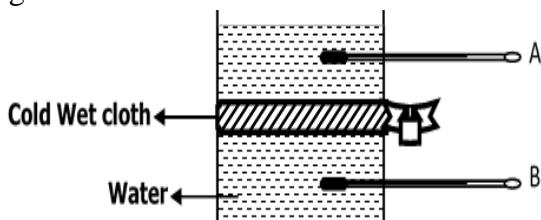
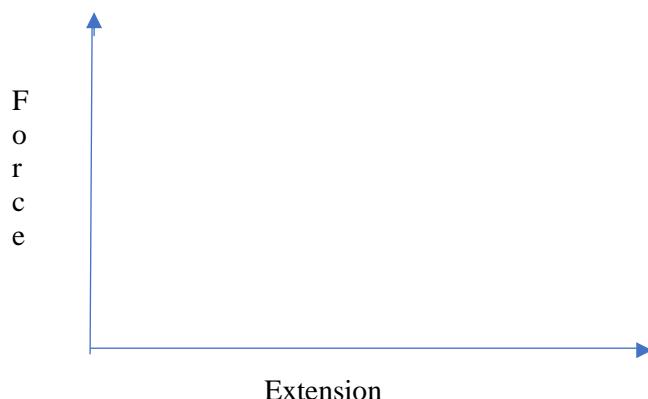


Figure 6

(i) State which thermometer will show a lower reading after some minutes. (1mk)

(ii) Explain your answer in (i) above. (1mk)

13. Two springs X and Y are defined as follows: X has a spring constant of  $25\text{N/m}$  and Y has a spring constant of  $Y$ . Sketch on the axes below graphs representing the behaviour of X and Y. (1mk)



14. In an oil drop experiment to determine the size of an oil molecule certain assumptions are usually made. State any two assumptions. (2mks)

**SECTION B (55 MARKS)**  
**Answer all questions in the spaces provided below each question.**

15. (a) The graph in figure 7 shows changes of pressure and volume of a fixed mass of a gas.

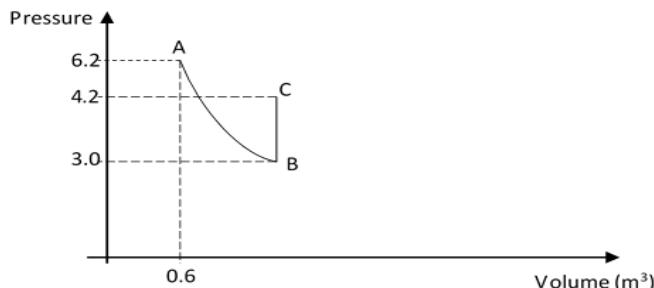


Figure 7

- (i) Calculate the volume of the gas at B. (4mks)

- (ii) I. Name the gas law represented by the graph between B and C. (1mk)

II. Give one way of increasing pressure at constant volume between B and C. (1mk)

- (b) Show that density of a fixed mass of a gas is directly proportional to the pressure at constant temperature. (3mks)

16. (a) Define *angular velocity* as used in circular motion. (1mk)

- (b) The graph in figure 8 was obtained in an experiment to investigate the variation of the centripetal force, F, with the radius, r of the circle on a turn table.

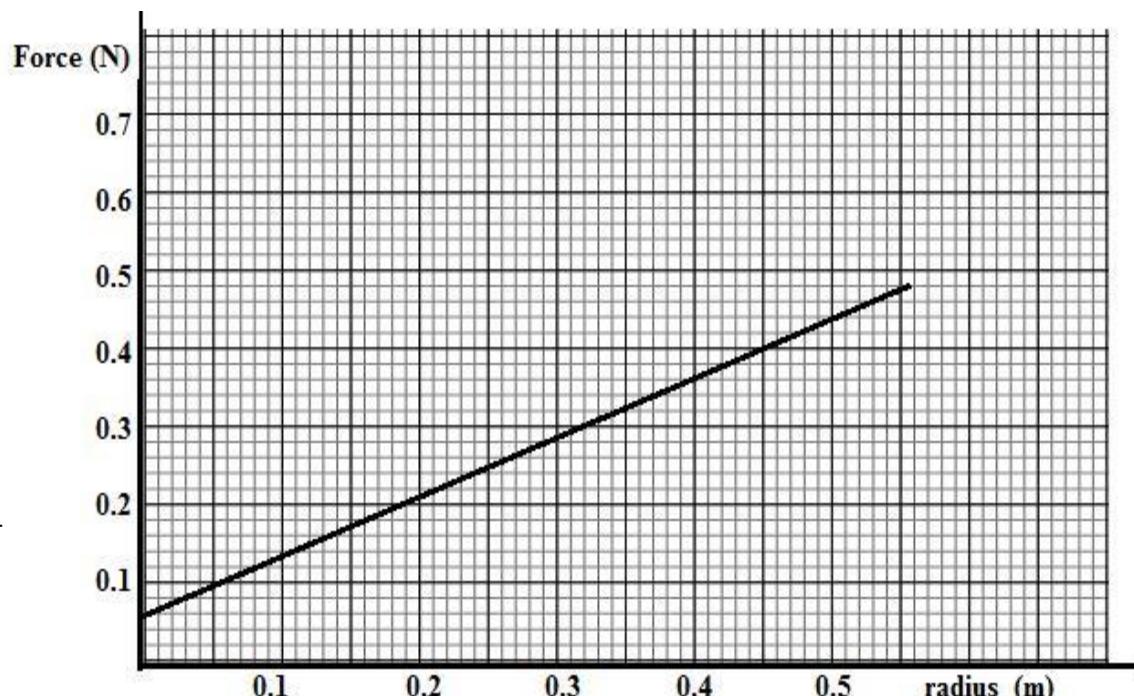
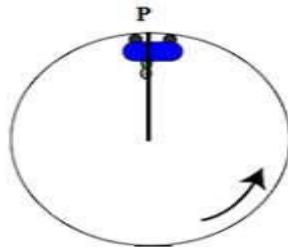


Figure 8

Given that the relationship between force,  $F$ , and radius,  $r$ , is of the form  $F = m\omega^2 r + C$ . Where  $c$  is a constant. Determine the angular velocity,  $\omega$  and the constant  $C$  of the body given that  $m = 100g$ . (4mks)

- (c) Explain why the earth is said to be accelerating when revolving around the sun at constant speed. (1mk)

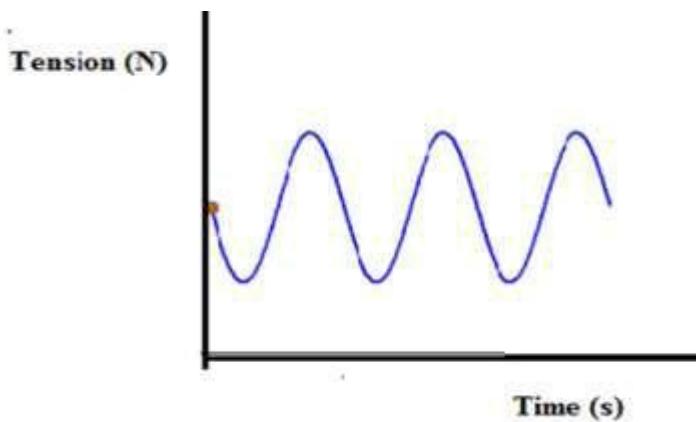
- (d) Figure 9 below shows a toy attached to a string and made to move along a vertical circle in an anti-clockwise direction.



**Figure 9**

- (i) Sketch on the diagram above, the path followed by the trolley if the string cuts when it is at position P. (1mk)

- (ii) the variation of tension in the string with time as the trolley moved along the vertical circle was plotted in the graph shown in figure 10.



**Figure 10**

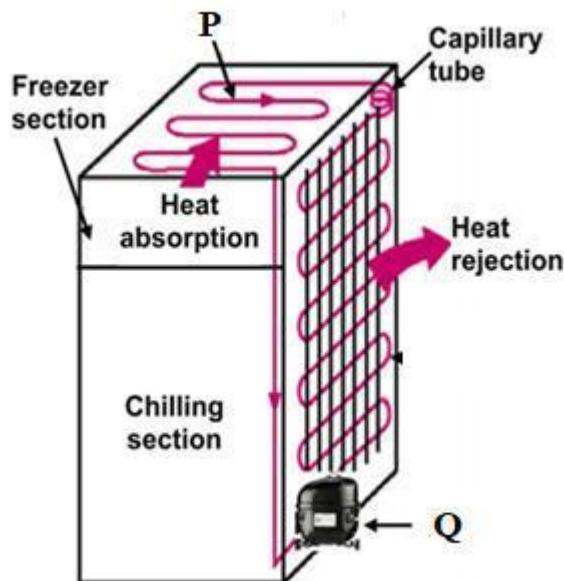
- I. Mark on the graph the points T corresponding to position P in the circle shown in figure 12 above (1mk)

- II. the graph is not touching the time axis (1mk)

Give a reason why

- e) A body moving with uniform angular velocity found to have covered an angular distance 170 radians in t seconds. Thirteen seconds later it is found to have covered a total angular distance of 300 radians. Determine t. (4mks)

17. (a) The figure 11 shows a domestic refrigerator.



**Figure 11**

(i)

parts P and Q

Name the

(2mks)

(ii)

how cooling is achieved in the refrigerator.

Explain

(3mks)

(iii)  
(2mks)

The shelves in a refrigerator are made of metal gauze instead of metal plates. Explain.

- (b) A copper can together with a stirrer of total heat capacity 60J/k contains 200g of water at 10°C. Dry steam at 100°C is passed in while the water is stirred until the whole reach a temperature of 30°C. Determine

the mass of steam condensed. (Specific heat capacity of water=4200J/kgK and specific latent heat of vaporization of steam(water) =2260000J/kg).

(5mks)

c) Increase in pressure increases the boiling point of a liquid. Explain how a pressure cooker helps in achieving this situation. (2mks)

18. (a) State the law of flotation. (1mk)

(b) You are provided with the following;

-A block of wood, a spring balance, thin thread, overflow can, measuring cylinder and some liquid.

With the aid of labelled diagram(s) describe an experiment to verify the law of flotation.

(5mks)

c) Determine the minimum volume of copper that must be attached to a cork of mass 25g so that the two just submerge in water. (Relative density of copper and cork are 9.0 and 0.25 respectively). (3mks)

d) State two reasons why density bottle may be preferred to measure relative density. (2mks)

19 (a) Figure 12 shows a lever being used to raise a load of 100N.

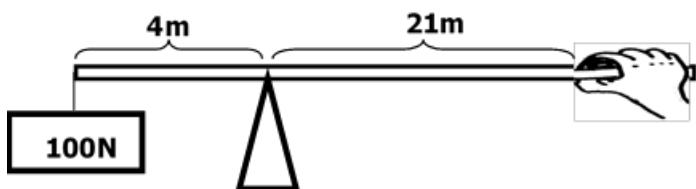


Figure 12

(i) Determine

(I) the effort applied. (2mks)

(II) The velocity ratio and mechanical advantage. (2mks)

III) Efficiency of the machine. (2mks)

(b) Give two ways in which the mechanical advantage could be increased. (2mks)

**THIS IS THE LAST PRINTED PAGE**

NAME..... ADM NO .....CLASS.....

Candidate's signature..... Date.....

232/1

**PHYSICS pp1**

**PAPER 1 (THEORY)**

**2 HOURS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS SERIES 5**

***CONTACT US ON: [0724351706/0726960003](tel:0724351706)***

***For marking schemes and more Post Mock papers for all subjects***

### **Instructions to candidates**

- (a) Write your name and Admission number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consist of **two** section A and B.
- (d) Answer **all** the questions in section A and B in the spaces provided.
- (e) All working **must** be clearly shown.
- (f) Mathematical tables and electronic calculators may be used.
- (g) **This paper consists of 12 printed pages.**
- (h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

*For examiners use only.*

Question	Maximum score	Candidate's score
1-12	25	
13	10	
14	12	
15	12	
16	12	
17	9	
<b>TOTAL</b>	<b>80</b>	

*This paper consists of 13 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.*

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

(Take  $g=10\text{N/kg}$  or  $10\text{m/s}^2$ )

1. Figure 1 below shows the reading from a micrometer screw gauge that has a zero error of  $-0.25\text{mm}$ . What is the actual diameter of the object. ( 2mks)

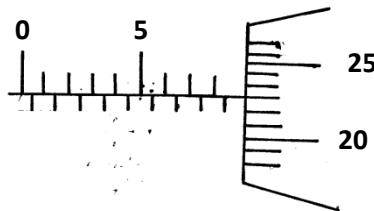


Figure 1.

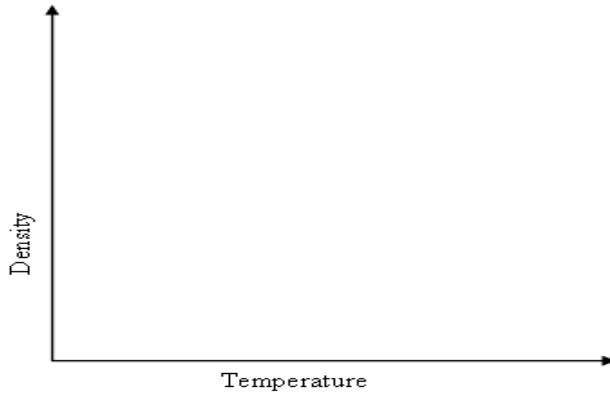
2. Two table tennis balls hang at the same level suspended from a thread a short distance apart. A stream of air is blown between the balls. State and explain what happen to the balls. (2 mks)

3. Give a reason why heat transfer by radiation is faster than heat transfer by conduction. (1mk)

4. Distinguish between density and relative density (1mk)

5. State and explain how the motion of the smoke particles changes when the temperature inside the smoke cell is lowered. (2mks)
- .....  
.....  
.....

6. On the axes provided sketch density-temperature graph, when water is heated from a temperature of  $0^{\circ}\text{C}$  to  $10^{\circ}\text{C}$ . Show the temperature at which water has the highest density. (2mks)



7. A uniform metre rule whose mass is 150g is balanced by suspending a 10g mass and a 20g mass on its ends as shown in figure 2 below.

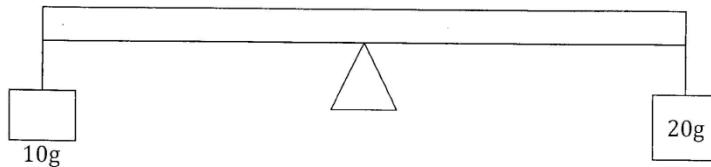


Figure 2.

- Determine the position of the pivot. (3mks)
- .....  
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.....

8 Figure 3 below represents a simple fire alarm. Explain how it works. (3mks)

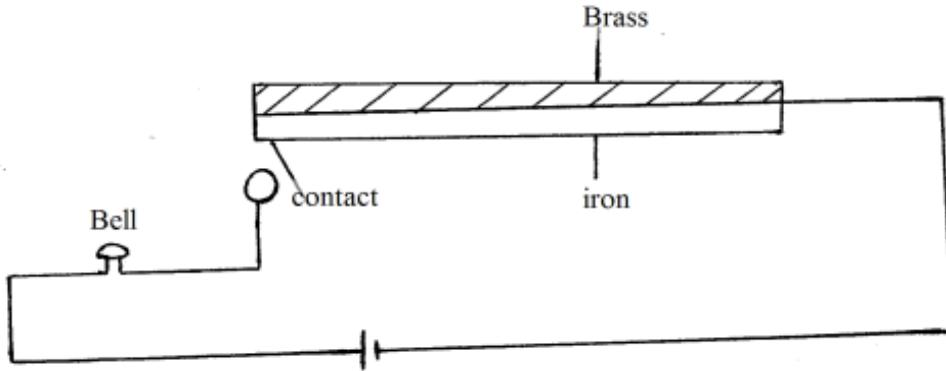


Figure 3.

9 . Figure 4 below shows a section of a pipe with different cross-sectional areas. If water flows with a velocity of 5m/s in section A, what would be the velocity of water in section B? (2mks)

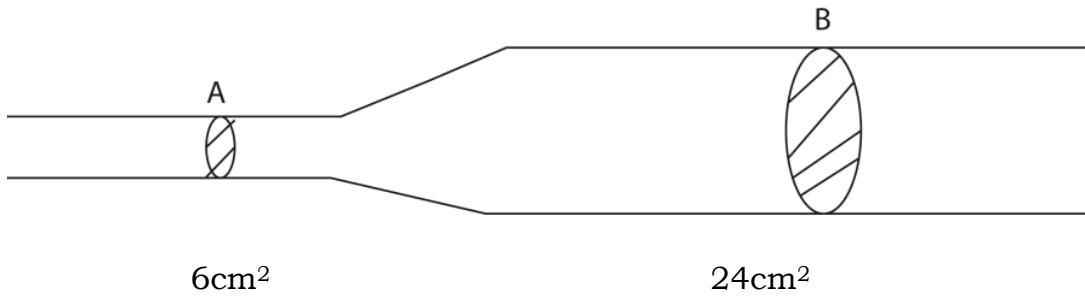


Figure 4.

10. State two factors that would raise the boiling point of a liquid. (2mks)

11. A car of mass 1500kg negotiates a level roundabout of radius 40m at a speed of 72km/h. Calculate the centripetal force acting on the car. (3mks)

12. A spring of elastic constant  $K$  has its length increased from 4.00m when unloaded to 4.25m when loaded with a 75N weight. Assuming that the elastic limit is not exceeded, determine the value of  $K$ . (2marks)

## **SECTION B (55 Marks)**

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

13. (a)(i) State the law of flotation (1mk)

- (ii) Explain why a hollow metal sphere floats on water while a solid metal sphere of the same material sinks in water. (2mks)
- 
- 
- 

- (b) Figure 5 below shows a uniform block of uniform cross-sectional area of  $6.0\text{cm}^2$  floating on two liquids A and B. The lengths of the block in each liquid are shown. Given that the density of liquid A is  $800\text{kg/m}^3$  and that of liquid B is  $1000\text{kgm}^{-3}$  determine the:

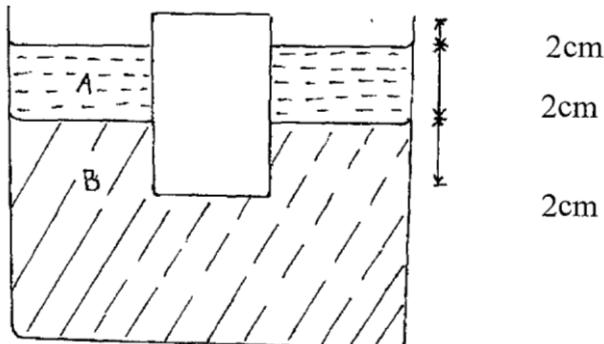


Figure 5.

- (i) Weight of liquid A displaced (2mks)
- 
- 
- 

- (ii) Weight of liquid B displaced (2mks)
- 
- 
- 

- (iii) Density of the block (3mks)
- 
- 
-

14. Figure 6 shows a fair ground ride trolley **M** of mass 120Kg carrying two passengers of average mass 40Kg released at point **P** of a frictionless curved surface **S**. Upon reaching the horizontal, it collided with a stationary trolley **N** of mass 140Kg carrying three passengers of average mass 60Kg. If the two trolleys moved together with a common velocity along the horizontal for 1.2 seconds before coming to rest, determine:

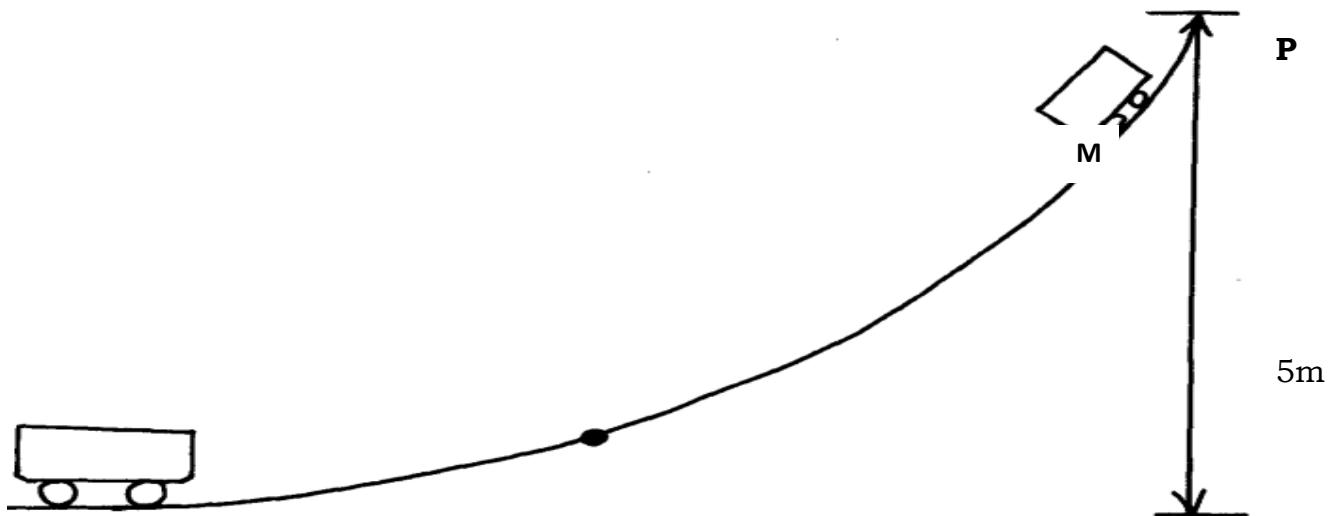


Figure 6.

- a) The gravitational potential energy of the trolley at point **P** (3mks)

**N** .....

.....

.....

.....

- (b) The velocity of trolley **M** just before it collides with trolley **N** (3mks)

.....

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- (c) The common velocity of the two trolleys after collision. (3mks)

.....

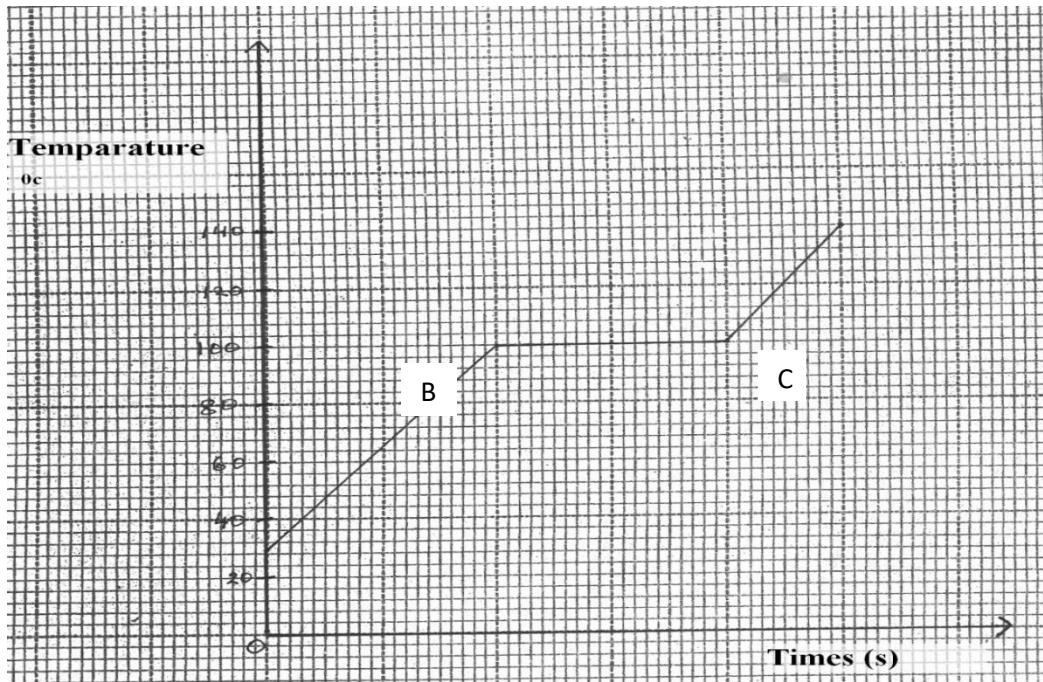
.....

(d) The impulse

(3mk)

15 a) State the difference between evaporation and boiling. (1mk)

b) The graph below shows the boiling process of water. Use it to answer the questions that follow.



(i) State the room temperature from the graph.

(1mk)

- ii) State what is happening along BC in the graph (1mk)

c) 50g of steam at  $100^{\circ}\text{C}$  was passed into cold water at  $20^{\circ}\text{C}$ . The temperature of the mixture was  $50^{\circ}\text{C}$ . Taking specific heat capacity of water as  $4200 \text{ J kg}^{-1} \text{ K}^{-1}$  and specific latent heat of vapourisation of water as  $2260 \text{ kJ kg}^{-1}$  and ignoring heat losses, determine.

- i) Quantity of heat lost by the steam. (3mks)

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- ii) Quantity of heat transferred from the condensed steam to the cold water (3mks)

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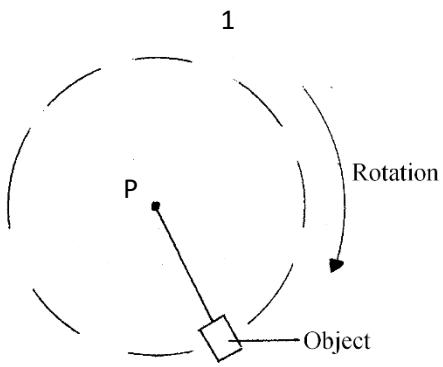
- iii) Mass of the cold water (3mks)

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.....

16. a) Define centripetal acceleration . (1mk)

.....  
.....

- b) An object of mass 400g revolves uniformly on a horizontal frictionless surface. It is attached by a cord 20 cm long to a fixed point P.



- i) Mark and label on the diagram the direction of centripetal force **F** and linear velocity **V**. (2mks)
- ii) The object makes 6 revolutions per second. Determine the angular velocity of the object. (2mks)
- .....  
.....  
.....  
.....

- c) A stone is tied to a light string of length 0.5 m. If the stone has a mass of 20g with a uniform angular velocity of 6 revolutions per second, determine.

- i) The period (2mks)
- .....  
.....  
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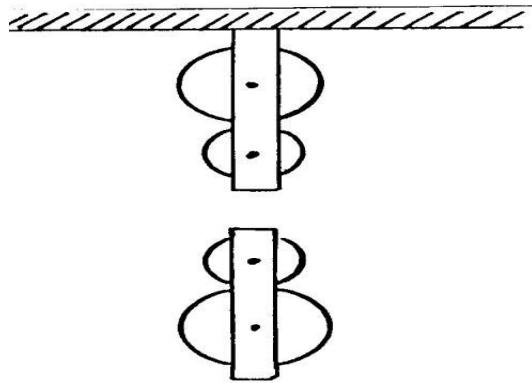
- ii) The tension of the string when the stone is at the bottom of the swing. (3mks)
- .....  
.....  
.....  
.....

d) ) State **two** factors affecting centripetal force.

(2 mks)

.....  
.....  
.....

17. a) Complete the diagram below to show how the pulley can be used to raise a load, **L** by applying an effort, **E**. (1mk)



a) The pulley system above has a mechanical advantage of 3. Determine;

(i) the velocity ratio of the system.

(1mk)

.....  
.....

(ii) the efficiency of the system.

(2mks)

.....  
.....  
.....

(iii) the effort when a load of 60N is raised.

(2mks)

(c) The reading on a mercury barometer at a place is 700 mm. The barometer contains some air which exerts a pressure of  $10\text{N/m}^2$ . Determine the pressure at that place in  $\text{N/m}^2$  (3mk)

NAME ..... SCHOOL.....INDEX NO.....

**232/1**

**PHYSICS THEORY  
PAPER 1**

## **SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS**

### **SERIES 6**

***CONTACT US ON: [0724351706/0726960003](tel:0724351706)***

***For marking schemes and more Post Mock papers for all subjects***

#### **INSTRUCTIONS TO CANDIDATES**

Answer all questions in the question paper.

Marks are given for a clear record of work.

Mathematical tables and electronic calculators may be used.

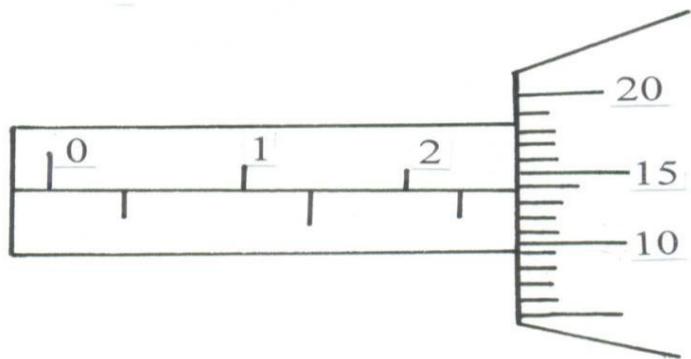
#### **FOR EXAMINERS USE ONLY**

QUESTION	MAXIMUM SCORE	CANDIDATE SCORE
1 – 12	25	
13	10	
14	12	
15	11	
16	12	
17	10	
Total	80	

***This paper consists of 13 printed pages***

1. Figure 1 below shows scales used to measure the width of a rod. The instrument had an existing reading before use of 0.02mm

Fig



What is the width of the rod

(2mks)

2. A mass of 60kg weighs 1200N on a certain planet. Determine the gravitational field strength of the Planet

(2mks)

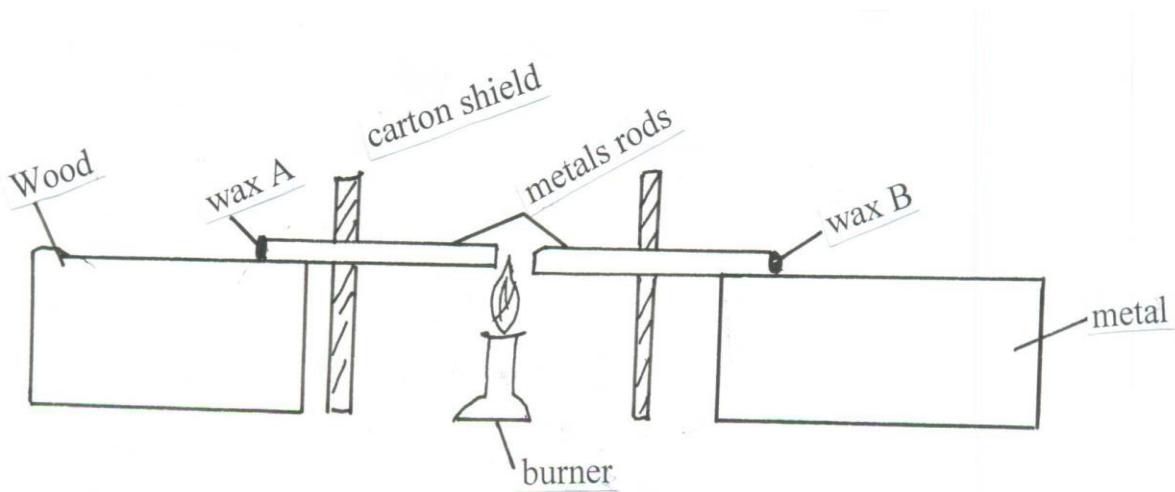
3. The barometric height in a town is 60cmHg. Given that the standard atmosphere is 76cmHg and density of mercury is  $13600\text{kgm}^{-3}$ , determine the altitude of the town (take density of air to be  $1.25\text{kgm}^{-3}$ )

(3mks)

4. How does the rate of diffusion in air and vacuum for ammonia differ

(1mk)

5. Fig 2 shows two metal rods of same thickness placed on wooden block and the other on metal block. Wax is fitted at the far ends of the rods.



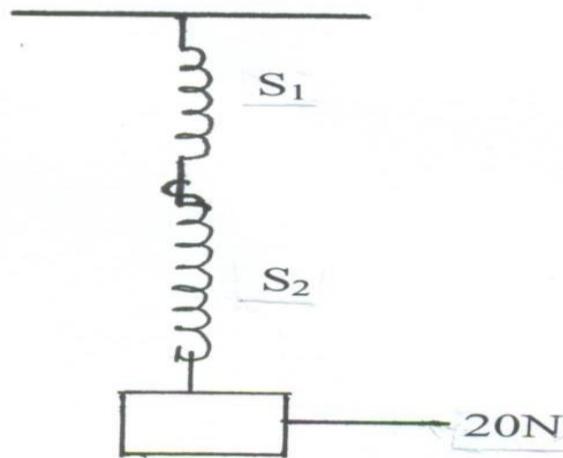
Which wax melts first and why?

(2mks)

6. A uniform half metre rule is balanced by a weight of 40N at one end. If the pivot is placed 10cm from the same end, calculate the weight of the rod. (3mks)

7. What type of equilibrium does a ball bearing has when at the bottom of a concave mirror (1mk)

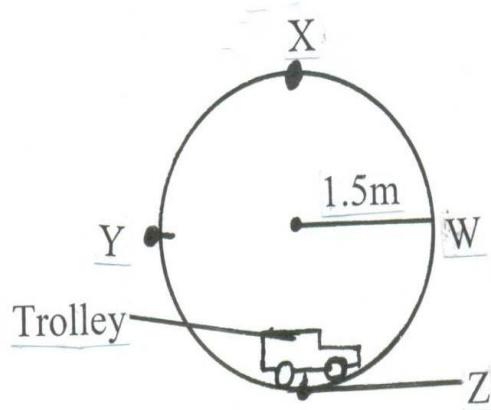
8. Two springs  $S_1$  and  $S_2$  are connected as shown in figure 3 below



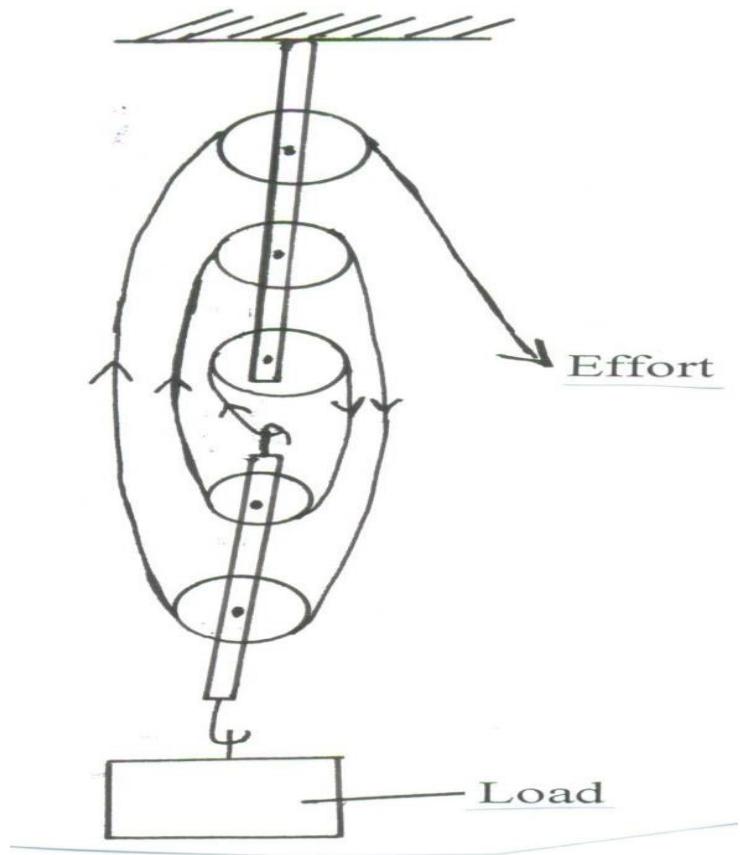
$S_1$  has a spring constant of value same of  $S_2$ . If their total extension is 3.6cm, determine the spring constant for each. (3mks)

9. The figure 4 below shows a trolley of mass 200g moving in a circular rail in a vertical plane. If the radius of the rail is 1.5m. Determine the minimum velocity at which the trolley pass point X. (3mks)

4.



10. An object of mass M has weight  $W_1$  in air and  $W_2$  in water suggest a reason why  $W_1$  is greater than  $W_2$ . (1mk)
11. The figure 5 shows a pulley system used to raise a load



If a load of 120N is raised by an effort of 29N determine the efficiency of the system (3mks)

12. State the pressure law of ideal gas (1mk)

## **SECTION B 55 MARKS**

13. (a) State the law of floatation (1mk)
- (b) A spherical bouy of diameter 0.5m and mass of 25kg is held stationary by a mass tied to its bottom such that  $\frac{3}{4}$  of its volume is below surface of water. Find the weight of the mass required to keep it stable (4mks)

*KISII SOUTH FORM 4 EXAM 2023 PHYSICS P.1*

6.

- (c) Explain how a submarine is able to float in water and sink in water (3mks)

- (d) In an experiment to determine the relative density of a liquid X, the following measurements were obtained.

Mass of solid in air = 200g

Mass of solid when immersed in water = 180g

Mass of solid when immersed in liquid x = 175g

Determine the relative density of the liquid x

(2mks)

14. (a) Define latent heat of vapourisation of a substance. (1mk)
- (b) Half full flat bottomed flask is heated till the water boils at  $100^{\circ}\text{C}$ . Heating is stopped and the flask closed tightly with cork then cold water poured over the flask. Explain what happens (3mks)

(c) In an experiment to determine specific heat capacity of a metal the following measurements were collected.

- |  |   |
|--|---|
| - Mass of the metal = 0.1kg  | S.H.C of water = $4200\text{Jkg}^{-1}$      |
| - Mass of copper calorimeter = 0.3kg                                 | S.H.C of calorimeter = $400\text{Jkg}^{-1}$ |
| - Mass of water in calorimeter = 400g                                |   |
| - Initial temperature of metal = $28^{\circ}\text{C}$                |   |
| - Initial temperature of water & calorimeter = $100^{\circ}\text{C}$ |   |
| - Final temperature of metal & water = $75^{\circ}\text{C}$          |   |

(i) Use the information to find specific heat capacity of metal used. (4mks)

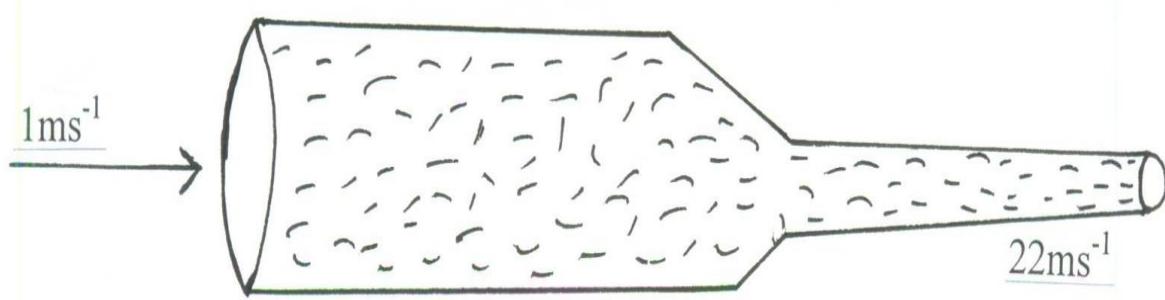
(ii) State 2 sources of error in the experiment above. (2mks)

(d) Explain why an athlete who has run and sweats feels cold on settling ( 2 mks)

15. (a) (i) Distinguish between streamline and turbulent flow (1mk)

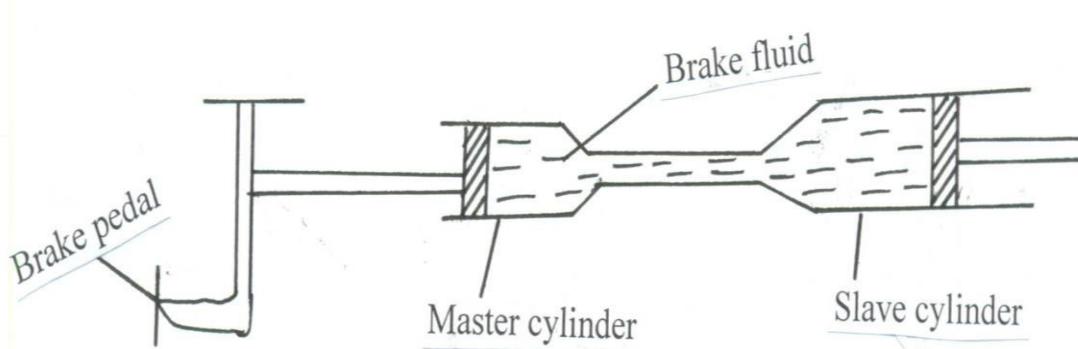
(ii) A boat travelling at a very high speed is likely to be dragged into a ship travelling in the opposite direction also at high speed. Explain this observation. (2mks)

(iii) Fig. 6 below shows a non-viscous fluid that is not compressible moving through a tube of varying cross sectional area.



If the area of the narrower region is  $0.05\text{m}^2$ , calculate the diameter of the wider region. (3mks)

(b) Figure 7 below represents a motor car hydraulic braking system.



(i) State two properties of the fluid used as brake fluid.

(2mks)

(ii) Explain briefly how the system works (3mks)

16. (a) Explain why a body moving in a uniform circular motion is said to be accelerating. (1 mk)

(b) Momanyi is using a sling to hunt. He uses a stone of 200g and sling string of length 75cm. If he whirls the stone at 4 revolutions per second find;

(i) The angular velocity of the stone (3mks)

(ii) The acceleration of the stone if launched at the speed. (2mks)

(c) The stone above in (b) (ii) is released horizontally at the linear speed it had; determine how far it would land. (3mks)

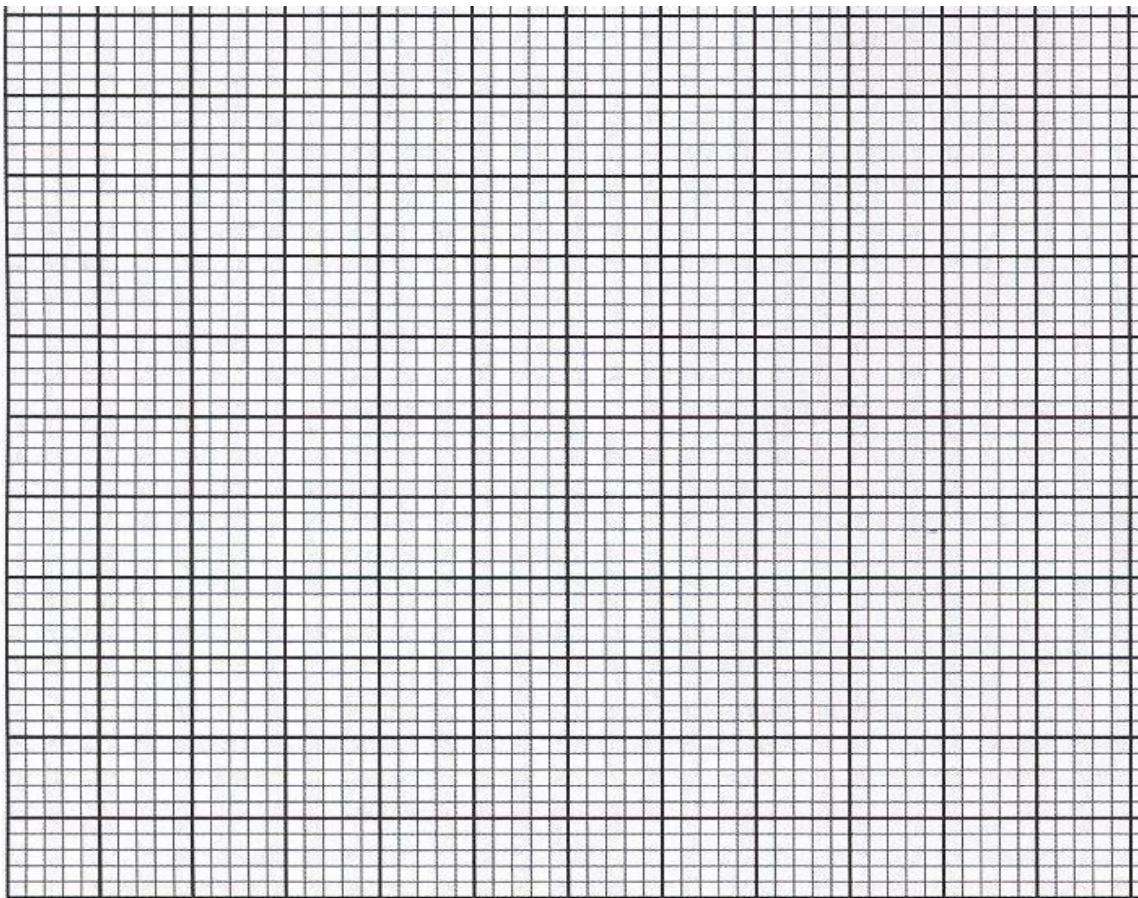
(d) By using a centrifuge, cream is separated from milk. Briefly explain the process scientifically. (3mks)

17. Table 1 below shows the values of velocity squared ( $V^2$ ) and displacement (s) moved by a car at uniform acceleration. Use the table to answer the questions that follow.

Displacement (m)	35	30	25	20	15	10	5	0
Velocity squared ( $V^2$ ) m/s <sup>2</sup>	170	145	120	95	80	54	29	4

(5mks)

- (a) On the grid provided, plot a graph of  $V^2$  against



(b) Determine the slope of the graph (2mks)

(c) Use the graph to determine  
(i) The acceleration of the car (2mks)

(ii) Initial velocity of the car (1mks)

**THIS IS THE LAST PRINTED PAGE**

NAME.....

ADM NO .....

SCHOOL.....

SIGNATURE.....

DATE.....

232/1  
PHYSICS  
PAPER 1  
TIME: 2 hours

## SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS SERIES 7

**CONTACT US ON: [0724351706/0726960003](tel:0724351706)**

*For marking schemes and more Post Mock papers for all subjects*

### **Instruction to The Candidates**

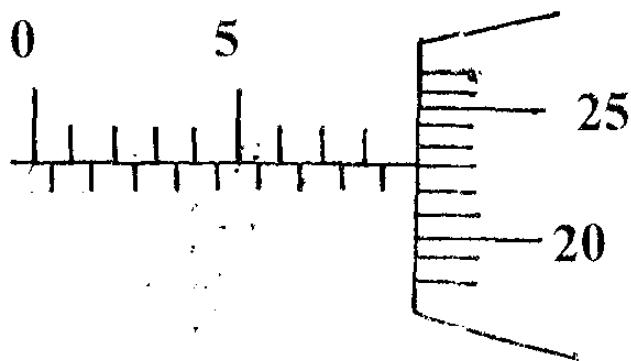
- a) Write your **name** and **ADM number** in the spaces provided above.
- b) Sign and write the **date** of examination in the spaces provided above.
- c) This paper consists of **two Sections A and B**.
- d) There are **9 printed pages**, with **18 questions** check to confirm that your paper is complete.
- e) Answer **all the questions** in sections **A and B** in the spaces provided.
- f) All working must be clearly shown in the spaces provided.
- g) Mathematical tables and electronic calculators **may be used**.

### **For Examiners Use Only**

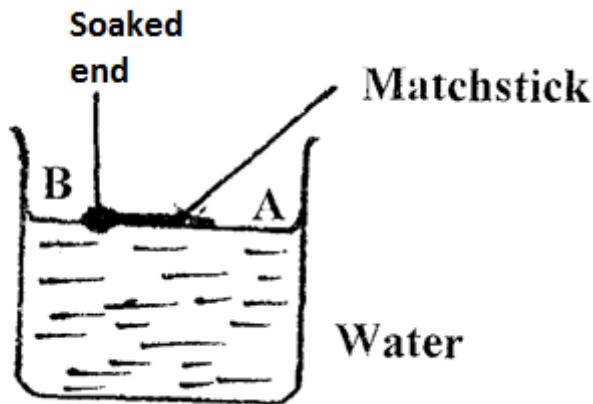
Section	Question	Total Score	Candidates Score
A	1-12	25	
B	13	09	
	14	09	
	15	09	
	16	10	
	17	09	
	18	09	
<b>Total</b>		<b>80</b>	

## **SECTION A (25 MARKS)**

1. The figure shows the reading of micrometre screw gauge that has a zero error of -0.25mm. What is the actual length of the object being measured (2marks)



2. The figure below shows a matchstick soaped on one end and placed on the surface of clean water as shown.



The matchstick is observed to move towards a certain direction

- i) State the direction (A or B) (1mark)

.....

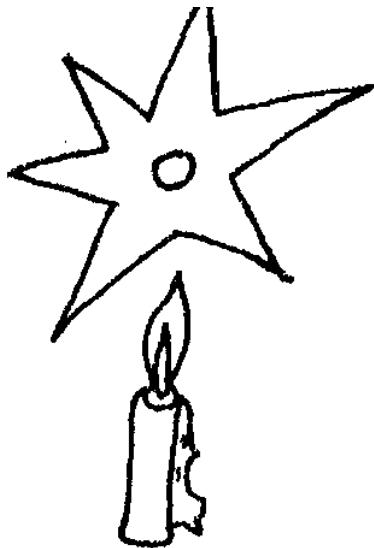
- ii) Explain (1mark)

.....

3. Two liquid X and Y have density  $1.25\text{g/cm}^3$  and  $1.5\text{g/cm}^3$  respectively. Calculate to 2d.p the density of the mixture containing 40% by mass of X the rest being Y (3marks)

4. A uniform meter rule pivoted at its 15cm mark is balanced by a 200g mass suspended at the 5cm mark. Determine the weight of the meter rule (3marks)

5. A paper windmill in a horizontal axis was placed about a candle as shown in the figure

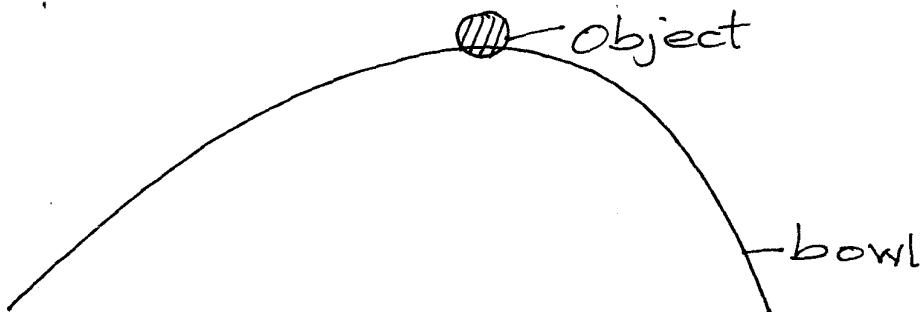


When the candle was lit the paper windmill began to rotate. Explain this observation.

(2marks)

.....  
.....  
.....

6. An object was placed on an inverted bowl as shown.



- i) State the type of stability above. (1mark)

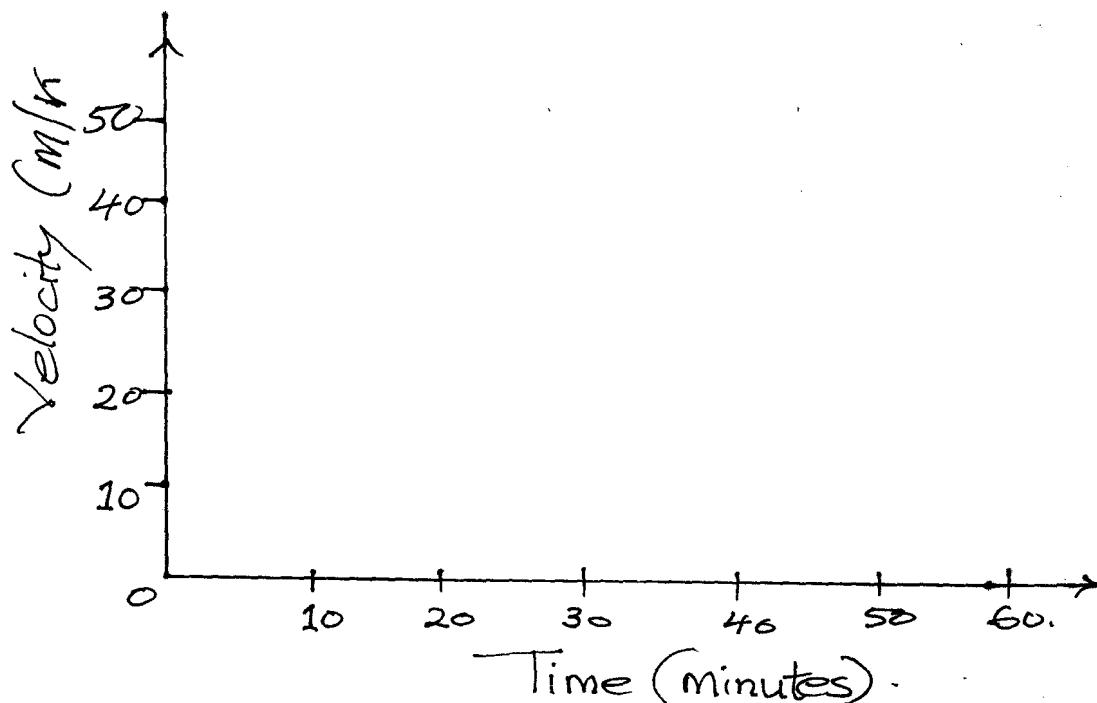
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- ii) Define the type stability above. (1mark)

.....

7. A pipe of diameter 12mm is connected to another pipe of radius 9mm. if water flows in the wider pipe at the speed of 2m/s what is the speed in the narrow pipe. (3marks)

8. A car starting from rest accelerates uniformly for 5minutes to reach 30m/s. It continues at this speed for the next 20minutes and then decelerates uniformly to come to stop in 10 minutes. On the axes provided sketch the graph of velocity against time for the motion of the car (1mark)



9. A diver was swimming in a swimming pool of uniform depth of 0.8m from the surface of water. If atmospheric pressure acting on the surface of water is 103000pa calculate the total pressure experienced by the diver. (density of water =  $1\text{g/cm}^3$ ,  $\text{g} = 10\text{m/s}^2$ ) (2marks)

10. The boiling point of water is known to be at  $100^\circ\text{C}$ . A student heated some water and noticed that it boiled at  $101^\circ\text{C}$  state two possible reasons for this observation. (2marks)

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11. Explain the difference between a liquid and a gas in terms of intermolecular distance and force. (2marks)

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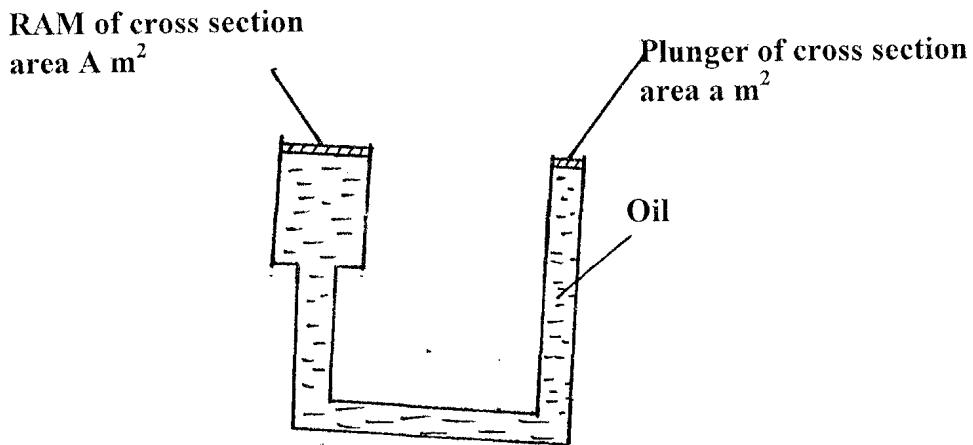
12. State the source of energy for gases in the atmosphere. (1mark)

.....

## **SECTION B 55 MARKS**

13. Define the term velocity ratio of a machine (1mark)

.....  
b) Figure below shows part of a hydraulic press. The plunger is the position where effort is applied while the ram piston is the position where load is applied. The plunger has a cross-section area  $a \text{ m}^2$  while the ram piston has a cross-section area  $A \text{ m}^2$



When the plunger moves down a distance  $d$ , the ram piston moves up a distance  $d$ .

- i) State the property of liquid on which the working of the hydraulic press works (1mark)

.....  
.....

- ii) Derive an expression for the velocity ratio (V.R) in terms of  $A$  and  $a$  (3marks)

.....  
.....

- c) A machine of velocity ratio 45, overcome a load of  $4.5 \times 10^3 \text{ N}$ , When an effort of  $135 \text{ N}$  is applied.  
Determine

- i) The efficiency of the machine (3marks)

- ii) The percentage of work that goes to waste (1mark)

- 14.a) Define specific latent heat of fusion of a substance (1mark)

.....

- b) Water of mass 200g at a temperature of  $60^{\circ}\text{C}$  is put in a well lagged copper calorimeter of mass 80g. A piece of ice at  $0^{\circ}\text{C}$  and mass 20g is placed in the calorimeter and the mixture stirred gently until all the ice melts. The final temperature T of the mixture is then recorded. (Take; specific latent of fusion of ice =  $334000\text{J/kg}$ , s.h.c of water =  $4200\text{J/kg}^{-1}\text{k}^{-1}$ , s.h.c of copper =  $900\text{J/kg}^{-1}\text{k}^{-1}$ )

Determine:

- i) The heat absorbed by the melting ice at  $0^{\circ}\text{C}$  (1mark)
- ii) The heat absorbed by the melted ice (water) to rise to temperature T. (answer may be given in terms of T) (2marks)
- iii) The heat lost by the warm water and the colorimeter (answer may be given in terms of T) (2marks)
- iv) The final temperature of the mixture (3marks)
- 15.a) State Newton's second law of motion (1mark)
- .....  
.....
- b) A matatu starts from rest and accelerates to cover a distance of 49m in 7seconds. Determine its acceleration. (2mks)

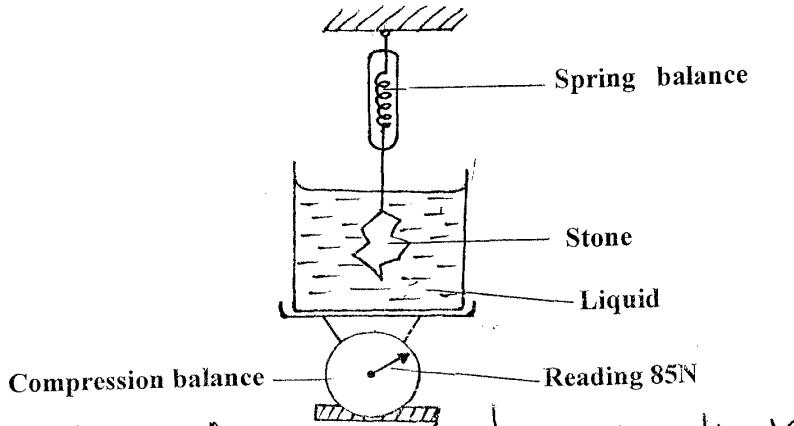
- (c) A trolley moving on a horizontal bench of height 1.2m strikes a barrier at the edge of the bench. The brass mass on the top of the trolley flies off on impact and lands on the ground 2.5m from the edge of the bench. Determine
- i) The time taken by the brass mass to reach the ground. (2marks)

- ii) The speed at which the trolley struck the barrier (2marks)

- d) A passenger dropped a coin held at his hands in a stationary bus and it landed at his feet. State and explain the position it will land if he repeat it once again and the bus was assumed to be moving in a straight line at constant speed (2marks)

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16. Figure below shows of mass 4kg immersed in liquid and suspended from a spring balance with a string. The beaker was placed on a compression balance and shown the reading of 85N. The density of the stone was  $3000\text{kg/m}^3$  while the density of the liquid was  $800\text{kg/m}^3$



- a) State Archimedes principle (1mark)
- .....
- b) Determine
- i) Volume of the liquid displaced (2marks)

ii) Up thrust on the stone (2marks)

iii) Reading of the spring balance (2marks)

c) Find the volume of hydrogen gas filled balloon that will carry a 300kg load in air (density of air = $1.3\text{kg/m}^3$  while that of hydrogen = $0.9\text{kg/m}^3$ ) (3marks)

17.a) State Boyles law (1mark)

.....

b) State the measurements taken in verifying the law above (2marks)

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.....

c) Explain how measurement above are used to verify Boyles law. (3marks)

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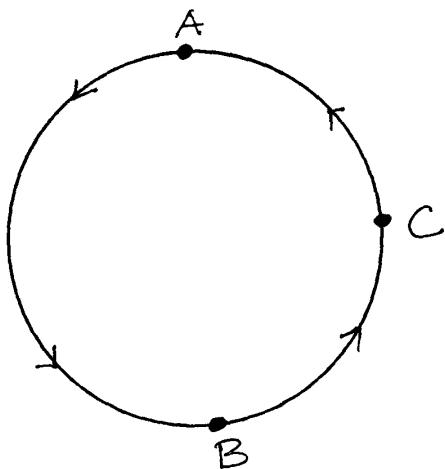
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d) At  $30^\circ\text{C}$ , pressure of a gas is 60cmHg. At what temperature would the pressure of the gas rise to 100cmHg if the volume is kept constant. (3marks)

- 18.a) A car of mass 1500kg moves round a circular track of radius 1200m at a constant speed of 20m/s  
what is the centripetal force action on the car. (3marks)

- b) The figure below shows a stone of mass 10kg being whirled using a rope in a vertical circle of radius 2.5m



State what provides the centripetal force at points.

- i) A (1mark)

.....

- ii) B (1mark)

.....

- iii) C (1mark)

.....

- c) Calculate the maximum tension on the body if it was moving ate a linear velocity of 10m/s.  
(3marks)

$$(g=10\text{m/s}^2)$$

NAME:.....INDEX NO.....

CANDIDATE'S SIGNATURE.....

**PHYSICS PAPER 1**

232/1 Time: 2Hrs.

**SMARTFOCUS KCSE QUICK REVISION SERIES EXAMS  
SERIES 8**

*CONTACT US ON: [0724351706/0726960003](tel:0724351706)*

*For marking schemes and more Post Mock papers for all subjects*

**Instructions:**

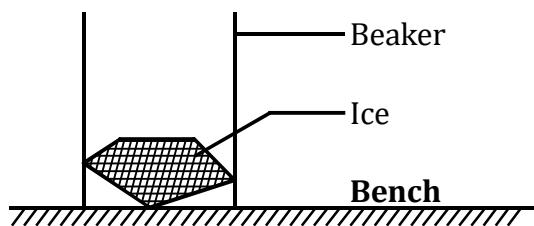
- This paper consists of **TWO Sections: A and B**.
- Answer **ALL** the questions in sections **A** and **B** in the spaces provided.
- **ALL workings MUST** be clearly shown.
- Mathematical tables and electronic calculators may be used.

**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	
<b>TOTAL SCORE</b>		<b>80</b>	

## **SECTION A (25 marks)**

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  $g = 10\text{N/kg}$  and density of mercury =  $13600 \text{ kg/m}^3$ ). (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.

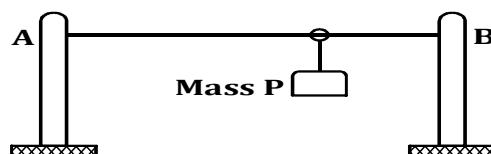


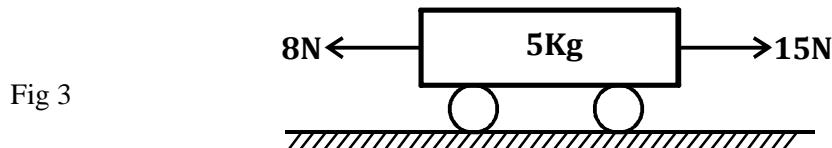
Fig 2

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  $7.7 \times 10^{-2} \text{ m}^3 / \text{s}$ . 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)

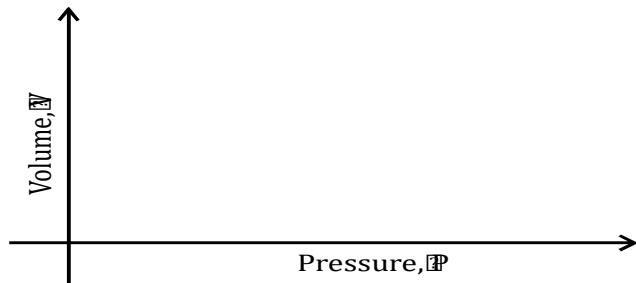
7. Two forces act on a trolley as shown below;



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

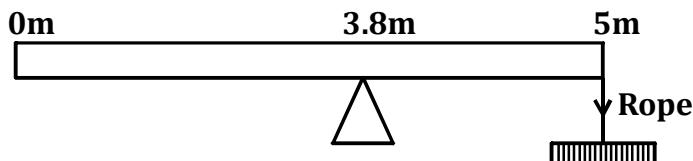
8. State the factors that affect the rate of flow of heat through a metal conductor.  
(2 marks)

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  $80^{\circ}\text{C}$ . When he added X kg of water at  $15^{\circ}\text{C}$ , the mixture attains a temperature of  $40^{\circ}\text{C}$ . 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.



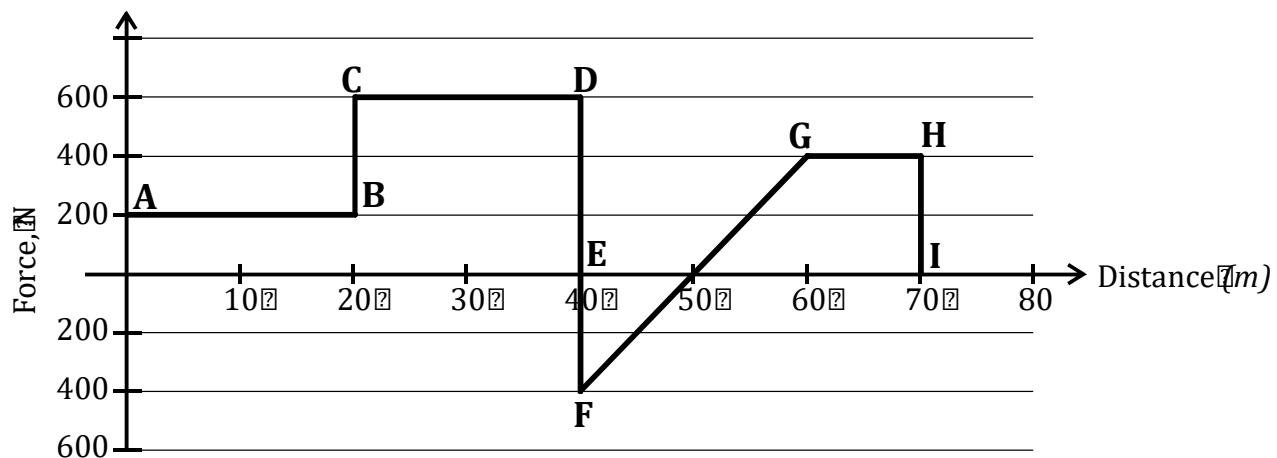
Calculate tension on the rope. (3 marks)

**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.



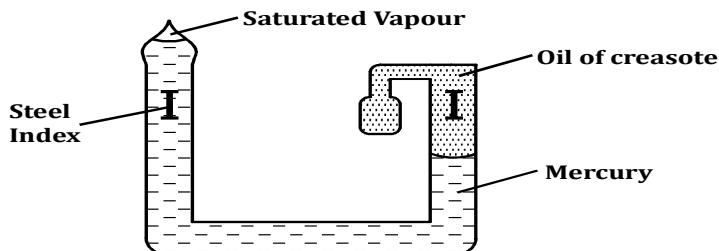
i) Calculate the total work done. (3 marks)

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)

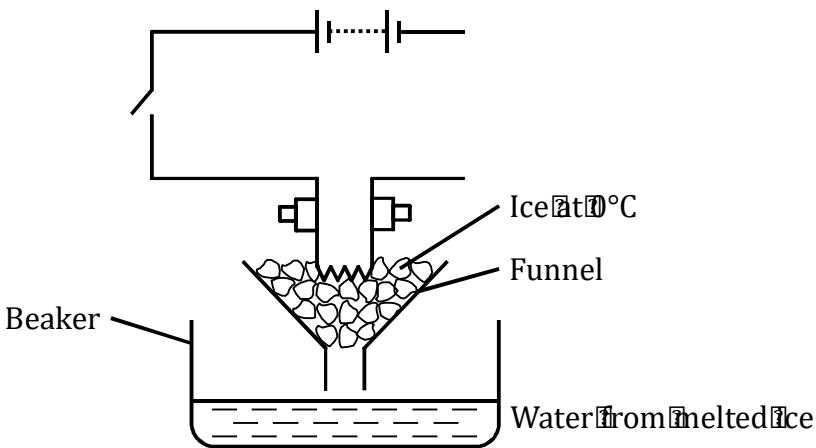
c) An electric pump can raise water from a low level reservoir to a high level reservoir at a rate of  $3.6 \times 10^5$  kg/h. The vertical height that water is raised is 400m. If the rate of energy loss in form of heat is 200kw, calculate the efficiency of the pump. (3 marks)

- 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  $200\text{ms}^{-1}$  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:
- the velocity of the block immediately after impact. (2marks)
  - the time taken by the block to strike the ground. (2 marks)
  - 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.



- 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)

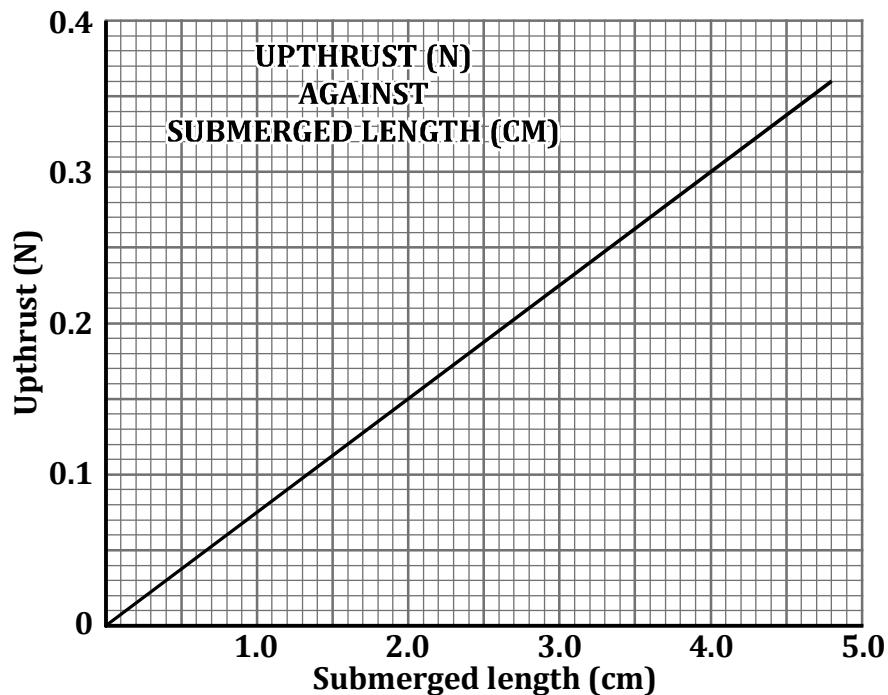
- ii) Explain why wet clothes put in a drum which has holes at the bottom get dried faster when the drum of drying machine is rotated at high speed. (2 marks)

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  $6.0\text{cm}^2$  and length of  $4.2\text{cm}$  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  $5.0\text{cm}^3$  of paraffin when floating and  $20\text{cm}^3$  when fully immersed in it. Given that the density of paraffin is  $0.8\text{g/cm}^3$ , calculate the density of the solid. (3 marks)

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1  
PHYSICS  
TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 11**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections A and B.
- iv) Answer **ALL** the questions in section A and B in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **For Examiners Use Only**

Section	Question	Maximum Score	Candidate's Score
A	<b>1 – 14</b>	<b>25</b>	
B	<b>15</b>	<b>10</b>	
	<b>16</b>	<b>12</b>	
	<b>17</b>	<b>10</b>	
	<b>18</b>	<b>13</b>	
	<b>19</b>	<b>10</b>	
	<b>TOTAL SCORE</b>	<b>80</b>	

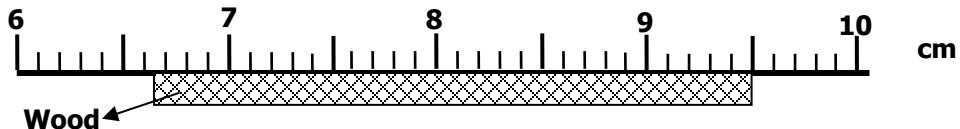
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EMAIL: [goldlitepublishers@gmail.com](mailto:goldlitepublishers@gmail.com)

For marking schemes and more papers

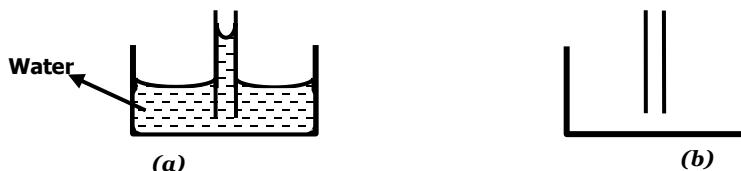
### **SECTION A: (25 MARKS)**

1. The figure below shows a section of a meter rule used to measure length of a piece of wood.



Find the length of the wood (2marks)

2. The diagram below shows a capillary tube immersed in water.



- (a) Make a sketch on the figure alongside (b) to show the appearance of the capillary tube if it was inserted in mercury. (1 mark)
- (b) Explain the difference if any between figure (a) and (b) above (2 marks)

3. Explain why a partially inflated balloon released at sea level would become fully inflated at a higher altitude. (1mark)

4. A catapult is used to project a stone of mass 40.0g vertically upwards to a height of 50.0m. Calculate the amount of elastic potential energy initially present in the catapult. (2marks)

5. A turning effect of force depends on the magnitude of the force. State any other factor that determines the moment of a force (1mark)

- (i) Mercury is usually preferred over water for use as a barometric liquid. Give a reason for this. (1mark)

- (ii) .State the property of Freon that makes it suitable for use as refrigerant. (1mark)

(iii) Other than the mass of ice, State another physical quantities that remain constant while pure ice is being converted to water. (1mark)

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6. Giving a reason, explain why it's advisable for luggage carrier compartment to be put under the seats than at the roof tops of the buses. (1 mark)

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7. Other than angle of banking, state any other factor that affects the critical velocity of a vehicle negotiating a bend. (1 mark)

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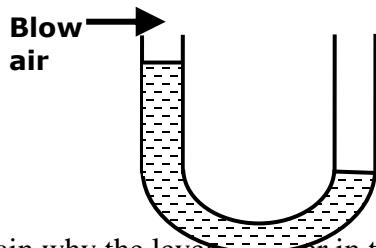
8. A balloon filled with argon gas of volume  $200 \text{ cm}^3$  at the earth's surface where the temperature is  $20^\circ\text{C}$ , and the pressure 760mm of mercury. If it is allowed to ascend to a height where the temperature is  $0^\circ\text{C}$  and the pressure 100mm of mercury, calculate the volume of the balloon. (2marks)

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10. It is a common behavior for a high jumper to slightly flex their knees just before landing. Explain the importance of this behavior from your knowledge of physics. (1mark)

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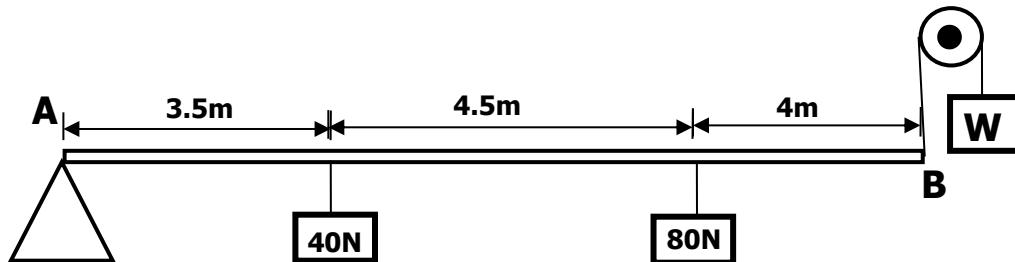
11. The figure below shows a manometer containing water. Air is blown across the mouth of one tube and the levels of the water changes as shown.



Explain why the level of water in the left limb of manometer is higher. (2 marks)

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12. The figure below shows a uniform rod AB of weight 20N pivoted at A.

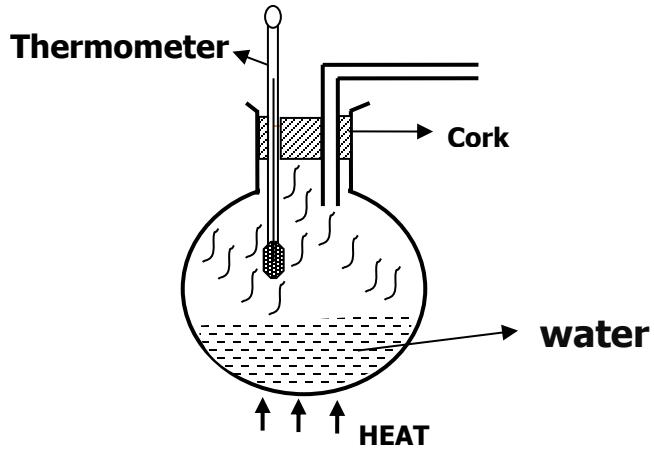


If the system is in equilibrium, determine the weight W shown. (3marks)

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13. A cemented floor feels cold to the feet, but a woolen carpet on the same floor feels warm.  
Explain this. (1mark)

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14. The diagram below shows an arrangement used to determine the upper fixed point of ungraduated thermometer.



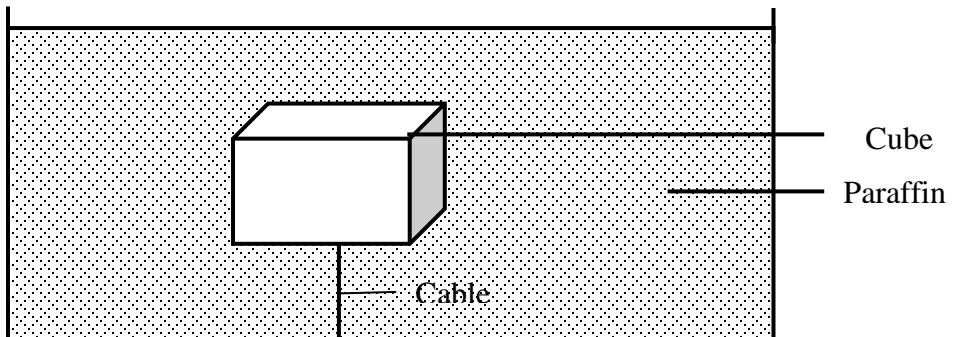
(i) Why is the bulb of thermometer not dipped in the water? (1mark)

(ii) Explain how the sensitivity of a thermometer can be improved. (1mark)

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**SECTION B (55 MARKS)**

15.(a) State Archimedes' principle . . . . . (1 mark)

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(b) The figure shows a cube of side 2.0 m block and of mass 4,800 kg attached to the base of a tank containing paraffin of density  $800 \text{ kgm}^{-3}$  by means of an inextensible and light weight cable.



Determine:

- (i) The density of the block. (2marks)

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- (ii) The upthrust acting on the block. (3 marks)

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- (iii) The tension in the cable. (2 marks)

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- (iv) The cable is then released, and the block rises to the surface where it subsequently floats. Calculate the fraction of the block which is beneath the surface of the paraffin. (2 marks)

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16. (a) Give **two** ways of increasing the boiling point of a liquid. (2 marks)

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- (c) A lagged copper calorimeter of mass 0.8 kg contains 0.6 kg of water at  $22.0^{\circ}\text{C}$ . A metal nut of mass 0.4 kg is transferred quickly from an oven at  $300^{\circ}\text{C}$  to the calorimeter and a steady temperature of  $52^{\circ}\text{C}$  is reached by the water after stirring. Given that the specific heat capacity of copper is  $400 \text{ Jkg}^{-1}\text{K}^{-1}$  and that of water is  $4200 \text{ Jkg}^{-1}\text{K}^{-1}$ , calculate:

- (i) Heat gained by the calorimeter and water. (3 marks)

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- (ii) Energy lost by the metal nut. (1 mark)

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- (iii) The specific heat capacity of the material making the nut. (3 marks)

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(c) An electric kettle rated 120 V, 60 W is used to melt 20 g of ice at  $0^{\circ}\text{C}$  to water at  $0^{\circ}\text{C}$  in 112 seconds, calculate the specific latent heat of fusion of ice. (3 marks)

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17. A stone is thrown vertically upwards from the top of a tower 30m high, with an initial velocity of 20m/s. Determine:

- i) The time it takes to reach maximum height. (2marks)

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ii) The total time which elapses before it hits the ground. (2marks)

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(b) A string of negligible mass has a bucket tied at the end. The string is 60cm long and the bucket has a mass of 45.0g. The bucket is swung horizontally making 6 revolutions per second. Calculate

- i) The angular velocity (2marks)

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ii) The angular acceleration (2marks)

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- iii) The tension on the string. (2marks)

18.(a)(i) During the construction of dams, the base of the dam is widened and curved. Explain.(2 marks)

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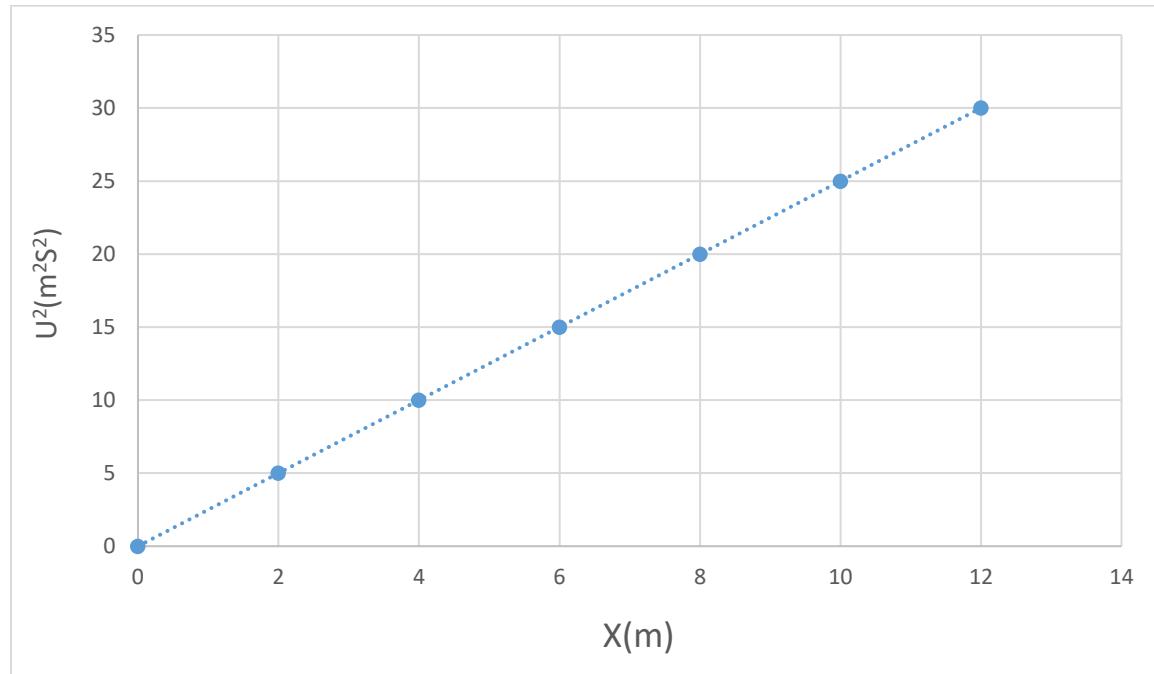
(ii) A block of density  $1.60 \text{ g/cm}^3$  and measures  $3.0\text{cm} \times 5.0\text{cm} \times 7.0\text{cm}$  was placed on the ground. Determine the difference between the maximum and minimum pressure that would be exerted on the ground by the block. (3 marks)

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b) i)State Newton's second law of motion (1 mark)

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ii)A wooden block resting on a horizontal bench is given an initial velocity  $U$  so that it slides on the bench for a distance  $X$  before it stops. Various values of  $X$  are measured for different value of the initial velocity. The figure below shows a graph of  $U^2$  against  $X$ .



i)Determine the slope  $S$  of the graph (3 marks)

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ii) Determine the value of k given that  $U^2 = 20kX$  where k is a frictional constant for the surface  
(2marks)

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iii) State with a reason what happens to the value of k when the roughness of the bench surface is reduced  
(2 marks)

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19.a)(i) State the kinetic theory of gases. (1 mark)

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(ii) State the reason why it is easier to separate water into drops than to separate a solid into smaller pieces. (1mark)

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c) (i) State Hooke's law (1mark)

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(ii) Two identical helical springs are connected in series. When a 50g mass is hang at the end of the springs, it produces an extension of 2.5 cm. Determine the extension produced by the same mass when the springs are connected in parallel. (3marks)

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d) (i)State Boyle's law. (1mark)

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(ii) Draw a suitable set up that can be used to verify Charles's law. (3marks)

**THIS IS THE LAST PRINTED PAGE.**

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1**

**PHYSICS**

**TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 12**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections **A** and **B**.
- iv) Answer **ALL** the questions in section **A** and **B** in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **For Examiners Use Only**

Section	Question	Maximum Score	Candidate's Score
A	1 – 13	25	
B	14	10	
	15	12	
	16	10	
	17	13	
	18	10	
	<b>TOTAL SCORE</b>	<b>80</b>	

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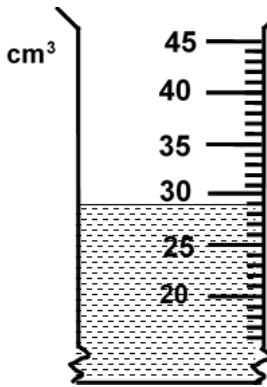
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### SECTION A (25 MARKS)

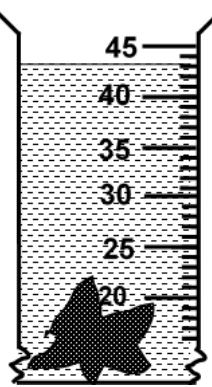
*Attempt all questions in this section in the spaces provided*

1. **Figure 1(a) and (b)** shows the change in volume of a liquid in a measuring cylinder when



an irregular solid is immersed in it.

**Figure 1(a)**

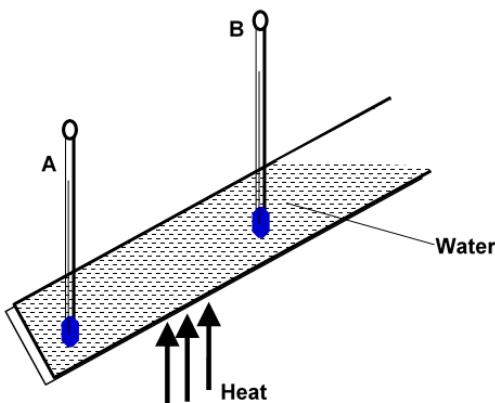


**Figure 1(b)**

Given that the mass of the solid is 21.0 g, determine the density of the solid (2 marks)

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2. **Figure 2** shows a glass tube with water fitted with two identical thermometers A and B. It is heated as shown.



**Figure 2**

State with reason which of the two thermometers shows a higher temperature. (2 marks)

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3. Two identical samples of bromine vapor are placed in identical gas jars A and B. A has some air in it and B is a vacuum. State with a reason which sample diffuses sooner.

(2 marks)

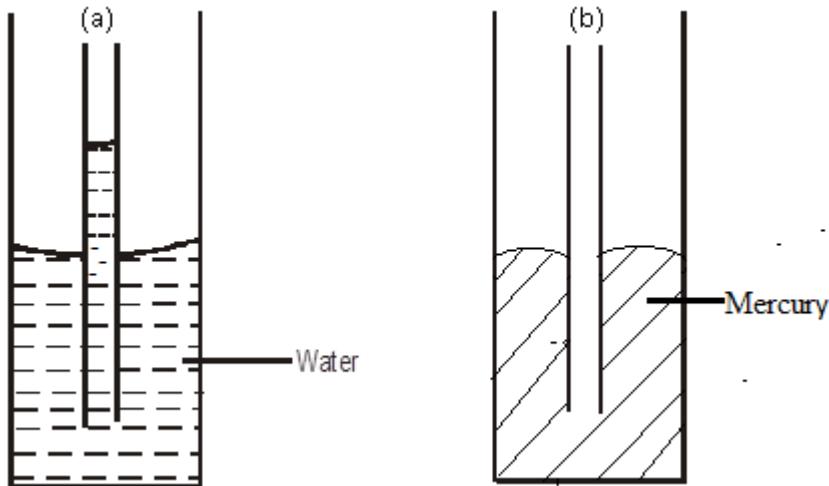
4. **Figure 3** shows a clinical thermometer which is not graduated.



**Figure 3**

- a) Name the part indicated with letter X ..... (1 mark)  
b) State the function of the part labeled Y. ..... (1 mark)

5. **Figure 4 (a)** shows a capillary tube immersed in water.



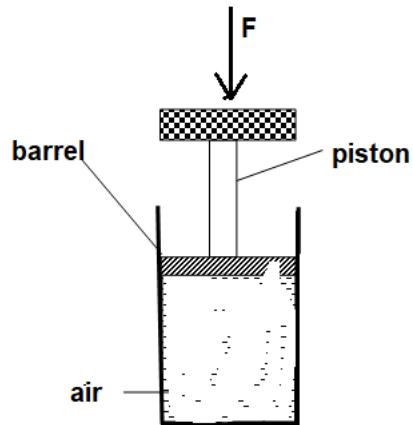
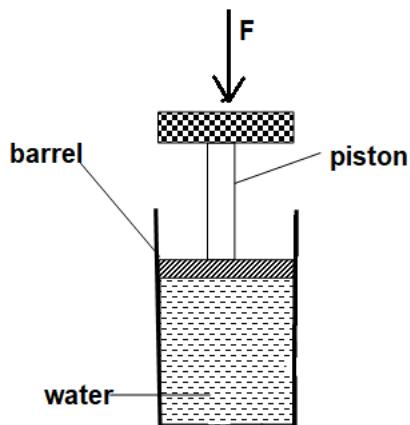
**Figure 4**

Using **figure 4(b)**, sketch to show the appearance of the mercury level in the capillary tube if it was inserted in mercury assuming equal diameters of the tubes (1 mark)

6. An oil drop has a diameter of 0.05cm. It forms a circular oil film of diameter 20cm when dropped on the surface of water. Determine the thickness of the molecule. (3 marks)

7. State **one** factor that determine the spring constant of a helical spring. (1 mark)

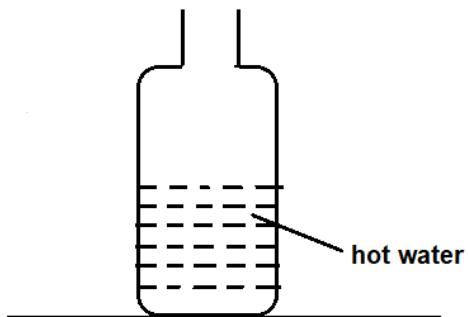
8. **Figure 5(a)** shows water enclosed by a piston in a cylinder while **figure 5(b)** show air enclosed by an identical piston in a cylinder



Equal inward force  $F$  is applied on the piston of the two cylinders. Giving reason, state the piston that moves in more. (2 marks)

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9. **Figure 6** shows a bottle containing hot water.



**Figure 6**

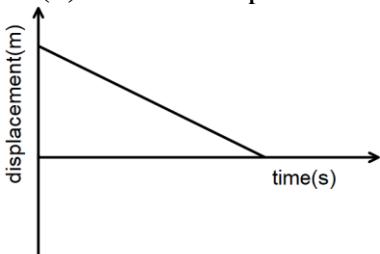
Explain how the stability of the bottle changes as water cools to room temperature (2 marks)

.....  
.....  
.....

10. Waves are a branch of physics. State what it deals with (1 mark)
- .....  
.....  
.....

11. a) A car undergoes uniform retardation to rest from 10m/s covering a distance of 25m. Determine its deceleration (2 marks)
- .....  
.....  
.....

- b) **Figure 7 (a)** shows a displacement time graph for the motion of a particle



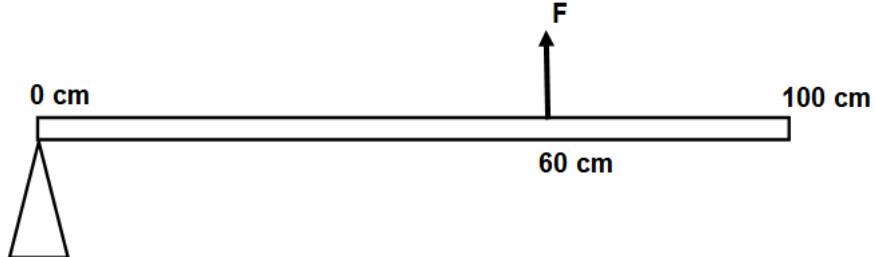
**Figure 7(a)**



**Figure 7(b)**

On the axes in **figure 7 (b)** sketch a velocity time graph for the same motion (1 mark)

12. A uniform meter rule of mass 150 g is pivoted freely at the 0 cm as shown in **figure 8**

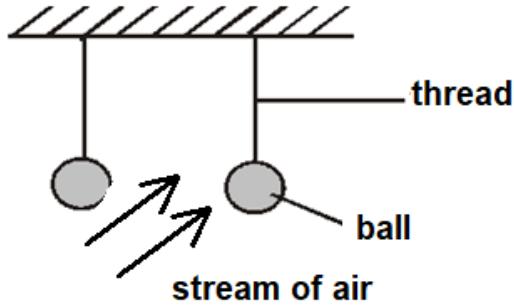


**Figure 8**

Determine the value of the force F needed to ensure that the rule has horizontal equilibrium (2 marks)

.....  
.....  
.....

13. **Figure 9** shows two balls suspended from threads a short distance apart.



**Figure 9**

A stream of air is blown between the balls in a horizontal direction. Explain what is observed. (2 marks)

.....  
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**SECTION B (55 MARKS)****Answer ALL the questions in this Section**

14. a) Define the term
- centripetal force*

(1 mark)

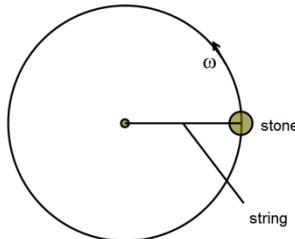
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- b) When a car is traveling on a mud road, mud flies off the fast spinning wheels, Explain this observation

(1 mark)

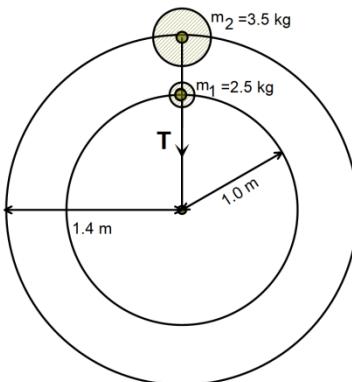
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- c)
- Figure 10**
- shows the path of a stone attached to a string whirled in a space in a horizontal circle.

**Figure 10**

Sketch on the diagram the path the body follows if the string breaks when the body is at the position shown. (1 mark)

- d) Two masses
- $m_1 = 2.5\text{kg}$
- and
- $m_2 = 3.5\text{kg}$
- are connected by a light string and are in uniform circular motion on a horizontal frictionless surface as shown in
- figure 11**
- . The masses describe circles of radii
- $r_1 = 1.0\text{m}$
- and
- $r_2 = 1.4\text{m}$
- respectively and the angular velocity of the masses is
- $5.0\text{rads}^{-1}$
- .

**Figure 11**

- (i) Which of the two masses is moving faster? Give a reason for your answer.(2 marks)

.....  
 .....

- (ii) Determine the:

- I. Centripetal force on
- $m_1$
- (2 marks)

.....  
 II. Centripetal force on  $m_2$  (2 marks)  
 .....

.....  
 III. The tension T on the string (2 marks)  
 .....

15. a) What is meant by the term *specific latent heat of vaporization*. (1 mark)  
 .....

- b) In an experiment to determine the specific latent heat of vaporization of water, steam at  $100^{\circ}\text{C}$  was passed into water contained in a well lagged copper calorimeter. The following measurements were made.

*Mass of calorimeter = 50 g*

*Initial mass of water = 70 g*

*Final mass of calorimeter + water + condensed steam = 123 g*

*Initial temperature of water + calorimeter =  $5^{\circ}\text{C}$*

*Final temperature of mixture =  $30^{\circ}\text{C}$*

*(Specific heat capacity of water =  $4200\text{Jkg}^{-1}\text{K}^{-1}$  and specific heat capacity of copper =  $390\text{Jkg}^{-1}\text{K}^{-1}$ )*

Determine:

i) Mass of the condensed steam. (2 marks)  
 .....

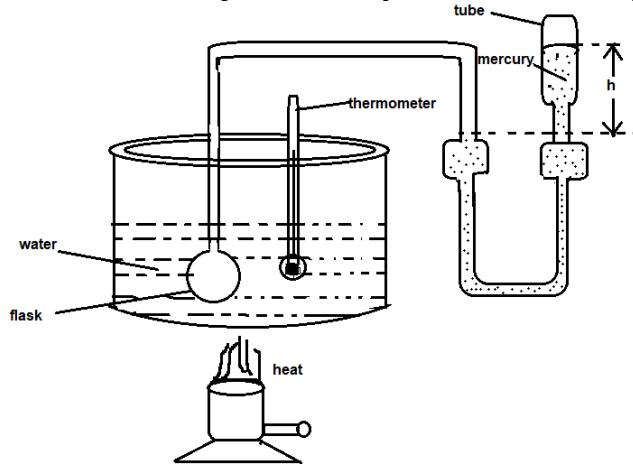
ii) Heat gained by calorimeter and water (3 marks)  
 .....

iii) Given that  $L_v$  is the specific latent heat of vaporization of steam

I. Write a simplified expression for the heat given out by steam. (2 marks)  
 .....

II. Determine the value of  $L_v$  (3 marks)  
 .....

16. a) Figure 12 shows a set-up which may be used to verify one of the gas laws



**Figure 12**

- i) State the law which the set-up may be used to verify (1 mark)  
.....  
.....
  - ii) Name two measurements that should be taken in order to verify the law stated in (i) above (2 marks)  
.....  
.....
  - iii) Explain how the set-up can be used to verify the law named in (i) above. (3 marks)  
.....  
.....  
.....  
.....  
.....
- b) A gas occupies  $3\text{m}^3$  at a temperature of  $27^\circ\text{C}$  at normal atmospheric pressure. Determine its volume at the same pressure if the temperature is increased to  $80^\circ\text{C}$  (3 marks)
- .....  
.....  
.....

17. a) State the law of conservation of linear momentum. (1 mark)

.....  
.....

b) Distinguish between elastic and inelastic collision. (1 mark)

.....  
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.....

- c) A lorry of mass 2000kg traveling at 20m/s collides with a car of mass 800kg traveling at 30m/s in the opposite direction. The impact takes 2 seconds before the two bodies move with a common velocity.

Determine:

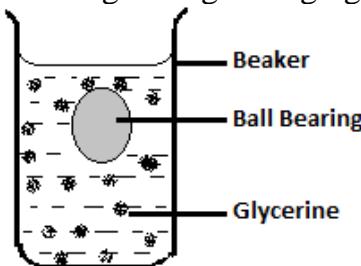
- (i) The common velocity (3 marks)

.....  
.....  
.....

- (ii) The impulsive force (2 marks)

.....  
.....  
.....

- d) **Figure 13** shows a ball bearing falling through glycerin



**Figure 13**

- (i) Name the TWO forces acting on the ball bearing. (2 marks)

.....

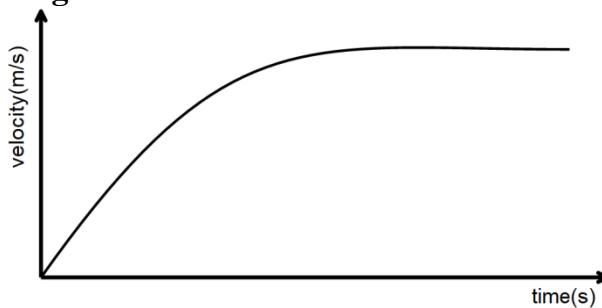
.....

- (ii) Write down an equation relating all the forces in (i) above when the ball bearing attains a constant velocity. (1 mark)

.....

.....

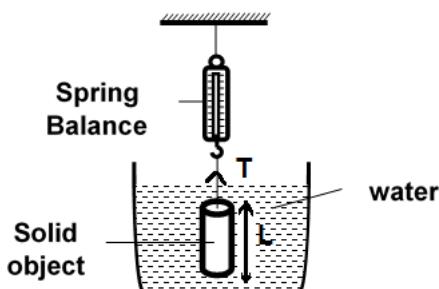
- (iii) The graph in **figure 14** shows the motion of the ball bearing through the above liquid.



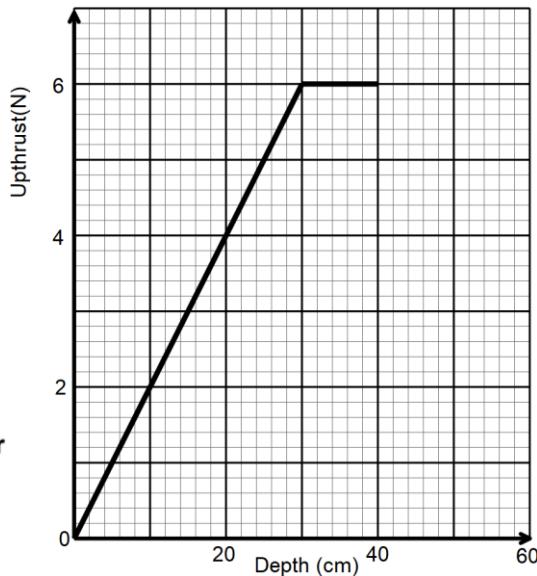
**Figure 14**

On the same axes above sketch the graph to represent the motion of the ball bearing through alcohol. (1 mark)

18. a) **Figure 15(a)** shows a solid object being lowered into a jar full of water and **figure 15(b)** the subsequent *upthrust-depth graph* as it is immersed in water. The tension of the string when the block is fully immersed is 3.0 N



**Figure 15(a)**

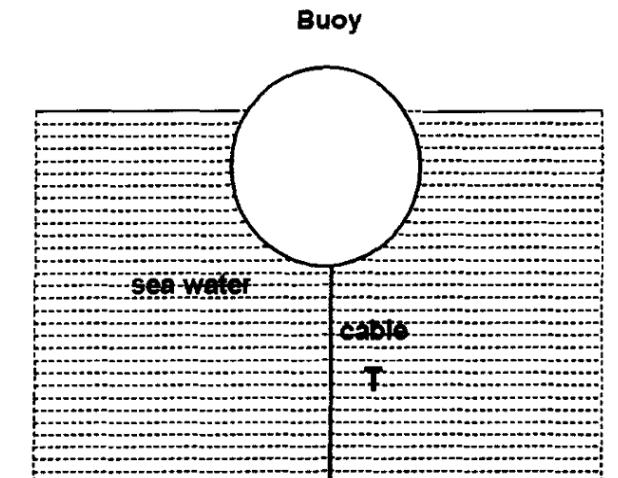


**Figure 15(b)**

Determine the:

- (i) Length,  $L$  of the object ..... (1 mark)
- (ii) Upthrust  $U$  when the object is fully immersed in water ..... (1 mark)
- (iii) Weight  $W$  of the object ..... (2 marks)  
.....  
.....
- (iv) Density of the object ..... (2 marks)  
.....  
.....

- b) **Figure 16** shows a buoy, B, of volume 40 litres and mass 10 kg. It is held in position in sea water of density  $1.04 \text{ gcm}^{-3}$  by a light cable fixed to the bottom so that  $\frac{3}{4}$  of the volume of the buoy is below the surface of the sea water.



**Figure 16**

Determine:

- (i) Upthrust on the buoy

(3 marks)

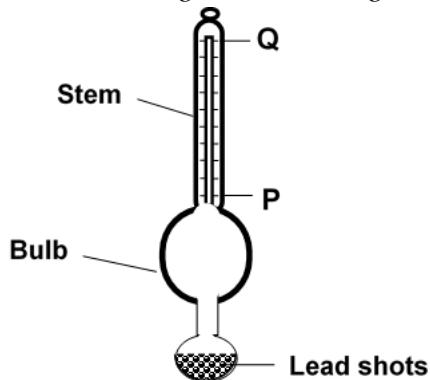
.....  
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- (ii) The tension T in the cable.

(1 mark)

.....  
.....

- c) **Figure 17** shows a diagram of a hydrometer which is suitable for measuring the densities of liquids varying between  $1.0\text{gcm}^{-3}$  and  $1.2\text{gcm}^{-3}$



**Figure 17**

- (i) State the reason why the bulb is wide.

(1 mark)

.....  
.....

- (ii) State the purpose of the lead shots in the glass bulb

(1 mark)

.....  
.....

- d) On the diagram indicate the label corresponding to  $1.0\text{gcm}^{-3}$  and  $1.2\text{gcm}^{-3}$

(1 mark)

**THIS IS THE LAST PRINTED PAGE**

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

232/1

PHYSICS

TIME: 2HRS

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 13**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections A and B.
- iv) Answer **ALL** the questions in section A and B in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10N/kg$  or  $10m/s^2$

### **FOR EXAMINERS USE ONLY**

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1-13	25	
B	14	9	
	15	12	
	16	12	
	17	12	
	18	10	
	TOTAL SCORE	80	

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EMAIL: [goldlitepublishers@gmail.com](mailto:goldlitepublishers@gmail.com)

For marking schemes and more papers

**SECTION A: 25marks**

1. A stopwatch is used to time a runner in a race. Figure 1 show the stopwatch at the start and at the end of a lap of the race.

Fig 1



start of lap



end of lap

State how long (in SI unit) did the runner took to finish the lap of the race (1mark)

2. The front views of two cars are shown in figure 2 , drawn to the same scale.

Fig  
2



family car



racing car

Suggest which car has the greater stability, and give a reason. (2marks)

3. Figure 3 below shows a micrometer screw gauge. State the reading indicated (2marks)

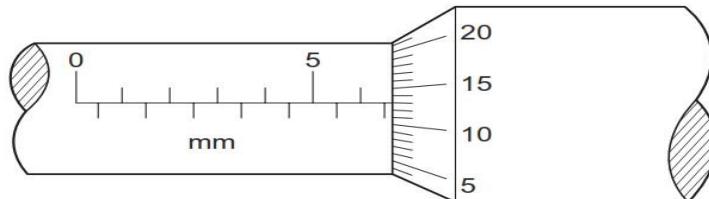


Fig 3

4. Figure 4 shows two identical springs of spring constant 3N/cm supporting a load of 30N.

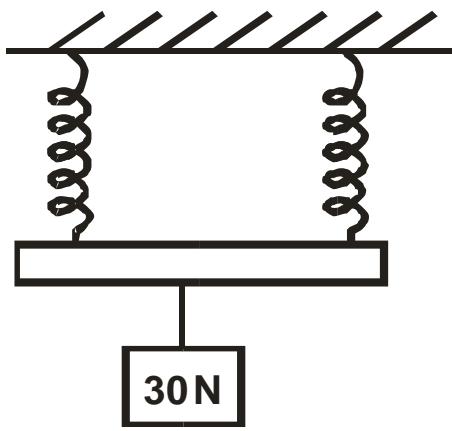


Figure 4

Determine the extension of each spring.

(2 marks)

5..Figure 5 shows a system for raising a heavy piece of metal into a vertical position.

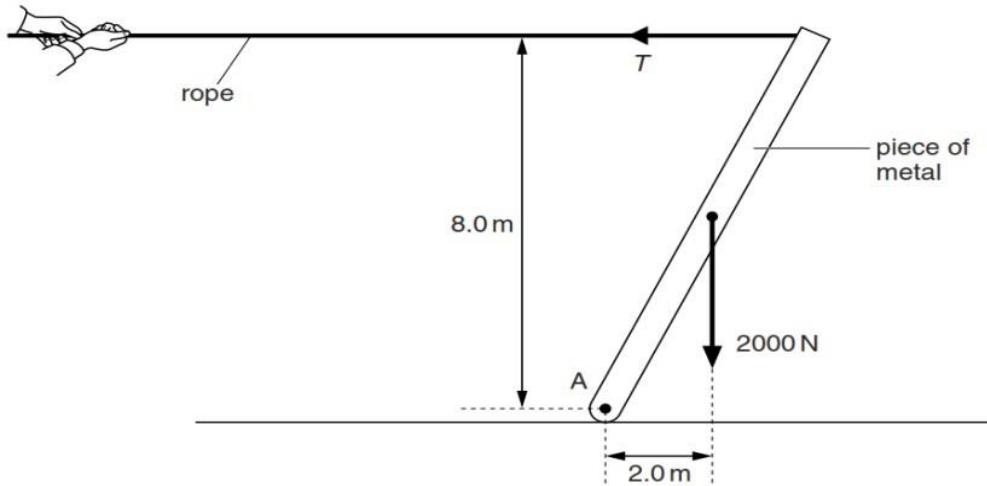


Fig 5

A man pulls on the rope with a horizontal force  $T$ . The piece of metal has a weight of 2000 N and is freely pivoted at A. The system is in equilibrium. By taking moments about A, calculate the value of  $T$ .

(3marks)

6. Explain why an aeroplane is likely to take off much earlier than expected when the speed of the wind blowing in the opposite direction to its motion on the runway suddenly increases (2 marks)

7.An aircraft 300m from the ground traveling horizontally at 400m/s releases a parcel. Calculate the horizontal distance covered by the parcel from the point of release. (Ignore air resistance) (3 mks).

8.A body of mass 4.0kg held at a vertical height of 500cm is released to travel a long a frictionless curved path as shown in figure 8

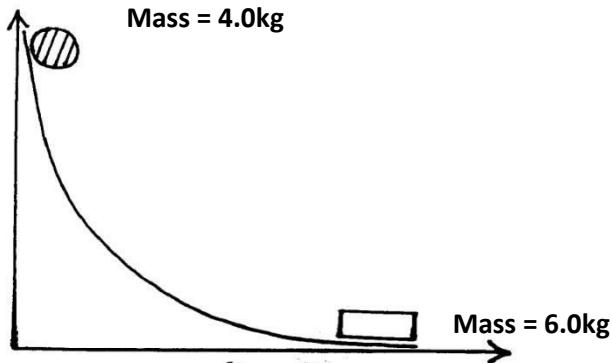


Fig 8

The 4.0kg mass strikes another body of mass 6.0kg at rest. Immediately it reaches the horizontal, the two bodies stick together and move in the same direction. Determine the velocity of the bodies immediately after collision. (3marks)

9.A tin with a hole is filled with water to a certain height. Water jets out as shown in figure 9(a) below. A second identical tin is filled with water to the same height and a block of wood floated as shown in figure 9(b).

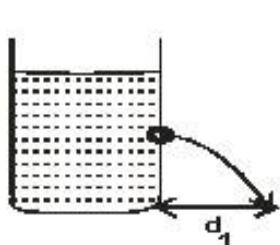


fig 9a

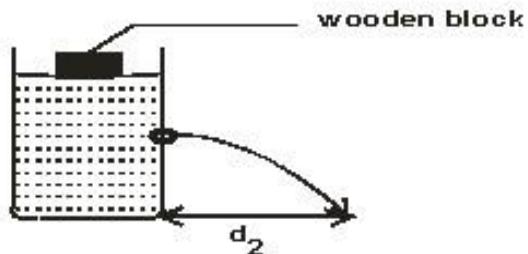
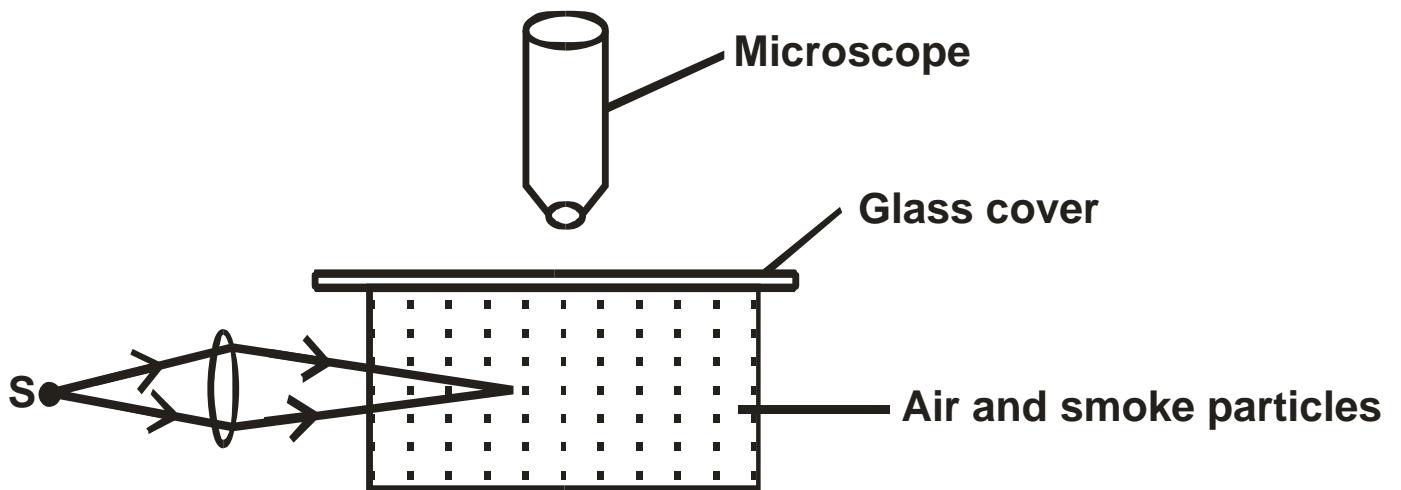


fig 9b

Fig 9

State the reason why the maximum distance of jet  $d_2$  is greater than  $d_1$ . (1 mark)

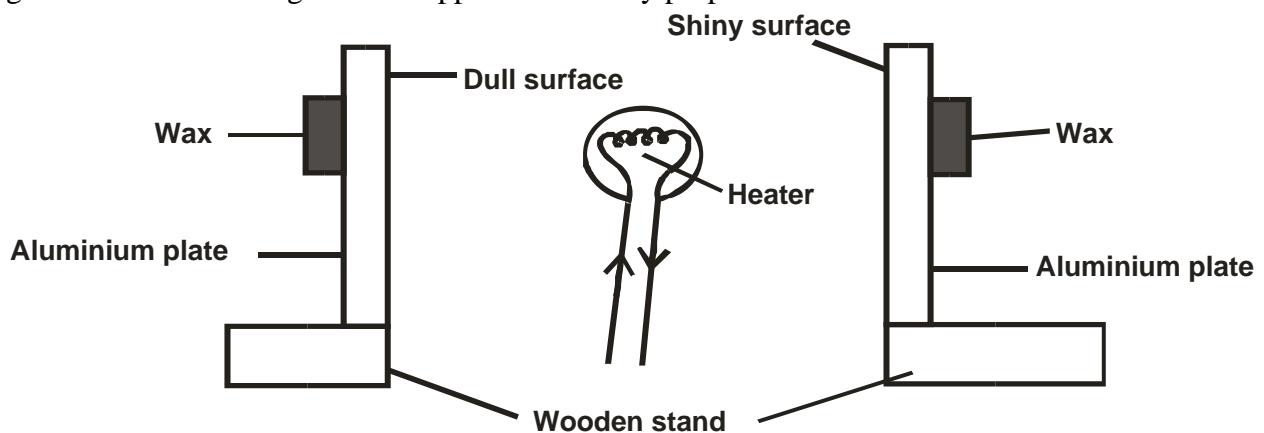
10.The figure 2 below shows the apparatus used to observe Brownian motion using a smoke cell.



- i) State the observation made in the smoke cell. (1 mark)
- ii) Explain the observation made when the temperature in the smoke cell is increased. (1 mark)

11. When a mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain. (2 marks)

12. Figure 3 shows an arrangement of apparatus to study properties of different surfaces.

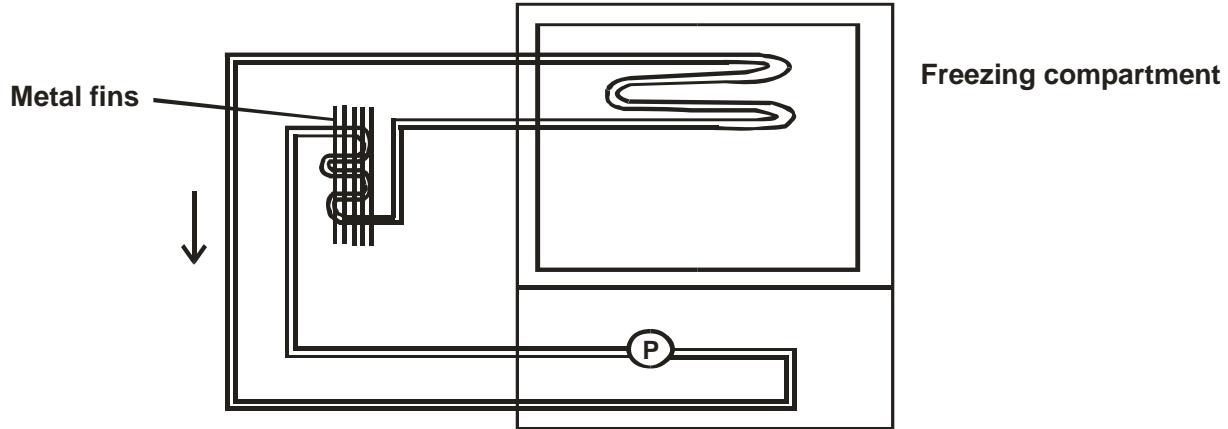


The heater is placed equidistant from the two plates. State what happens when the heater is switched on for some time. (1 mark)

13. Explain your answer in question 12 above (1mark)

#### SECTION B: 55marks

14. a) The figure below shows the features of a refrigerator.



i) What is the function of the pump P? (1 mark)

ii) What is the function of the copper fins at the back of the refrigerator? (1 mark)

iii ) Explain briefly how cooling takes place in the refrigerator. (3 marks)

iv) What is the purpose of the double wall in a refrigerator? (1 mark)

b) i) Define the term latent heat of fusion of a substance. (1 mark)

ii) The figure below shows an apparatus that could be used to determine the specific latent heat of fusion of ice.

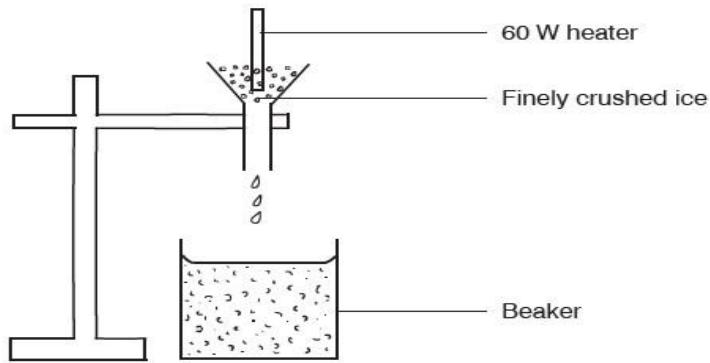


Fig 12

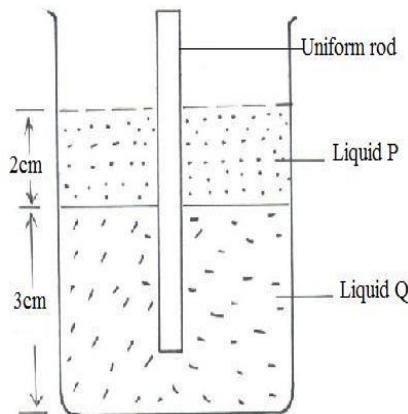
In order to obtain results that are as accurate as possible, state why it is important to:

**I.** wait until water is dripping into the beaker at constant rate before taking readings. (1 mark)

**II.** Use finely crushed ice rather than larger ones. (1 mark)

15. (a) State the law of flotation. (1 mark)

(b) Figure 13 below shows a uniform rod of height 8cm floating vertically in a beaker containing two immiscible liquids P and Q. The densities of the liquids are  $800\text{kg/m}^3$  and  $1200\text{kg/m}^3$  respectively the cross-sectional area of the rod is  $2\text{cm}^2$ .



Determine

(i). the weight of liquid P displaced by the rod. (3 marks)

(ii) The weight of liquid Q displaced by the rod. (2 marks)

(iii) The mass of the rod. (1 mark)

(iv) The density of the rod. (2 mks)

(c). Figure 14 below shows a block of volume  $50 \text{ cm}^3$  and density  $2000 \text{ kg/m}^3$  submerged in a liquid and suspended from a uniform horizontal beam by means of a thread. The beam is balanced by a spherical mass of 40 g, which is suspended from it on the other side of the pivot as shown

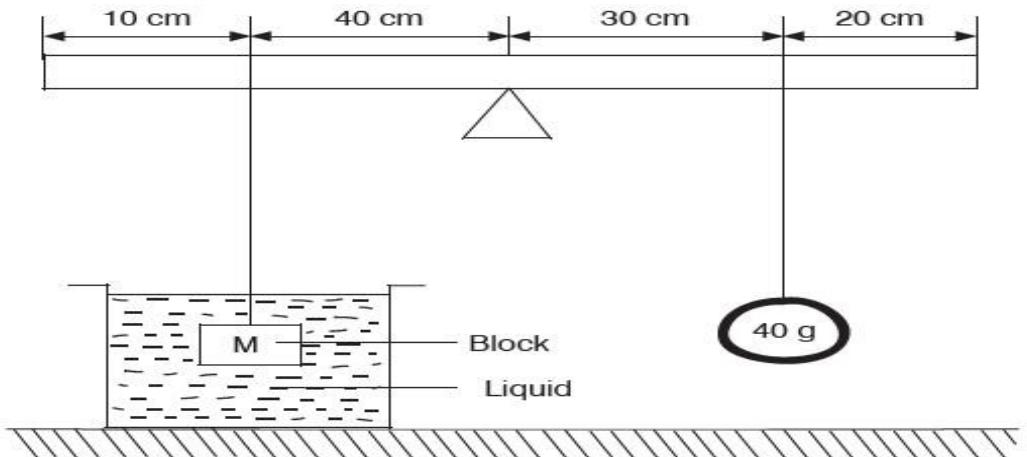
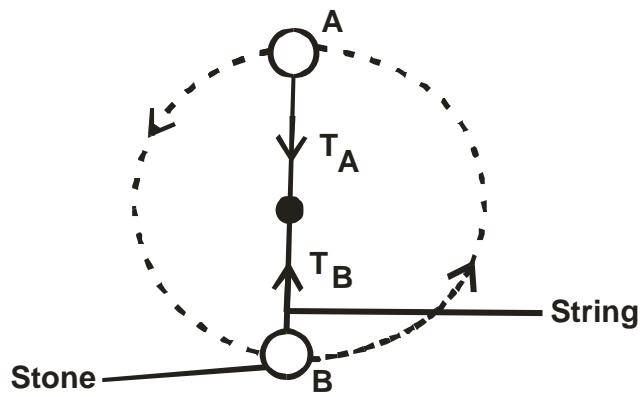


Fig 14

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

16. a) State two condition necessary for a driver to negotiate a bend on a banked road at a relatively high speed (2 marks)

(b).The figure shows stone of mass 100g whirled in a vertical circle using a thread of length 56cm.  
(Take  $g = 10 \text{ N/Kg}$ )



If the stone is whirled at a speed of 8m/s. Calculate;

- i) The centripetal force experienced by the stone. (3 marks)

- ii) Tension force on the string

at :

- I) A (2 marks)

- II) B (2 marks)

- iii) calculate the angular velocity of the stone. (1mark)

(d)Figure 15 shows a centrifuge that is used to separate particles suspended in a liquid.

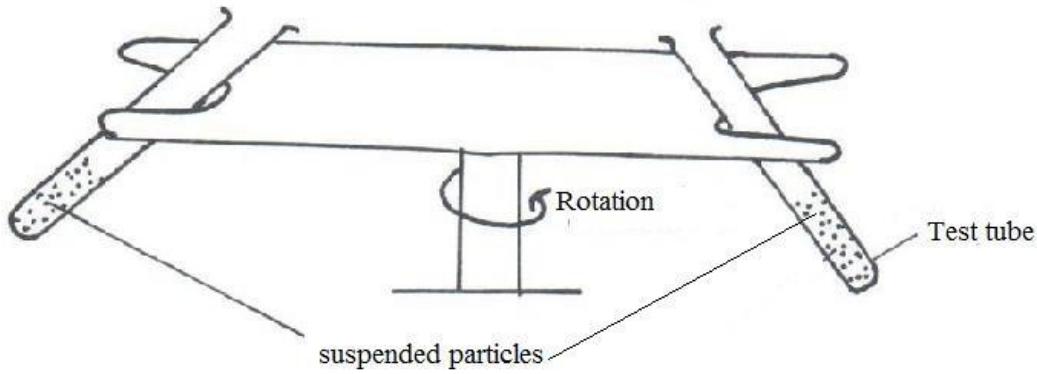


Fig 15

Particle of different mass  $M_1$ ,  $M_2$  and  $M_3$  are suspended in a liquid which they do not dissolve. The system is then rotated in the direction shown.

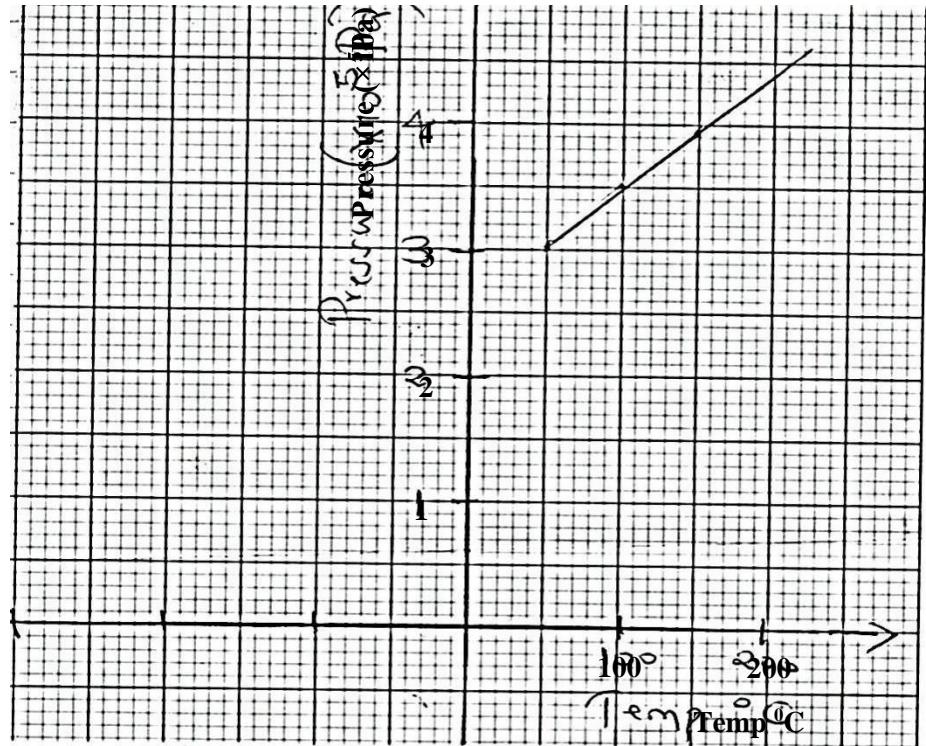
(i). State why the particles of different masses will acquire different radii as the system is rotated. (1 mark)

(ii). If  $M_3 > M_2 > M_1$ , arrange the particle in increasing radii when the centrifuge is rotated for some time. (1 mark)

17.a) State one condition necessary for pressure law to hold. (1 mark)

b) A bubble at the bottom of a pond expands as it rises to the top of the liquid. Explain. (1 mark)

c) The graph below represents a graph of pressure against temperature,  $^{\circ}\text{C}$ .



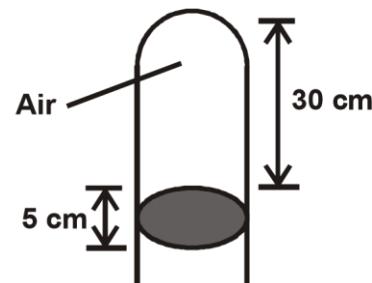
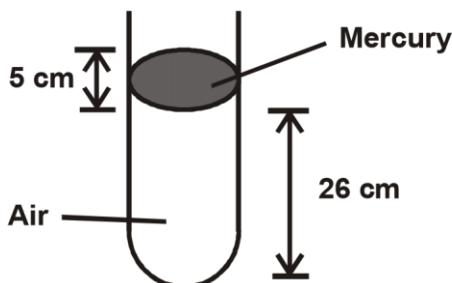
From the graph, determine;

i) The absolute zero temperature.  
(1 mark)

ii) The pressure at 373K  
(1 mark)

Explain why temperature in (i) above cannot be achieved (2 marks)

- d) A column of air 26cm long is trapped by mercury thread 5cm long. When the tube is inverted, the air column becomes 30cm long. What is the value of atmospheric pressure? (3 marks)



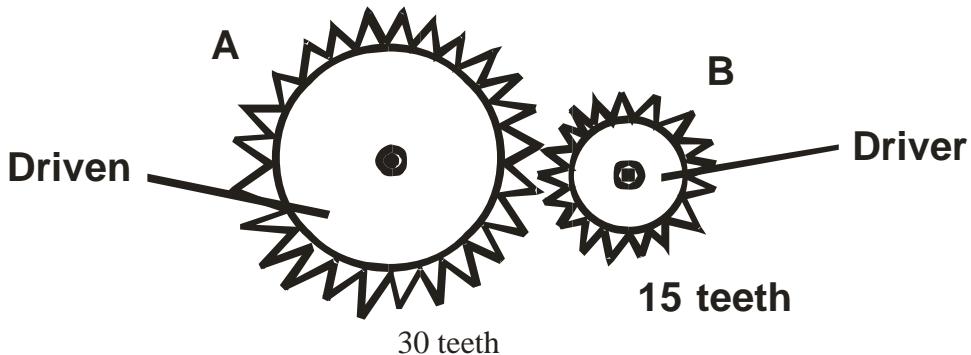
Explain using kinetic theory of gases why pressure of gases increases as temperature of the gas is increased.

(3 marks)

- 18.a) Differentiate between work and energy. (2 marks)

- b) Describe the energy transformation that takes place when a car battery is used to light a bulb. (1 mark)

- c) The figure shows a machine.



Gear wheel A with 30 teeth is driven by gear wheel B with 15 teeth.

- i) Determine the velocity ratio of the machine. (2 marks)

- ii) If the machine has a mechanical advantage of 0.375, determine the efficiency of the machine. (2 marks)

- d) A cart of mass 30kg is pushed along horizontal path by a horizontal force of 8N and moves with a constant velocity. The force is then increased to 14N.

Determine:;

- i) The resistance to the motion of the cart. (1 mark)

- ii) The acceleration of the cart. (2 marks)

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

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

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1  
PHYSICS**

**TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 14**

### **INSTRUCTIONS TO CANDIDATES:**

- (a) Write your Name , School and Index Number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consists of two sections A and B.
- (d) Answer all questions in Section A and B in the spaces provided.
- (e) All working MUST be clearly shown in the spaces provided.
- (f) Non-programmable silent electronic calculators may be used.
- (g) This paper contains 14 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (h) Candidates should answer the questions in English.

### **FOR EXAMINER'S USE ONLY**

SECTION	QUESTION	MAX. SCORE	CANDIDATE SCORE
A	1 - 13	25	
B	15	12	
	16	08	
	17	10	
	18	13	
	19	12	
<b>TOTAL SCORE</b>		<b>80</b>	

## SECTION A: 25 MARKS

*Answer all questions in this section*

1. a) Draw a diagram to represent a scale of a micrometer screw gauge of thimble scale 50 divisions and reading 3.68mm (2mks)

.....  
.....  
.....  
.....  
.....

- b). Determine the actual reading if the micrometer screw gauge above has a zero error of 0.03mm. (1mk)

.....  
.....

2. Figure 1 shows a bimetallic strip made of brass and iron. A marble is placed at end of the bimetallic strip as shown below:-

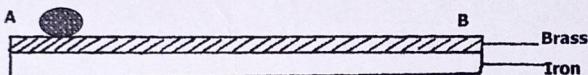


Fig.1

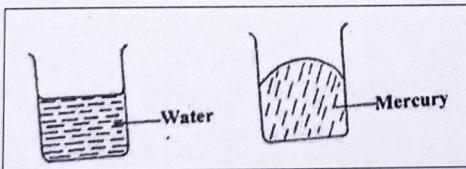
- State and explain what will be observed when the bimetallic strip is strongly cooled (2mks)

.....  
.....

3. A bottle containing a smelling gas at the front bench of a classroom is opened. State the reason why the gas is detected throughout the room (1mk)

.....  
.....

4. Figure 2 shows the level of mercury and water in a beaker.

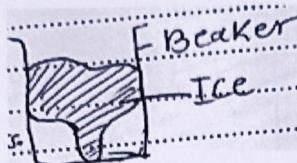


- Explain the difference in the shape of the meniscus (1mk)

.....  
.....

5. Mercury - in glass barometer shows a height of 70cm. What height would be shown in the barometer at the same place if water of density  $1.0 \times 10^3 \text{kg/m}^3$  is used. (Density of mercury =  $13600 \text{kgm}^{-3}$ ) (2mks)

6. The figure below shows a beaker containing a block of ice. State and explain the change in stability when the ice melts. (2mks)



7. Figure 3 shows a uniform rod AB which is 40cm long. It has a mass of 2kg and pivoted at C. If 2N is acting at point B, and 30N force is passed through a frictionless pulley.

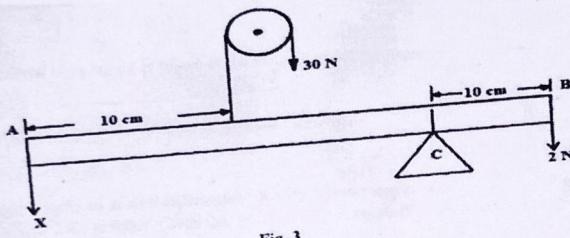
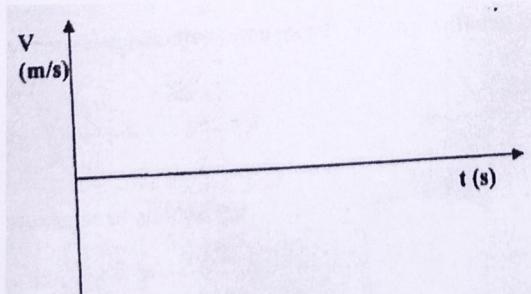


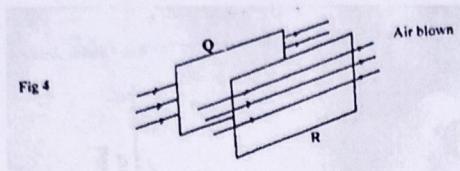
Fig. 3

Find the force X acting at end A. ( 3 marks)

8. Sketch on the axis provided below a velocity – time graph of a motion of a stone thrown vertically upward from the edge of a platform and eventually the stone lands without bouncing on the ground below the platform. (1 mark)



9. Figure 4 shows two light sheets of paper arranged as shown.



Explain what is observed if strong air is blown at the same time behind paper Q and in front of paper R as shown

(2mks)

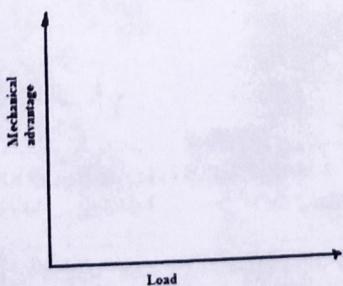
- .....  
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10. State and explain a branch of physics that involves the study of sound. (2mks)

- .....  
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.....  
11. State two physical quantities that remain constant while pure ice is being converted to water. (2mks)

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12. State the reason why thermal conductivity of a metal increases with increase in the cross –section area of the conductor? (1mk)

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13. State two factors that lower surface tension of water. (2mks)

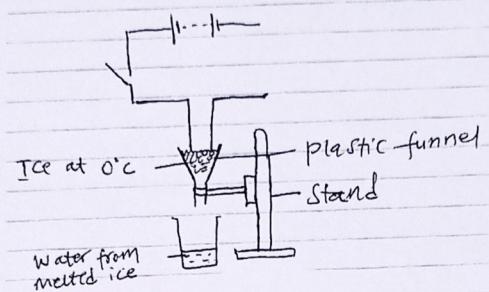
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14. On the grid provided, sketch a graph of mechanical advantage against load for a pulley system used to lift a load. (1 mk)



**SECTION B (55 MARKS) (Answer all the questions)**

15a). State two ways in which the freezing point of ice can be lowered (2mks)

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



i). Complete the circuit to show the essential circuit components. (2mks)

ii). Write down an equation showing how quantities measured from the above set -up can be used to determine the latent heat of fusion of ice. (1mk)

c). A block of metal of mass 150g at  $100^{\circ}\text{C}$  is dropped into a lagged calorimeter of heat capacity  $40\text{JK}^{-1}$  containing 100g of water at  $25^{\circ}\text{C}$ . the temperature the resulting mixture is  $34^{\circ}\text{C}$ . (specific heat capacity of water is  $4200 \text{ JKg}^{-1}\text{K}^{-1}$ ).

Determine:-

i). Heat gained by the colorimeter (2mks)

ii). Heat gained by water (2mks)

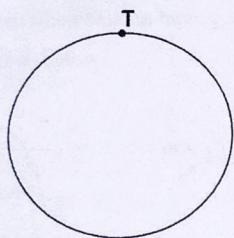
iii). Specific heat capacity of the metal block.

(2mks)

16 a). One of the factors that affect the centripetal force is the mass of the body. State another factor.

(1mk)

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.....  
b). A mass of 400g is rotated by a string at a constant speed V in a vertical circle of radius 100cm. the tension in the string experienced at point T is 9.2N.



i). Determine the velocity V of the mass at point T.

(3mks)

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.....  
ii). Determine the tension in the string at the bottom of the circle.

(2mks)

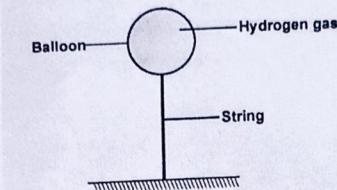
c). State two applications of circular motion

(2mks)

17 a). State the Archimedes principle.

(1mk)

- b) A rubber envelope of a hydrogen filled balloon having volume of  $2\text{m}^3$  is held in position by a vertical string as shown below.



The mass of the balloon is 1.3kg. Given that density of hydrogen is  $0.1\text{kg/m}^3$  and density of air is  $1.3\text{kg/m}^3$ .

Calculate

- i). The total weight of the balloon including the hydrogen gas. (2mks)

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- ii). The up thrust. (2mks)

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- iii). The tension in the string (2mks)

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- c). A solid weighs 50N in air and 44N when completely immersed in water. Calculate

- i). Relative density of the solid. (2mks)

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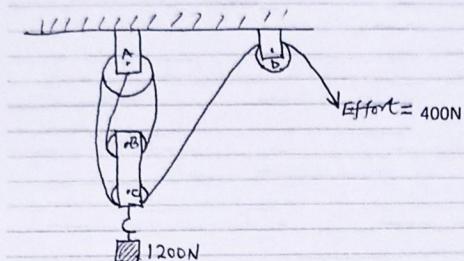
- ii). Density of the solid. (1mk)

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- 18 a). Define velocity ratio as used in machines. (1mk)

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b). The figure below shows a pulley system used to lift a load of 1200N using an effort of 400N.



i). State the velocity ratio of the system. (1mk)

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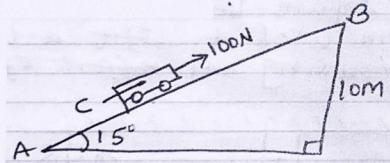
ii). State the function of pulley D. (1mk)

.....

iii). Indicate the direction of tension force in each string. (1mk)

.....

c). The figure below shows an inclined plane. A trolley of mass 30kg is pulled up a slope by a force of 100N parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.



i). What is the work done on the trolley against the gravitational force in moving from A to B? (2mks).

.....

ii). Determine the work done by the force in moving the trolley from A to B. (2mks)

.....

iii). Determine the efficiency of the system. (3mks)

.....

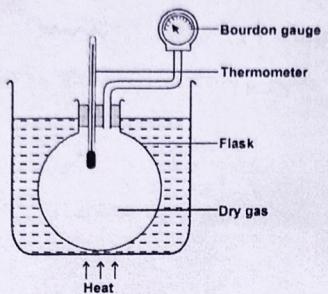
iv). Determine the mechanical advantage of the system. (2mks)

.....

19. a). What is meant by absolute zero temperature?

(1mks)

b). The set up below was used by a group of form three students to verify pressure law.



Describe briefly how the set-up can be used to verify pressure law.

(4mks)

c). A  $4.5\text{cm}^3$  bubble released at the bottom of a dam measured  $18\text{cm}^3$  at the surface of the dam. Work out the depth of the dam taking atmospheric pressure to be  $1 \times 10^5 \text{ Pa}$  and the density of water as  $1\text{g/cm}^3$  (3mks)

d) i) What is meant by the term "ideal gas".

(1 mks)

ii) A container holds  $70\text{cm}^3$  of air. The pressure is  $100\text{kPa}$  and the temperature is  $7^\circ\text{C}$ . What is the final pressure when the air is compressed to  $30\text{cm}^3$  and the temperature is  $27^\circ\text{C}$ . (3 mks)

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1**

**PHYSICS**

**TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 15**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections **A** and **B**.
- iv) Answer **ALL** the questions in section **A** and **B** in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **For Examiners Use Only**

Section	Question	Maximum Score	Candidate's Score
<b>A</b>	<b>1 – 13</b>	<b>25</b>	
<b>B</b>	<b>14</b>	<b>10</b>	
	<b>15</b>	<b>12</b>	
	<b>16</b>	<b>10</b>	
	<b>17</b>	<b>13</b>	
	<b>18</b>	<b>10</b>	
	<b>TOTAL SCORE</b>	<b>80</b>	

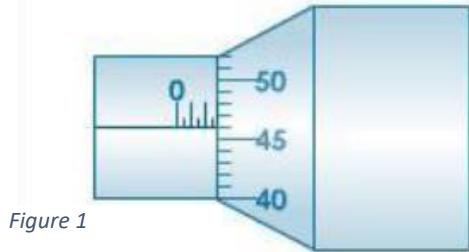
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EMAIL: [goldlitepublishers@gmail.com](mailto:goldlitepublishers@gmail.com)

For marking schemes and more papers

1. The figure below shows a section of a micrometer screw gauge with a thimble scale of 50 divisions. When the spindle is in contact with the anvil, the device reads 0.25mm. The screw gauge is used to measure the diameter of a spherical ball and the scale reading is as shown below. State the actual diameter of the ball.

(2 marks)



2. Alcohol in glass thermometer cannot be used when boiling water is used in an experiment. Explain. (1 mark)
3. Explain briefly how the temperature in a green house is kept higher than outside. (2 marks)
4. A wooden bench feels neither warm nor cold when touched by bare hands. Explain this observation. (2 marks)
5. The reading on a mercury barometer at Mombasa is 760mm. Calculate the pressure at Mombasa in N/m<sup>2</sup> (density of mercury =  $1.36 \times 10^4$  Kg/m<sup>3</sup>) (2 marks)
6. The diagram shown in figure 2 below is an arrangement of three pulley wheels used to help in lifting loads. The system has a velocity ratio of 3. Complete the diagram to show the threading of the rope and the position of effort, load (3 marks)



Figure 2

7. State the meaning of the term 'radian' as a unit of measurement (1 mark)

8. A stone of volume  $800 \text{ cm}^3$  experiences an upthrust force of  $6.5 \text{ N}$  when fully immersed in a liquid. Determine the density of the liquid. (2 marks)

9. Figure 3 shows air flowing through a pipe of different cross-sectional areas. Two pipes A and B are dipped into water.

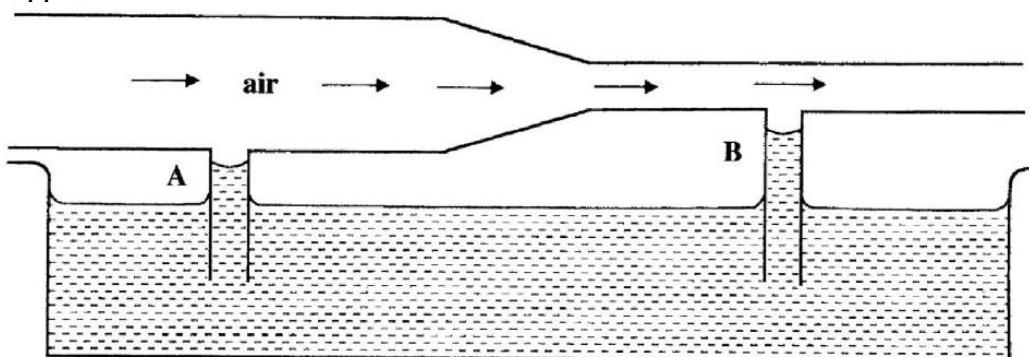


Figure 3

Explain the cause of the difference in the levels of water in the pipes A and B. (2 marks)

10. A balloon is filled with hydrogen gas and then released into the air. The balloon is observed to expand as the balloon rises. Explain why it expands. (2 marks)

11. The figure 4 below shows a ball being whirled in a vertical plane. Mark on the same figure, as A, the position where the string is likely to snap if the angular velocity of the ball is increased. Explain your answer. (2 marks)

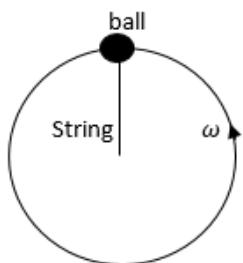


Figure 4

12. A uniform metre-rule balances at the 30cm mark when a mass of 500g is placed at the 25cm mark as shown in the figure 5 below. (Not drawn to scale).

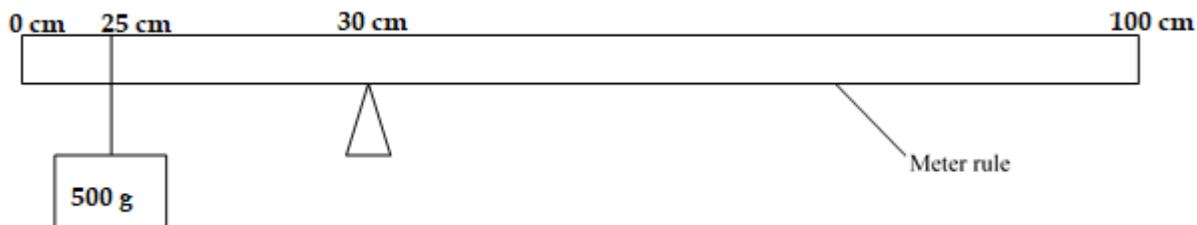


Figure 5

Determine the mass of the meter-rule

(3 marks)

### SECTION B (55 MARKS)

13. The diagram below shows a spring balance tied to an object of mass 500g and rotated in a circular path of radius 50 cm.

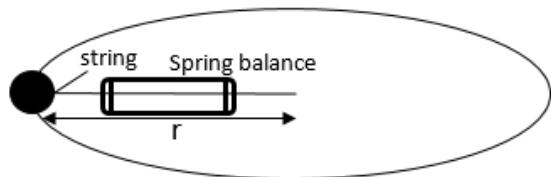


Figure 6

- State the source of force that keeps the object moving in a circular path. (1mark)
- The speed of the object is constant but the body is accelerating on the circular path. Explain (1 mark)
- i. If the object is whirled faster, what would happen to the spring balance reading? (1 mark)  
ii. Give a reason for your answer in, c (i) above (2 marks)
- If the spring balance reads 81N. Determine:
  - the linear velocity,  $v$  of the body (3 marks)

ii. centripetal acceleration of the body (3 marks)

e) State the purpose of banking roads at bends (1 mark)

14. a) State the law of flotation (1 mark)

b) Figure 7 below shows a test-tube whose cross-sectional area is  $2\text{cm}^2$  partially filled with lead shot floating vertically in water.

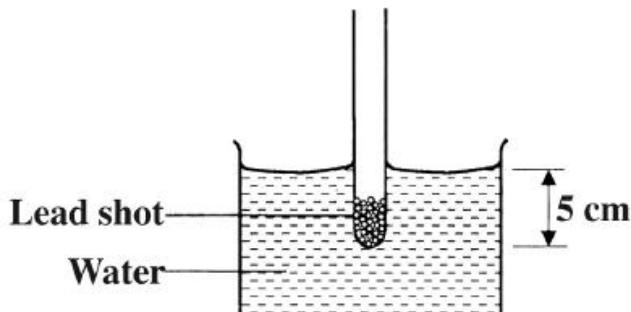


Figure 7

Determine the:

i. Volume of water displaced (2 marks)

ii. Weight of displaced water (3 marks)

c) State the combined weight of the test-tube and the lead-shot (1 mark)

d) Determine the length of the test-tube that would be submerged if a liquid of density  $0.8\text{g/cm}^3$  is used. (3 marks)

e) The set-up in figure 7 may be used as a hydrometer. Suggest any one change that can be made so that it measures small differences in densities of liquids (1 mark)

15.

- a) Define the following terms as used in machines:
- Efficiency (1 mark)
  - Velocity ratio (1 mark)

- b) The figure below shows a 200g mass placed on a frictionless surface and attached to a spring.

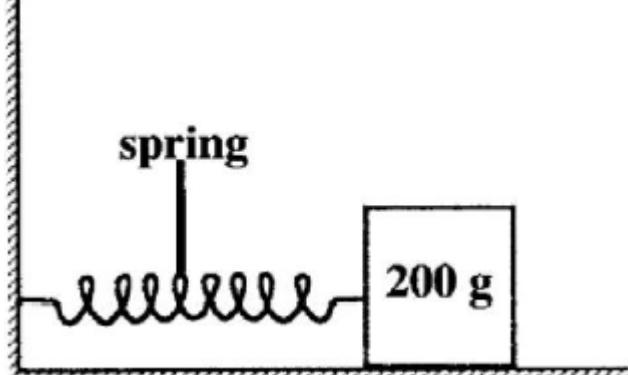


Figure 8

The spring is compressed then released. If the elastic potential energy of the compressed spring is  $2.7 \times 10^{-2} \text{ J}$ , determine the maximum speed with which the block moves after it is released.

(3 marks)

- c) A spherical ball is released vertically from a height,  $h$ . Sketch on a diagram to show the forces acting on the ball just after it is released. (3 marks)
- d) Sketch a graph of potential energy against kinetic energy as the ball falls to the ground (2 marks)
- e) State two ways in which an inclined plane can be made to reduce the applied effort when pulling a load along the plane (2 marks)

16.

- a) State what is meant by an ideal gas (1 mark)

- b) The pressure acting in a gas in a container was changed steadily while the temperature of the gas was maintained constant. The value of volume  $V$  of the gas measured various values of pressure. The graph in the figure 9 shows the relation between the pressure  $P$  and the reciprocal of volume,  $V^{-1}$ .

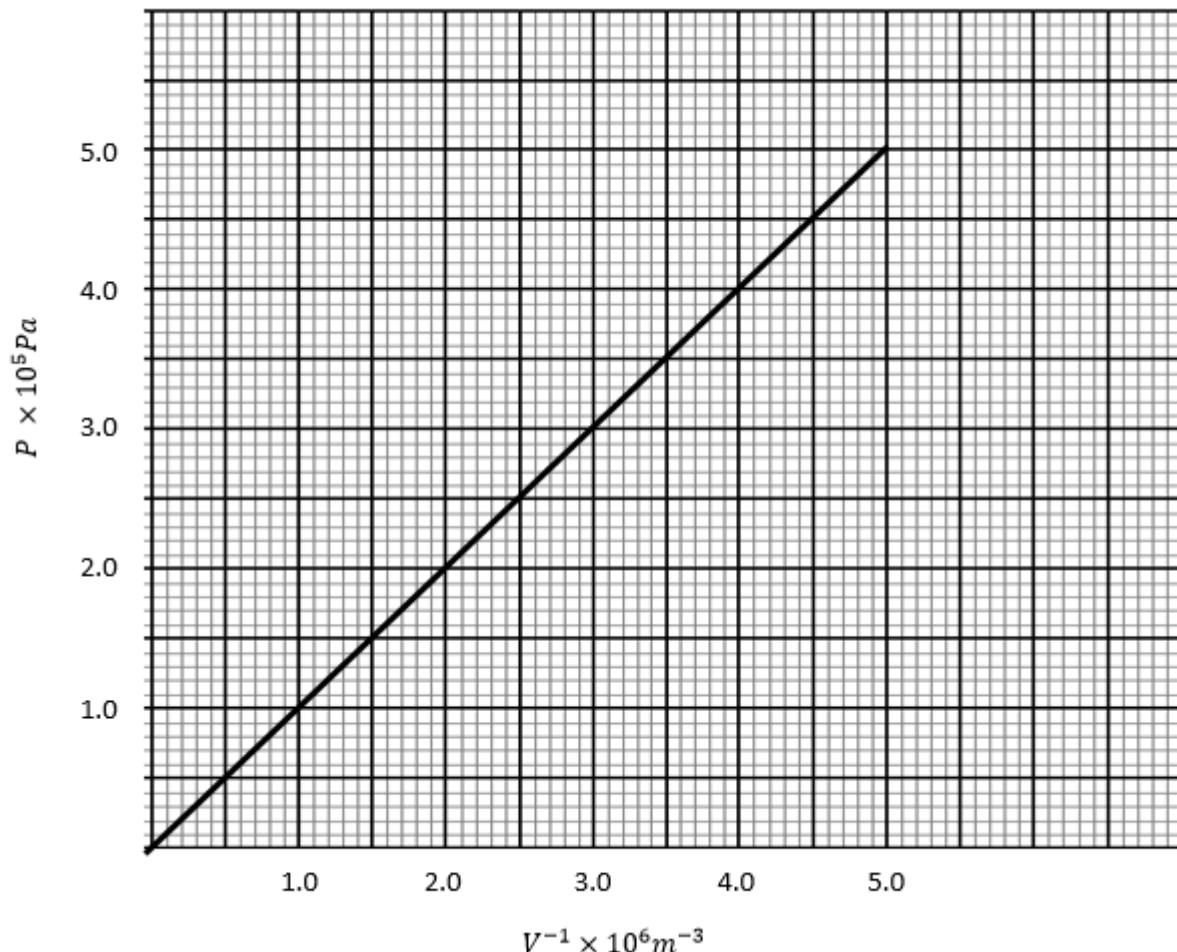


Figure 9

- Identify the gas law being verified by the above graph (1 mark)
- Given that the relation between the pressure  $P$  and the value,  $V$  of the gas is given by the equation:  $PV = k$ , where  $k$  is a constant, use the graph to determine the value of  $k$  (3 marks)
- A gas occupies a volume of 4000 litres at a temperature of  $37^\circ C$  and normal atmosphere pressure. Determine the new volume of the gas if it is heated at constant pressure to a temperature of  $67^\circ C$  (normal atmosphere pressure  $P = 1.01 \times 10^5 Pa$ ) (3 marks)
- State two limitations of gas laws (2 marks)

17.

- a) State the principle of transmission of pressure (1 mark)

- b) The diagram below shows a U-tube filled with two liquids X and Y.

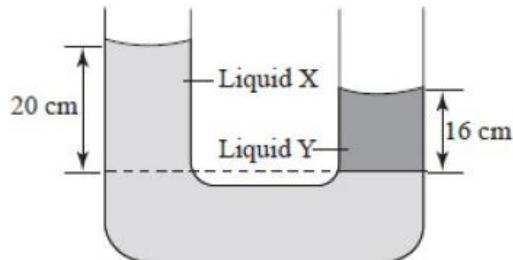


Figure 10

If the density of liquid Y is  $1.26 \text{ g cm}^{-3}$ , determine the density of liquid X. (3 marks)

- c) The figure 11 below shows water getting in and out of a pipe.

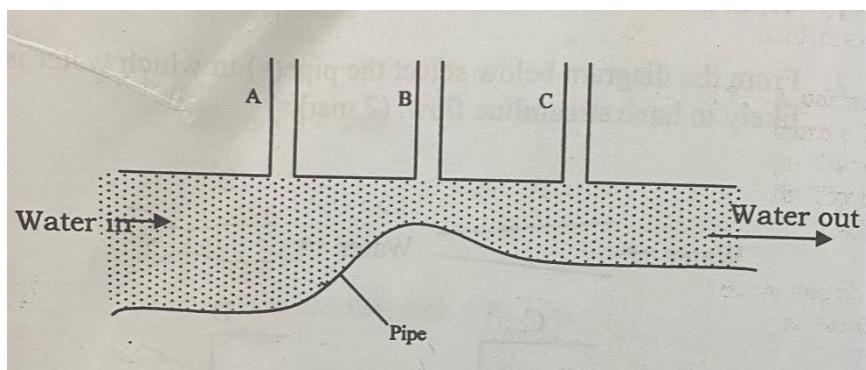


Figure 11

If the water in the pipe is flowing continuously and has a streamline flow:

- i. Show on the diagram the relative level of water in tubes A, B and C (1 mark)

- ii. Explain your answer above (1 mark)

- d) A strong wind lifted off the roof of a classroom. Explain how this could happen (2 marks)
- e) The speed of air at the upper part of an airplane wing is 120m/s and the lower side is 100m/s. The area of the airplane wing is 12m<sup>2</sup>. Calculate the pressure difference on the wings (2 marks)

**This is the last printed page**

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1**

**PHYSICS**

**TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 16**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections **A** and **B**.
- iv) Answer **ALL** the questions in section **A** and **B** in the spaces provided.
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- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **For Examiners Use Only**

Section	Question	Maximum Score	Candidate's Score
A	1 – 13	25	
B	14	10	
	15	12	
	16	11	
	17	11	
	18	11	
	<b>TOTAL SCORE</b>	<b>80</b>	

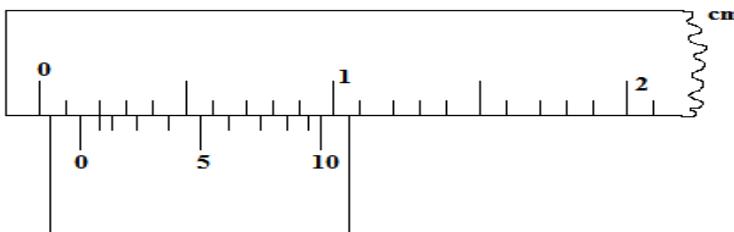
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EMAIL: [goldlitepublishers@gmail.com](mailto:goldlitepublishers@gmail.com)

For marking schemes and more papers

### **SECTION A: (25 MARKS)**

1. 1 The figure below shows part of a vernier callipers when the jaws are closed without an object in between the jaws.



- a) State the zero error of the vernier callipers. (1mark)

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- b) A student used the same vernier calipers to measure the diameter of a test tube of actual diameter 2.15cm. What was the reading shown by the vernier callipers? (1mark)

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- 2 State a reason why a burn from steam at  $100^0\text{C}$  is more severe than a burn from boiling water at the same temperature (1 mark)

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3. Apart from temperature difference between the ends of a material, state any other two factors that determines rate of heat flow in a material (2marks)

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4. A point in the rim of a wheel has a linear velocity of 5.6 m/s. if the rim has a radius of 40cm determine the angular velocity of the point (2marks)

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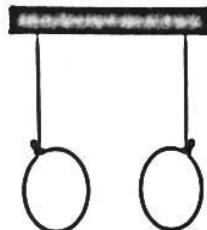
5. A wooden block of mass 2kg is placed on a horizontal surface. A horizontal force of 12N is exerted on it makes it to accelerate at  $5\text{ms}^{-2}$ . Find the coefficient of friction between the surfaces. (3marks)

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6. Explain briefly how the temperature in a green house is kept higher than outside. (2 marks)

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7. The figure below shows two inflated balloons hanging vertically on light threads.



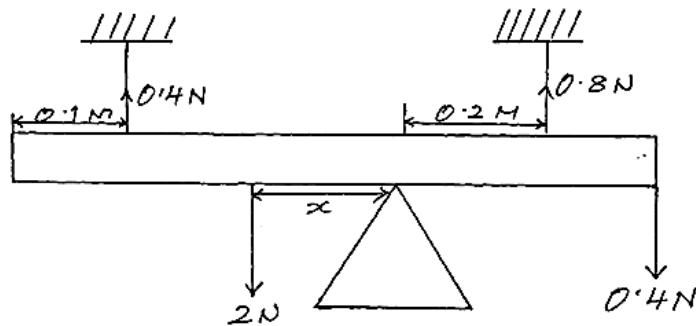
State and explain the observation that will be made when a stream of air is blown in the space between the balloons.  
(2 marks)

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8. Explain why a hole in a ship near the bottom is more dangerous than the one near the top  
(1mark)

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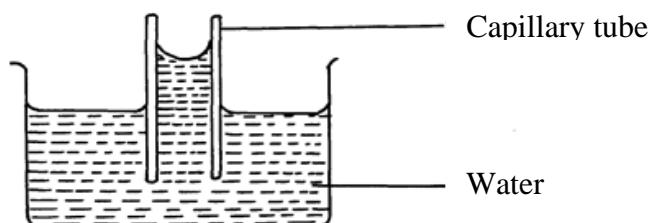
9. The diagram bellow shows a uniform meter rule pivoted at its center and balanced by the forces shown.  
(3marks)



Determine the value of  $x$ .

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10. The figure shows a capillary tube dipped in water.



State **two** differences that will be observed when water is replaced with mercury in the set up above.  
(2 marks)

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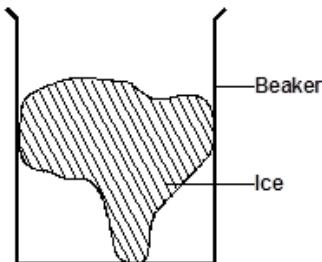
11. Give the transducer used to convert mechanical energy to electrical energy. (1 mark)

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12. A body is uniformly accelerated from rest to a final velocity of 100m/s in 10seconds. Calculate the distance covered.  
(2marks)

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13. The figure below shows beaker containing a block of ice.



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

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#### SECTION B (55 MARKS)

14. a) Define the term heat capacity. (1 mark)

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b) A metal block of mass 2.0kg is heated electrically. The voltmeter read 12 volts and ammeter 4.0A. The temperature of the metal block increased from  $25^{\circ}\text{C}$  to  $75^{\circ}\text{C}$  in 10 minutes. Assuming no heat is lost to the surrounding. Determine:

i) Heat supplied by the heater. (2marks)

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ii) Heat gained by the metal cylinder (1mark)

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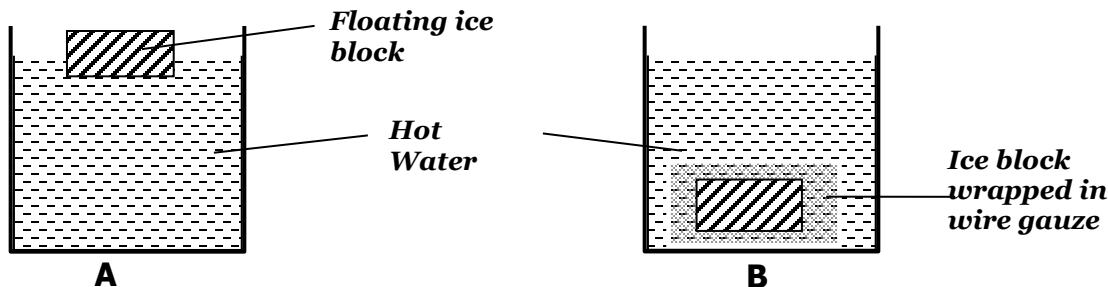
iii) Specific heat capacity of the metal block.

(2marks)

c) Explain why food cooks faster in a pressure cooker than in an open sufuria

(2marks)

d) The figure below shows two identical containers A and B containing hot water and ice block.



State with reason which water cools faster assuming that the wire gauge absorbs negligible heat.  
(2marks)

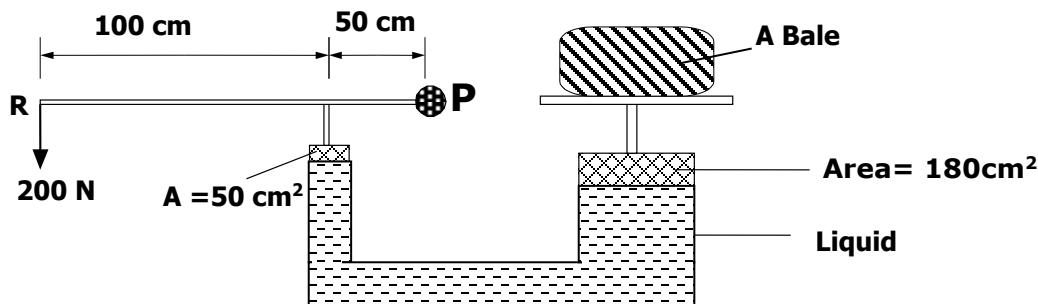
15 a) State Newton's second law of motion in terms of momentum. (1mark)

b) (i) A bullet of mass 20.0 g is fired with a velocity of 300m/s into a wooden block of mass 4.98 kg suspended from a long in extensible string. The bullet sticks into the wood and the two moves together.

Find the velocity of the block and bullet immediately after collision took place. (2marks)

(ii) Calculate the height to which both swings upwards. (2marks)

c) Figure shows a hydraulic press system using a lever of negligible mass on the side of a small piston pivoted at point P. A force of 200N is applied at R.



Calculate ;

- (i) The force  $\mathbf{F}$  exerted by small piston on the liquid. (2marks)

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- (ii) The weight of the Bale supported by the large piston (2marks)

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- (iii) Efficiency of the system. (3marks)

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16. (a) State Archimedes principle (1mark)

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(b) A cylinder of length 5.0 cm and uniform cross section area  $50.00 \text{ cm}^2$  is suspended from a spring balance and totally immersed in water. If the density of the material of the cylinder is  $1.25\text{g}/\text{cm}^3$  and density of water  $1\text{g}/\text{cm}^3$ , determine:

- i.The up thrust on the cylinder (2marks)

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- ii.Weight of the cylinder (2marks)

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- iii.The reading on the spring balance (2marks)

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- (b)(i) State the reason why lead shots are fixed at the bottom of hydrometer. (1 mark)

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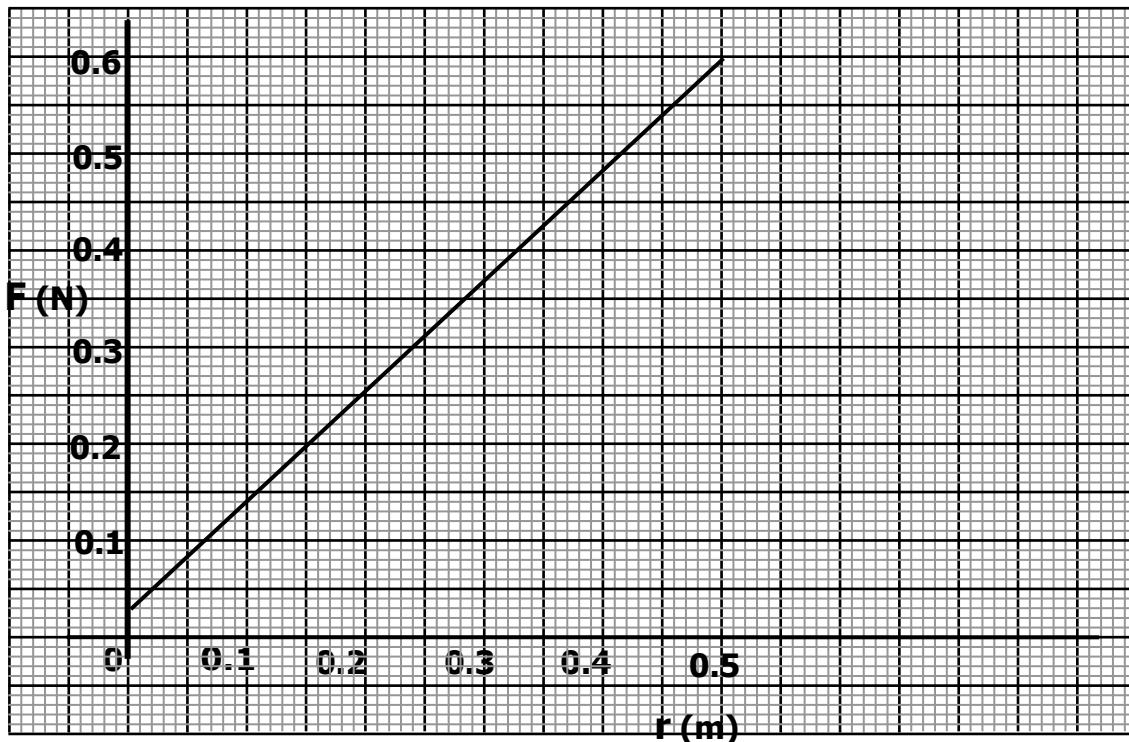
(ii) A hydrometer of mass 30.0 g floats in water of density  $1.0\text{g/cm}^3$ . If the bulb of the hydrometer had a volume of  $2.8 \times 10^{-5}\text{ m}^3$  and stem has a cross – section area of  $1.0\text{ cm}^2$ , what length of the stem would be submerged in the water. (3marks)

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17. a) Define the term angular velocity. (1mark)

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b) The graph below was obtained from an experiment to investigate the variation of the centripetal force, F with the radius, r of the circle on which a body rotates was performed.



From the graph, determine the angular velocity,  $\omega$  of the body given that  $m = 100\text{g}$  and  $F = m\omega^2 r + c$  where  $c$  is a constant. (3 marks)

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c) A stone of mass 40g is tied to the end of a string 50cm long and whirled in a vertical circle at 2 revolutions per second. Calculate the maximum tension in the string. (3marks)

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d) A stone is thrown horizontally with a velocity of 45m/s from the top of a vertical tower 50m high. Determine:

- i. The time taken by the bullet to reach the ground (2marks)

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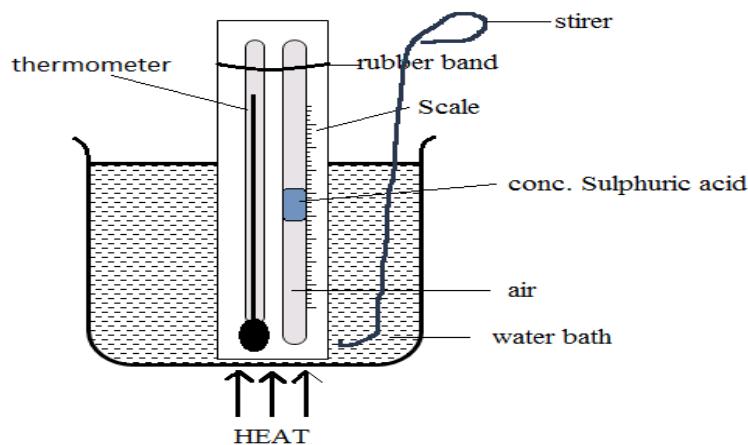
ii.The maximum horizontal distance covered by the bullet (2marks)

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18. a) Define the absolute zero of the Kelvin temperature scale. (1 mark)

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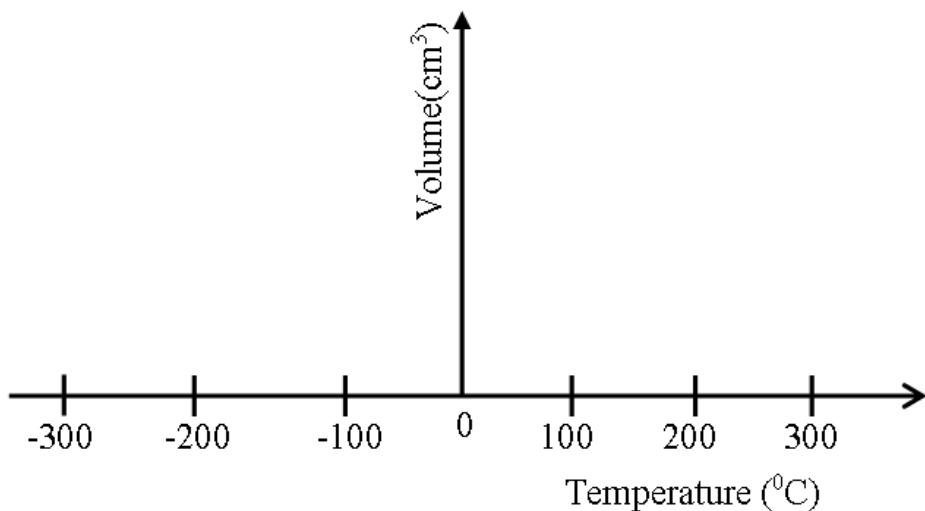
(b) The diagram below shows an experiment to investigate the relationship between volume and temperature of a fixed mass of gas at constant pressure



(i) While stating any measurements to be made, explain how the set up would be used to verify Charles law. (3marks)

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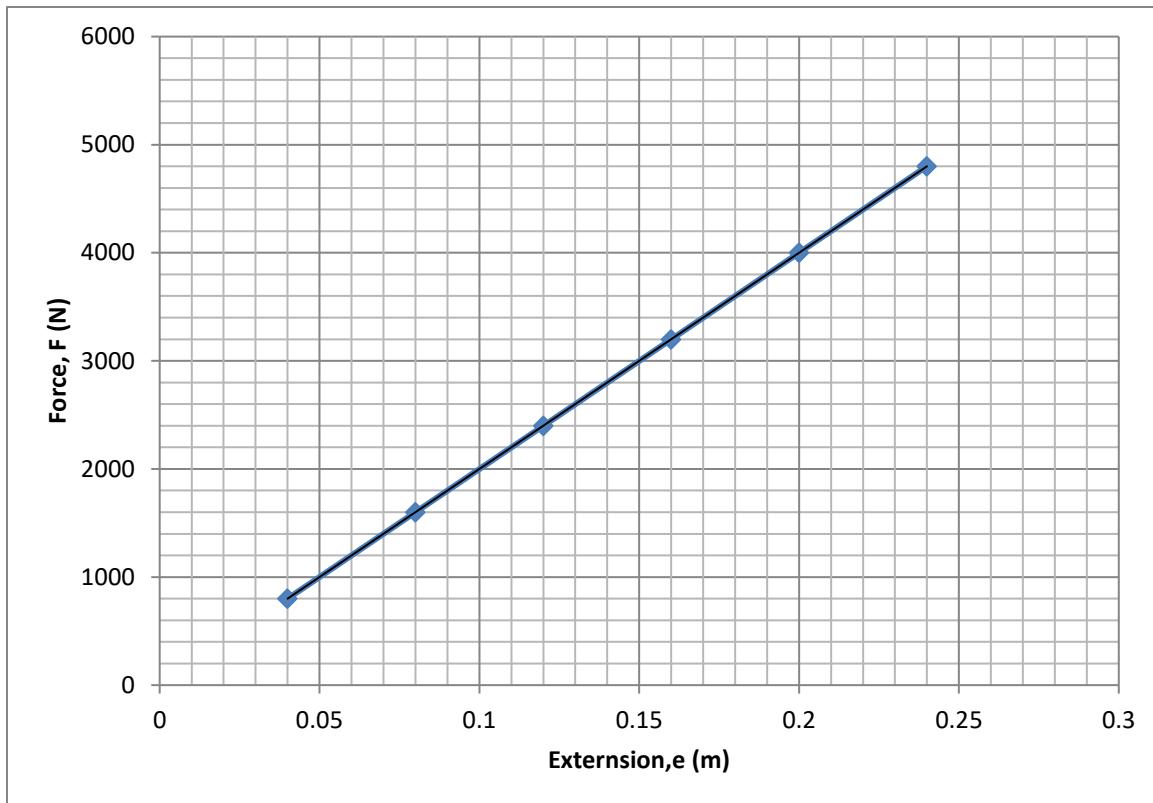
(iii)On the grid shown in the figure below sketch a graph of volume ( $\text{cm}^3$ ) against temperature ( ${}^\circ\text{C}$ ) for the experiment above. Clearly mark with the letter T the absolute zero temperature. (1 mark)



c) A mass of air of volume  $750\text{cm}^3$  is heated at constant pressure from  $10^0\text{ C}$  to  $100^0\text{ C}$ . determine the final volume of the air. (2marks)

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d) The figure below shows a graph of weights of persons entering a lift against the extension of four similar springs supporting a lift. From the graph determine,



(i) The spring constant of the springs (3marks)

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(ii) The spring constant of a single spring (1mrk)

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# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

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

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1  
PHYSICS  
TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 17**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections **A** and **B**.
- iv) Answer **ALL** the questions in section **A** and **B** in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **FOR EXAMINERS USE ONLY**

SECTION	QUESTION	MAXIMUM MARKS	CANDIDATE'S SCORE
A	1 - 11	25	
B	12	10	
	13	11	
	14	10	
	15	12	
	16	12	
<b>TOTAL</b>		<b>80</b>	

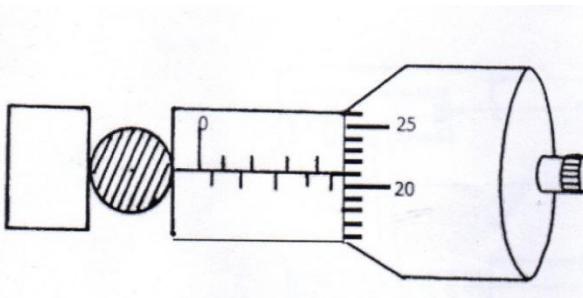
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## **SECTION A (25 MARKS)**

1. A spherical ball bearing is held between the anvil and spindle of a micrometer screw gauge. The reading on the gauge when the jaws are closed without anything in between is 0.11 mm.



What is the diameter of the ball bearing? (2 marks)

2. a) Boiling water is not used for sterilization of clinical thermometer. State the reason for this.  
(1 mark)

b) State how the clinical thermometer is sterilized. (1 mark)

3. 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  $-40^{\circ}\text{C}$ . (2 marks)

4. State what happens to the position of C.O.G of a body in the following states of equilibrium if the body is slightly pushed.

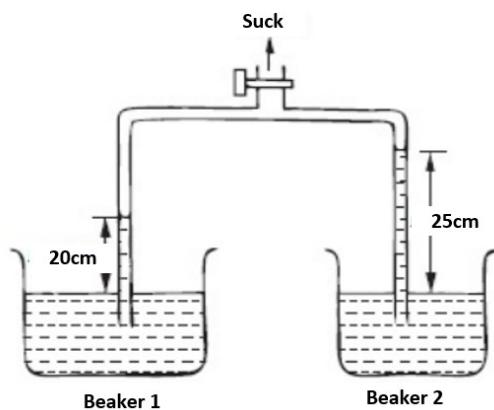
a) Stable equilibrium. (1mark)

b) Unstable equilibrium. (1mark)

c) Neutral equilibrium. ( 1mark)

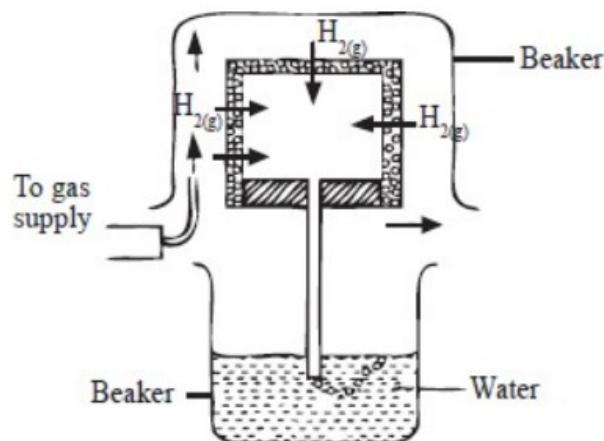
5. Using kinetic theory of matter, distinguish between solids and liquids states of matter in terms of intermolecular forces and spaces between particles. (2 marks)
6. In a vacuum flask, the walls enclosing the vacuum are silvered on the inside. State the reason for this. (1 mark)
7. The following data was obtained from an experiment to determine the size of palm oil molecule.
- Volume of 50 drops of palm oil =  $1.5 \times 10^{-9} \text{ m}^3$
  - Area of a patch from one drop of the oil. =  $8.0 \text{ cm}^2$
- Determine the size of a palm oil molecule. (3 marks)
8. Explain why it is dangerous for a bus to carry standing passengers. (2 marks)
9. State two factors that affects the spring constant of a spring. (2 marks)

10. Two liquids were sucked up in two identical tubes as shown in the figure below



Given that the liquid in beaker 2 is water of density  $1 \text{ g/cm}^3$  determine the density of liquid in beaker 1. (3 marks)

11. The figure below shows an arrangement to demonstrate diffusion through a porous pot.



The hydrogen gas is supplied for sometimes then stopped and the beaker removed. State and explain what is likely to be observed when the hydrogen gas supply is stopped.

(3 marks)

## **SECTION B**

**(55 MARKS)**

12. a) State the law of conservation of linear momentum.

(1 mark)

b) A high jumper usually lands on thick mattress. Explain how the mattress helps in reducing the force of impact.

(1 mark)

c) A bus of mass 2500 kg travelling at a constant velocity of 15 m/s collides with a stationary car of mass 800 kg. The impact takes 0.5 seconds before the two move together at a constant velocity for 20 seconds.

Calculate;

i) The common velocity after the impact.

(3 marks)

ii) The distance moved after the impact.

(2 marks)

iii) The impulsive force.

(3 marks)

13. a) A body moving at a constant speed in a circular path is said to be accelerating. Explain.

(1 mark)

b) Define angular displacement.

(1 mark)

b) A body of mass 450g tied to a string of length 60 cm, is moved in a horizontal circle at a constant speed of 240 revolutions per minute.

Determine;

i) Angular velocity of the body. (2 marks)

ii) Tension in the string. (2 marks)

c) The above body in b) is released and falls to the ground 2.6 m below it.

Calculate;

i) The time it takes to reach the ground. (2 marks)

ii) Maximum horizontal distance it travels from the point of release. (3 marks)

14. a) State Archimedes principle. (1 mark)

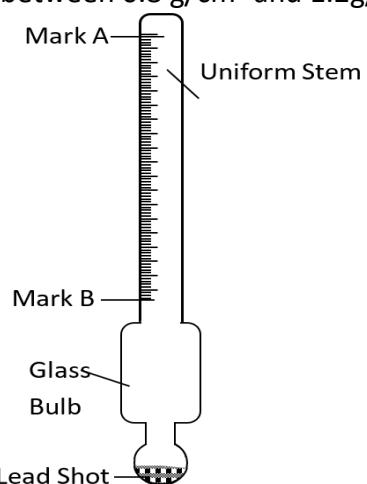
b) An object weighs 5.2 N in air, 3.2 N when completely immersed in water and 1.8 N when completely immersed in an acid.

Calculate;

i) Density of the object. (3 marks)

ii) Density of the acid. (3 marks)

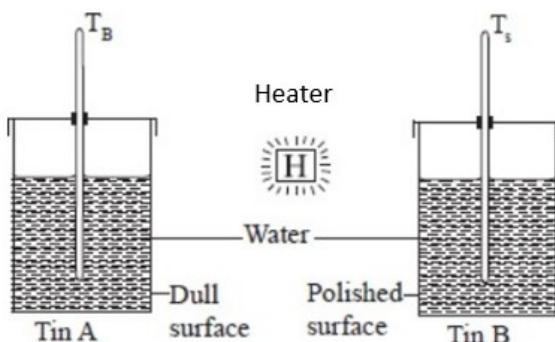
c) The figure below shows a simple hydrometer which is suitable for measuring density of liquids varying between  $0.8 \text{ g/cm}^3$  and  $1.2 \text{ g/cm}^3$ .



i) State the purpose of the lead shots in the glass bulb. (1 mark)

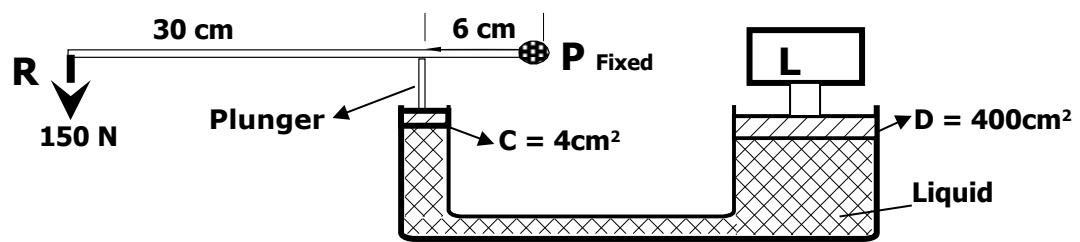
- ii) State how the hydrometer would be made more sensitive. (1 mark)
- iii) Indicate on the diagram the mark corresponding to  $0.8 \text{ g/cm}^3$  and  $1.2 \text{ g/cm}^3$ . (1 mark)
15. a) Define the term specific latent heat of fusion. (1 mark)
- b) In an experiment to determine the specific latent heat of vaporization of water, steam at  $100^\circ\text{C}$  was passed into water contained in a well lagged aluminium calorimeter. The following data measurements were made;
- mass of calorimeter =  $100 \text{ g}$
  - initial mass of water =  $150 \text{ g}$
  - initial temperature of water =  $18^\circ\text{C}$
  - final mass of calorimeter + water + condensed steam =  $264 \text{ g}$
  - final temperature of the mixture =  $68^\circ\text{C}$
- (Specific heat capacity of water =  $4200 \text{ J/kgK}$  and specific heat capacity of aluminium =  $400 \text{ J/kgK}$ )
- i) Determine;
- I) Mass of the condensed steam. (1 mark)
  - II) Heat gained by the calorimeter and water. (3 marks)

- iii) Given that  $L_v$  is the specific latent heat of vaporization of steam, determine the value of  $L_v$ . (3 marks)
- c) Two similar cans are partly filled with equal quantities of paraffin. Each holds a thermometer, is covered with a lid and stands on a wooden bench at the same distance from a source of radiant heat as shown below.



- i) Explain why heat from the heater could not have reached the cans by;
- I) Conduction. (1 mark)
  - II) Convection. (1 mark)

- ii) Explain why there is a difference in the thermometer readings after some time.  
 (1 mark)
- iii) How can the set up in the figure above be adjusted in order to produce the same results?  
 (1 mark)
16. a) Define velocity ratio of a machine. (1 mark)
- b) The effort piston of a hydraulic machine is of radius 2.8 cm, while that of the load piston is of radius 14 cm. the machine raises a load of 120 kg at a constant velocity. If the machine has an efficiency of 80%.
- Calculate;
- i) The velocity ratio of the hydraulic machine. (2 marks)
- ii) The effort needed to raise the load. (3 marks)
- c) The figure below shows a hydraulic press that is worked by applying a force of 80 N ta the end of a lever 28 cm long pivoted at the other end. The smaller piston is 4 cm from the pivot. The area of the piston A is  $2 \text{ cm}^2$  and that of B is  $10 \text{ cm}^2$ .
- 
- Determine;
- i) The force applied to piston A. (2 marks)
- ii) The force exerted on the piston B by the liquid. (2 marks)
- iii) The mechanical advantage of the hydraulic press. (2 marks)



# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

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

NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1**

**PHYSICS**

**TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 18**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections **A** and **B**.
- iv) Answer **ALL** the questions in section **A** and **B** in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **EXAMINER'S USE ONLY**

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1 - 13	25	
B	14		
	15		
	16		
	17		
	18		
TOTAL SCORE		80	

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## **SECTION A (25 marks)**

**Answer ALL the questions in the spaces provided.**

1. A density bottle was used to measure the density of liquid L and the following were the measurements taken

- Mass of empty bottle = 26g
- Mass of bottle filled with alcohol (of density  $800\text{kg/m}^3$ ) = 66g
- Mass of bottle filled with liquid L - 86g

Find the density of liquid L.

(3 marks)

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2. A Spring extends by 0.7cm when a mass of 420g is hang on it on earth. By what length would the spring extend if the same set up was taken to the moon where the gravitational intensity is one-sixth of that on earth.

*Take gravitational field intensity on surface of Earth g,  $10\text{N/kg}$*

(3 marks)

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3. A candle is lit and placed on a level bench. State and explain the changes in the stability on the candle as it continues to burn.

(2 marks)

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4. Two table tennis balls are at the same level while suspended from threads a short distance apart. A stream of air is blown between the balls in a horizontal direction. State and explain the observation made.

(2 marks)

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5. A car of mass 800kg moves on a circular track of radius 20m. The force of friction between the tyres and the tarmac is 4800N. Determine the maximum speed at which the car can be driven on the track without skidding.

(3 marks)

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6. The diagram below shows a rectangular wire with loose thread tied in it and dipped in a soap solution to form a film.

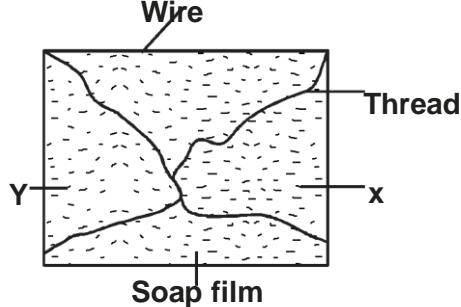


Fig 1.0

Draw a diagram showing what will be observed when the film is broken at points X and Y. (1 mark)

7. Explain why a glass container with thick glass walls is more likely to crack than one with a thin wall when very hot liquid is poured on to them. (2 marks)

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8. On the axes provided in the figure 2.0 below. Sketch a graph of velocity ( $V$ ) against time ( $t$ ) for uniformly accelerated motion given that when  $t = 0$ ,  $V$  is greater than zero. (1 mark)

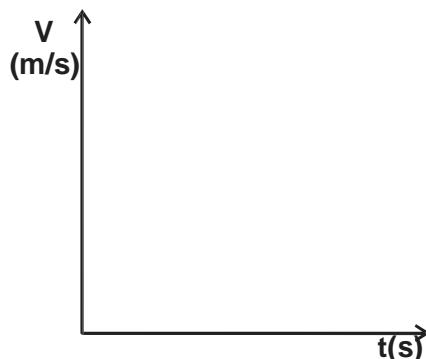


Fig 2.0

9. A uniform rod of length 4m and mass of 4kg is pivoted at 3.6m mark. The rod is held horizontal with a vertical rope at the 4m mark, as shown in the figure 3.0 below.

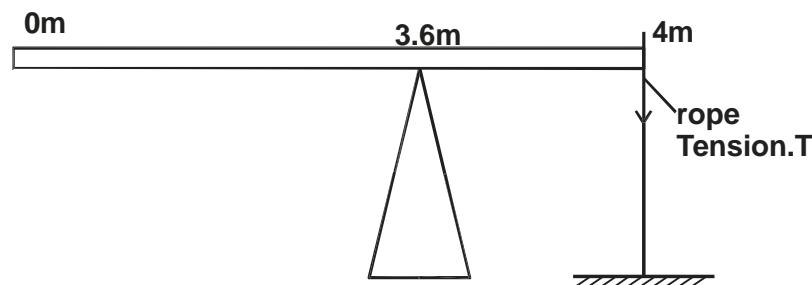


Fig 3.0

Calculate the tension, T in the rope (Take  $g = 10\text{N/kg}$ )

(3 marks)

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10. When graphite particles are suspended in water and observed through a microscope, they are seen to move in a random motion. Explain. (1 mark)

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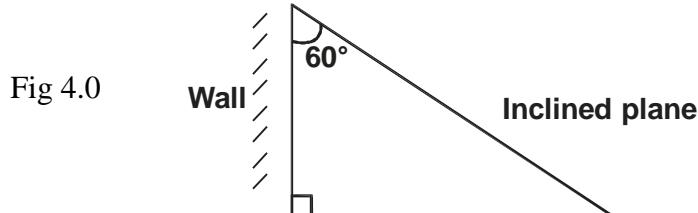
11. Explain why a glass of water cools more when ice at  $0^\circ\text{C}$  is added to it than when equal mass of water at  $0^\circ\text{C}$  is added to it. (1 mark)

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12. Explain why it is necessary to add a little flour to the water when boiling it to cook ugali. (1 mark)

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13. A plane is inclined against a wall as shown in the figure 4.0 below.



Calculate the Velocity Ratio of the inclined plane.

(2 marks)

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**SECTION B (55 marks)**  
Answer all questions in this section

14. a) Explain why it is advisable to use a pressure cooker for cooking at high altitudes. (2 marks)

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- b) Water of mass 6kg initially at 25°C is heated in an electric kettle rated 6.0Kw. The water is heated until it boils at 100°C. (Take specific heat capacity of water  $4200\text{Jkg}^{-1}\text{k}^{-1}$ , heat capacity of the kettle 450J/k, specific latent heat of vaporisation of water =  $2.3 \times 10^6 \text{ J/kg}$ )

Determine

- i) Heat absorbed by the water. (2 marks)

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- ii) Heat absorbed by the electric kettle. (2 marks)

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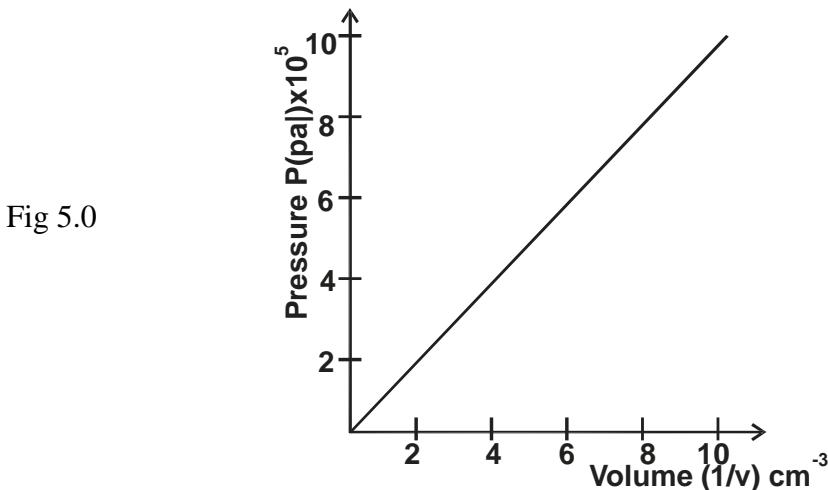
- iii) Time taken for the water to boil. (3 marks)

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- iv) How much longer it will take to boil away all the water? (3 marks)

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15. A student performed an experiment to study the relationship between pressure and volume of a gas enclosed in a vessel. Temperature was kept constant throughout the experiment. The results obtained were plotted and the graph below obtained.



- a) State the law of the student was investigating. (1 mark)

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- b) Given that  $p = \frac{R}{V}$  use your graph to obtain R. (3 marks)

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- c) A small metal sphere is released to fall through a long column of water held in a vertical tube. Explain why the sphere finally acquires a steady velocity. (2 marks)

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- d) A target of mass 1.05kg hangs from a tree by a long light string. An arrow of mass 100g is shot towards the target with a velocity of 10m/s and embeds itself in the target.

Determine:

- i) the velocity of the target and the arrow just after collision. (2 marks)

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- ii) the maximum height reached by the target after the impact. (3 marks)

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- 16.a)** State the law of floatation. (1 mark)

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- b) A rectangular block of cross-sectional area  $0.08\text{m}^2$  is immersed in a liquid of density  $1200\text{kg/m}^3$ . The top and the lower surfaces are 80cm and 200cm below the surface of the liquid respectively.

- i) What is the downward force on the top of the block? (3 marks)

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ii) Calculate the upthrust on the block.

(3 marks)

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c) A block of glass of mass  $0.25\text{kg}$  floats in mercury of density  $1.36 \times 10^4\text{kg/m}^3$ . What volume of the glass lies under the surface of mercury? (3 marks)

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d) The weight of cube in air is  $0.25\text{N}$ . When immersed in water, it weighs  $0.44\text{N}$  and when in oil weighs  $0.46\text{N}$ . Calculate the relative density of the oil. (3 marks)

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17.a) State Newton's first law of motion. (1 mark)

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b) A bus of mass  $5,000\text{kg}$  and a car of mass  $1200\text{kg}$  are both travelling on a dual carriage way at the same velocity. If both drivers apply the same breaking force. State with reason which one will come to stop first. (2 marks)

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c) A driver driving a car of mass  $1200\text{kg}$  at a constant speed of  $72\text{km/h}$  is flagged down by a traffic police officer  $145\text{m}$  away. It takes him  $2$  seconds to react to the police signal and brings the car to rest by applying a constant breaking force in  $10$  seconds. Determine.

i) The minimum stopping distance.

(3 marks)

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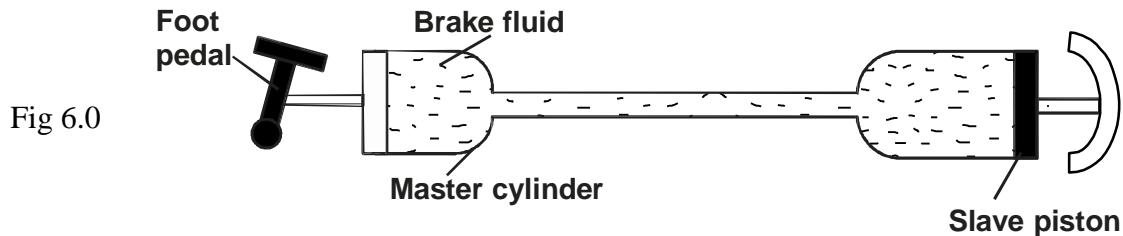
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- ii) State whether it will hit the traffic police officer or not. (1 mark)

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- 18.a) The figure 6.0 below represents a hydraulic brake.



A force of 20N is applied on the foot pedal connected to a piston of area  $0.0005\text{m}^2$  and this causes a stopping force of 5000N. Calculate

- i) The pressure in the master cylinder. (3 marks)

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- ii) The area of the slave piston. (3 marks)

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- iii) The velocity ratio (3 marks)

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- b) A box of mass 500g has dimension  $10\text{m} \times 5\text{m} \times 3\text{m}$ . Determine the maximum pressure exerted by the box on a flat surface. (Take  $g = 10\text{N/kg}$ ) (3 marks)

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NAME.....CLASS.....ADMN NO.....

DATE.....SIGN.....

**232/1  
PHYSICS**

**TIME: 2HRS**

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 19**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections A and B.
- iv) Answer **ALL** the questions in section A and B in the spaces provided.
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- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **FOR EXAMINER'S USE ONLY:**

SECTION	QUESTION	MAXIMUM SCORE	STUDENT'S SCORE
A	1-12	25	
B	13	13	
	14	10	
	15	13	
	16	10	
	17	09	
TOTAL SCORE		80	

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## **SECTION A (25 MARKS)**

1. State the procedure followed when using a metre rule (3mks)  
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.....
2. Define a compression force. (1mk)  
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3. Mosquito larvae floats on water surface. Explain how oiling controls the breeding of mosquitoes. (1mk)  
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4. Complete the table below (3mks)  

<b>Equilibrium state</b>	<b>Effect of external force on position of centre of gravity</b>
Stable	
Unstable	
Neutral	
5. A model toy boat of cross-sectional area  $1000 \text{ cm}^2$  floats in fresh water. If the boat sinks 6cm as a result of loading, calculate the load on the boat. Given that the density of water is  $1\text{g/cm}^3$  (3mks)
6. The type of the material is one factor which affects spring constant. State other two factors. (2mks)  
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7. Water with negligible viscosity flows steadily through a horizontal pipe of varying cross-sectional area. At a point A of area  $10\text{cm}^2$ , the velocity is  $0.2\text{m/s}$ . Calculate the pressure difference between A and B. If the area at B is  $2.5\text{cm}^2$  and density of water is  $1000\text{kg/m}^3$ . (3mks)

8. State the principle of moments. (1mk)

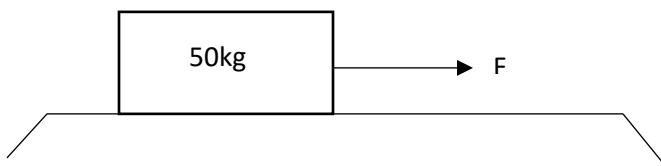
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9. Draw a sketch of displacement time graph for a body moving with decreasing velocity. (2mks)

10. Define the term velocity ratio as used in machines. (1mk)

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11. The diagram below shows a block being dragged on a horizontal floor. If the coefficient of kinetic friction is 0.40, determine force F required to move the box at uniform speed. (3mks)



12. State the part of the vacuum flask which minimizes heat loss by (2mks)

- i. Radiation

.....

- ii. Conduction

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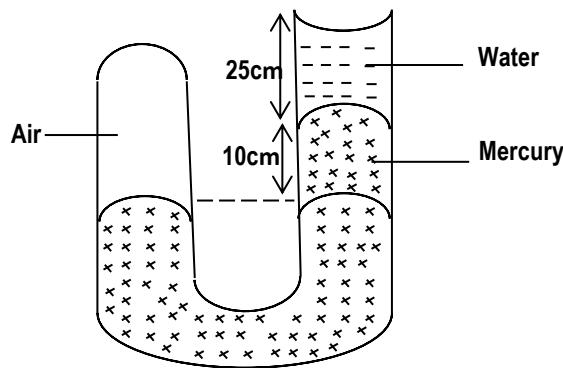
### **SECTION B (55 MARKS)**

13. a) Define pressure and state its SI unit (2mks)

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.....

- b) Show that the pressure exerted by a fluid is given by the formula.  $P = h\rho g$ . Where  $h$  is the height of the fluid,  $\rho$  is the density of the fluid and  $g$  is the acceleration due to gravity. (3mks)

- c) The figure below shows a U-tube manometer containing air, mercury and water. Calculate the pressure exerted on the trapped air. (Take atmospheric pressure to be  $1.05 \times 10^5$  pa, density of mercury and water to be  $13600\text{kg/m}^3$  and  $1000\text{kg/m}^3$  respectively). (3mks)

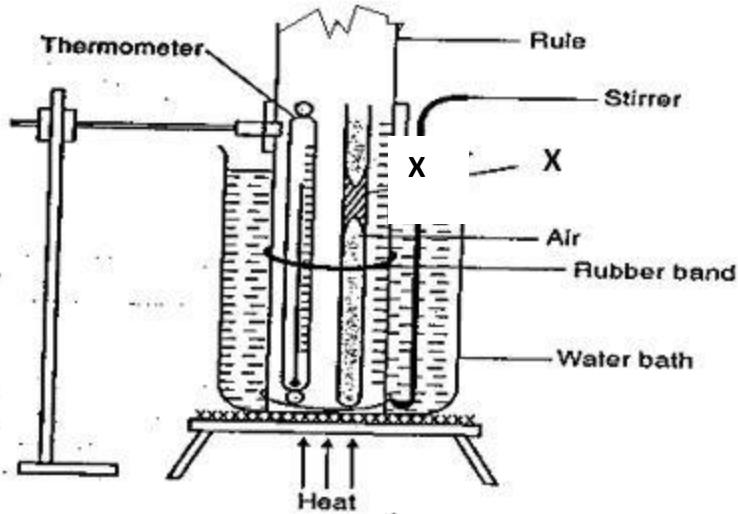


- d) Explain why a girl wearing high heeled shoes makes deeper marks while walking on a soft ground than when wearing toupees shoes. (2mks)
- .....  
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- e) The barometric height at the base of a mountain is 70cmHg. If the mountain is 435.2m high, determine the reading of the mercury barometer at the top of the mountain. Take density of mercury as  $13600\text{kg/m}^3$  and that of air as  $1.25\text{kg/m}^3$ . (3mks)

14. (a) State Pressure Law (1mk)
- .....  
.....  
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.....

- (b) The following diagram shows a set-up of apparatus used to verify Charles Law.



(i) Give the name of part labelled X

(1mk)

(ii) State the component of X

(1mk)

(iii) State two functions of the part named in (i) above?

(2mks)

(iv) Briefly explain how the set up above is used to verify Charles Law

(3mks)

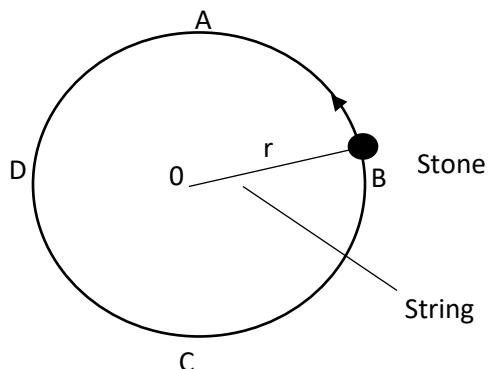
(c) A certain mass of hydrogen gas occupies a volume of  $1.6\text{m}^3$  at a pressure of  $1.5 \times 10^5\text{Pa}$  and a temperature of  $12^\circ\text{C}$ . Determine the volume when the temperature is  $0^\circ\text{C}$  at a pressure of  $1.0 \times 10^3\text{Pa}$ .

(2mks)

15. a) Define the term angular velocity.

(1mk)

b) The diagram below show a stone of mass 500g moving in a vertical circular path of radius 50cm centre O. It is whirled with a frequency of 2 cycles per second.



i) Calculate  
I. Its linear velocity (2mks)

II. Tension at A. (3mks)

III. Tension at B. (2mks)

IV. Tension at C. (3mks)

ii) At what point is the string likely to break? (1mk)

.....

iii) Indicate the direction of centripetal force on the diagram. (1mk)

16. a) Define the term specific heat capacity. (1mk)

.....

.....

.....

b) State two precautions to be taken when carrying out the experiment to determine specific heat capacity of solid by electrical method. (2mks)

c) A copper calorimeter of mass 0.12kg contains 0.1kg of kerosene at 15°C. If 56g of aluminium at 80°C is transferred into the liquid and the final temperature of the mixture is 27°C. (Taking heat loss to be negligible, specific heat capacity of aluminium is 900J/kgK and copper 400J/kgK). Determine:

- Heat absorbed by kerosene and calorimeter. (3mks)

- Heat lost by aluminium (2mks)

- The specific heat capacity of kerosene. (2mks)

17. a) i. Define the term diffusion (1mk)

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ii) State two factors affecting the rate of diffusion in gases. (2mks)

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iii) Compare liquids and gases in terms of intermolecular forces (1mk)

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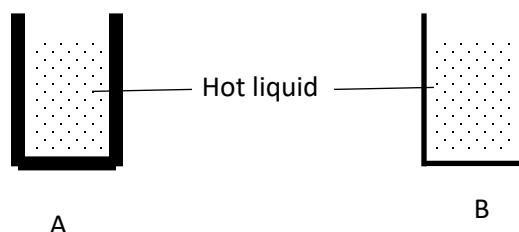
b) i. The diagram below shows a bimetallic strip at room temperature. Draw the strip when temperatures are lowered below room temperature. Given that B has a higher linear expansivity than A. (1mk)



ii) Explain your answer in b(i) above. (1mk)

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.....

iii) The diagram below shows two glass tumblers filled with boiling water at the same time. State and explain the observation. (3mks)



# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

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PHYSICS

TIME: 2HRS

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 20**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections A and B.
- iv) Answer **ALL** the questions in section A and B in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
- vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.
- viii) Candidates should answer the questions in English.

Constant:  $g=10N/kg$  or  $10m/s^2$

### **FOR EXAMINER'S USE ONLY**

SECTION	QUESTION	TOTAL SCORE	CANDIDATE SCORE
A	1 -13	25	
B	14	10	
	15	12	
	16	07	
	17	08	
	18	09	
	19	09	
<b>TOTAL</b>		<b>80</b>	

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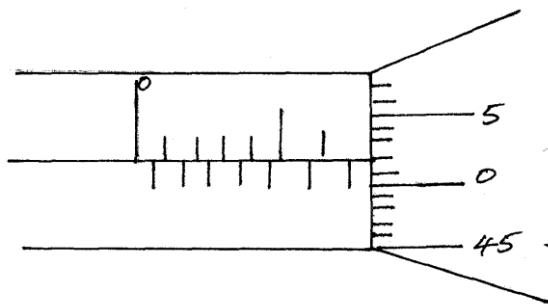
## **SECTION A (25MARKS)**

**Answer all the question in this section in the spaces provided**

- 1 Define mechanics as a branch of physics (1mark)

.....  
.....

- 2 The figure below shows part of a micrometer gauge after an object is placed in between the anvil and spindle. The gauge has zero error of 0.001 cm.



- (i) What is the pitch of the above micrometre screw gauge (1mark)

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- 3 State the reason why an object on earth has a higher weight than on the moon (1mark)

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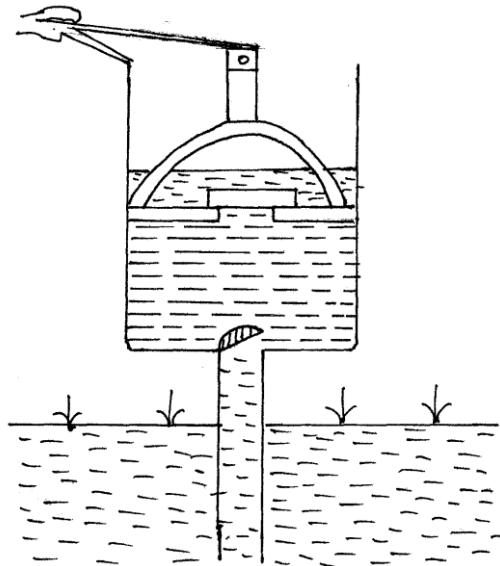
- 4 State the kinetic theory of gases (1mark)

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- 5 The lower and the upper fixed point in a mercury thermometer are 20cm apart. What is the recorded temperature in  $^{\circ}\text{C}$  when the mercury column is 7.2cm below the upper fixed point (3marks)

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- 6 The figure below shows a type of pump



(i) Name the pump (1mark)

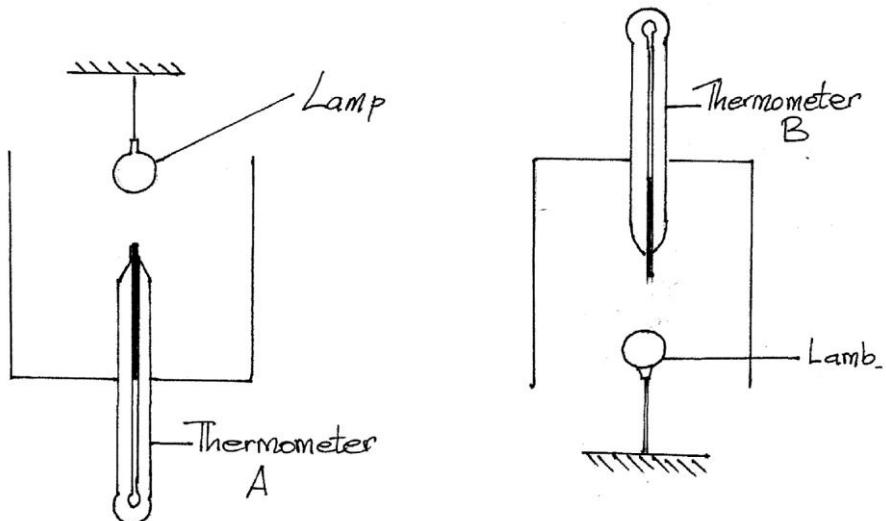
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(ii) State the limitation of this pump (1mark)

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7 The figure below shows two set ups by a student using identical lamps and thermometer



If the lamps are switched on for the same duration, state and explain in which set up will the thermometer read a higher temperature (2marks)

.....

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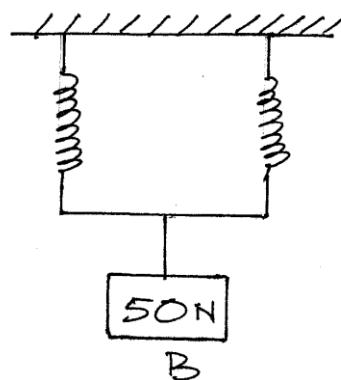
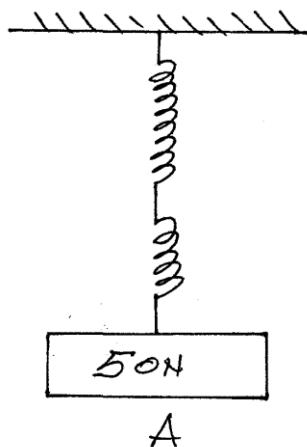
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8 (a) Define moment of a force (1mark)

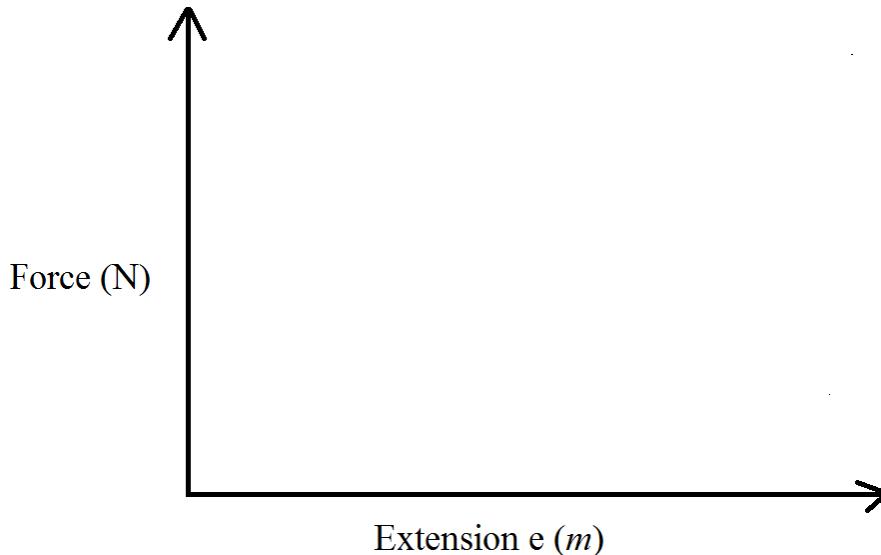
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- (b) A metre rule of negligible weight is balanced by masses of 24N and 16N suspended from its ends.  
Find the position of the pivot (2marks)
- .....  
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- 9 The figure below shows two systems of springs arrangements A and B. The springs are identical and have a spring constant K.

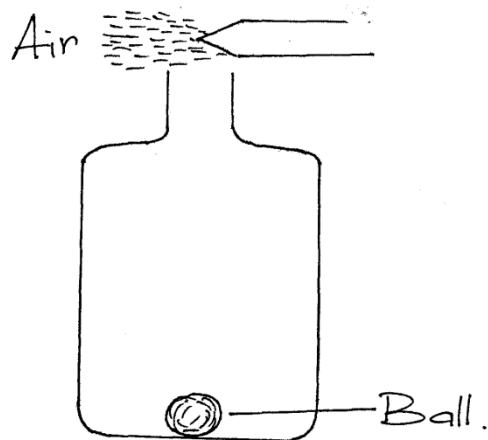


- (a) State with a reason which system of the spring is stiffer (2marks)
- .....
- (b) On the axes provided sketch the graph of systems A and B assuming that the springs obey Hooke's law (1mark)



- 10 (a) State the Bernoulli's effect (1mark)

- (b) The diagram below shows a very light ball inside a flask. Air is blown at high speed at the mouth of the flask



- (i) State and explain the observation made (2marks)

- (ii) Apart from the magnitude of a force, state another factor that affects the turning effect of a force on a body (1mark)

- 12 State the reason why a steel sphere resting on a horizontal surface is said to be in neutral equilibrium (1mark)

- 13 State the Pascal principle of transmission of pressure (1mark)

### **SECTION B 55(MARKS)**

**Answer all the question in this section in the spaces provided**

- 14 (a) Define velocity (1mark)

- (b) A body is thrown vertically upwards with an initial velocity  $u$  m/s. After a time  $t$  seconds the body reaches a maximum height  $h$  metres. Show that  $h = \frac{u^2}{2g}$  (3marks)
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- (c) An object is projected at a velocity of 40m/s from a cliff 20m high. Calculate the distance from the foot of the cliff when the object hits the ground. (3marks)
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- (d) State the law of inertia (1mark)
- .....  
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- (e) (i) The following table shows the velocity of a marble falling in a tall cylinder with glycerine.

Time (s)	0	1	2	3	4	5	6	7
Velocity (m/s)	0	2.0	2.4	2.7	2.9	2.9		

- (ii) Complete the table above (1mark)
- (iii) Other than the weight of the ball bearing and the upthrust, name the other force acting on the ball bearing in (e) (i) above (1mark)
- .....  
.....

- 15 (a) Define velocity ratio as used in machines (1mark)
- .....  
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- (b) An inclined plane is placed at  $30^\circ$  to the horizontal so that it can be used to raise a load through a height  $h$ . If the efficiency of the machine is 100% determine:

(i) The velocity ratio of the machine (2marks)

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(ii) The effort needed to move a load of 800N along the plane at a constant velocity (2marks)

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(c) State the law of conservation of energy (1mark)

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(d) A force of 6N extends a spring by 200mm. Calculate the work done in extending the spring (2marks)

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(e) (i) State Hooke's law (1mark)

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(ii) A force of 6N extends a spring by 200mm. Calculate the work done in extending the spring by 300mm (3marks)

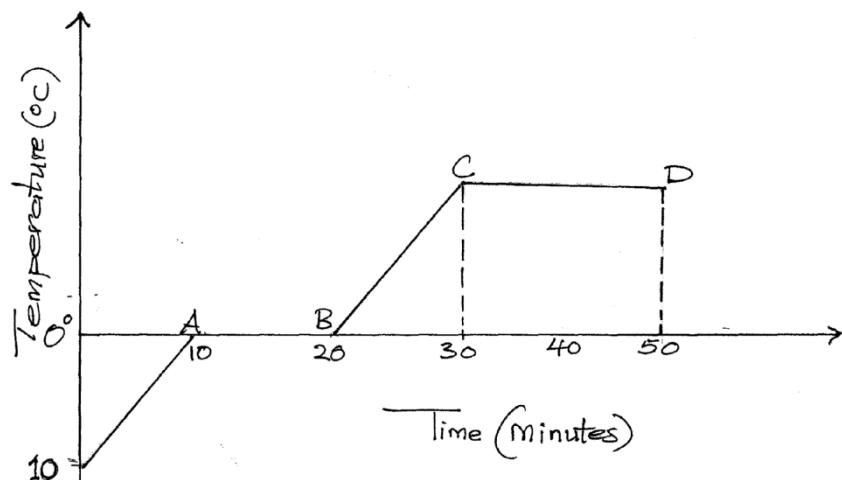
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16(a) Other than the presence of impurities, state another factor that increases the melting point of a substance. (1mark)

.....

(b) Define specific latent heat of fusion of a body (1mark)

(c) The figure below shows a graph of variation of temperature with time for a given substance of mass 200g heated with a 50W electric heater



(i) Explain the shape of the graph between AB and CD (2marks)

(ii) Explain why CD is longer than AB (1mark)

(iii) Calculate the specific latent of fusion of the body (2marks)

17(a) State two quantities that must be kept constant in order to verify Boyle's law (2marks)

(b) An air bubble at the bottom of a beaker full of water becomes larger as it rises to the surface. State the reason why;

- (i) The bubble rises to the surface (1mark)

.....

- (ii) It becomes larger as it rises (1mark)

.....

- (c) State two assumptions made in explaining the gas laws using the kinetic theory of gases (2marks)

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- (d) The volume of a fixed mass of a gas reduced from  $500\text{cm}^3$  to  $300\text{cm}^3$  at constant pressure. The initial temperature was  $-183^\circ\text{C}$ . Determine the final temperature (2marks)

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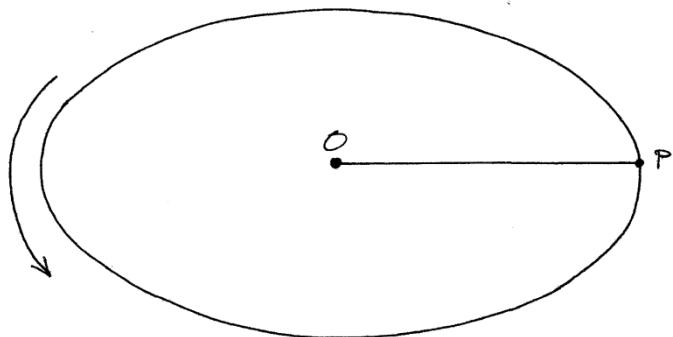
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- 18(a) Define the term angular velocity (1mark)

.....

.....

- (b) A particle P tied to string is moving with a constant speed V in a horizontal circle about O in the direction shown in the figure below.



- (i) Indicate with an arrow on the diagram the direction of the constant speed V on body P (1mark)

- (ii) Use an arrow to indicate the direction in which the net force F acting on P will act (1mark)

- (iii) State what provides the net force F in part (b) above (1mark)

.....

- (iv) Give a reason why particle P above experience centripetal acceleration even though it is moving with a constant speed V (1mark)

- (c) A string of length 70cm is used to whirl a stone of mass 0.5Kg in a horizontal circle at 5 revolutions per second.

Determine:

- (i) The period (2marks)

- (ii) The angular velocity (2marks)

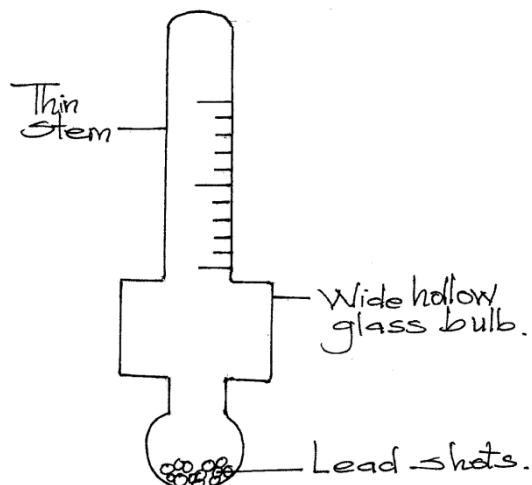
- 19(a) State the law of flotation (1mark)

- (b) A solid displaces  $9.2\text{cm}^3$  of a liquid when floating and  $11.5\text{cm}^3$  when fully immersed in the same liquid .The density of the solid is  $0.8\text{g/cm}^3$ . Determine:

- (i) The upthrust on the solid when floating (3marks)

- (ii) The density of the liquid (2marks)

- (c) The hydrometer shown in the figure below is one of the application of Archimedes principle and relative density.



- (i) State the function of the following parts of the hydrometer

(I) Wide Bulb (1mark)

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.....

(II) Lead shots (1mark)

.....  
.....

(ii) State how the sensitivity of the hydrometer can be increased (1mark)

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**THIS IS THE LAST PRINTED PAGE!**

# **GOLDLITE ONLINE EDUCATIONAL SERVICES**

*Kenya Certificate of Secondary Education (KCSE)*

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PHYSICS  
TIME: 2HRS

## **SMARTFOCUS KCSE QUICK REVISION SERIES SERIES 21**

### **INSTRUCTIONS TO CANDIDATES**

- i) Write your name and admission number in the spaces provided above.
- ii) Sign and write the date of examination in the spaces provided above
- iii) This paper consists of **TWO** sections A and B.
- iv) Answer **ALL** the questions in section A and B in the spaces provided.
- v) All working **MUST** be clearly shown.
- vi) Non programmable silent calculators may be used.
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- viii) Candidates should answer the questions in English.

Constant:  $g=10\text{N/kg}$  or  $10\text{m/s}^2$

### **FOR EXAMINER'S USE ONLY**

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 13	25	
B	14	12	
	15	10	
	16	11	
	17	09	
	18	13	
<b>TOTAL</b>		<b>80</b>	

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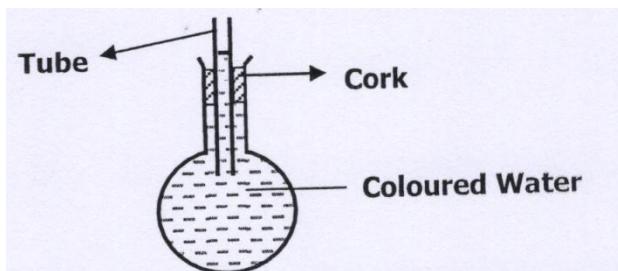
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## **SECTION A (25 MARKS)**

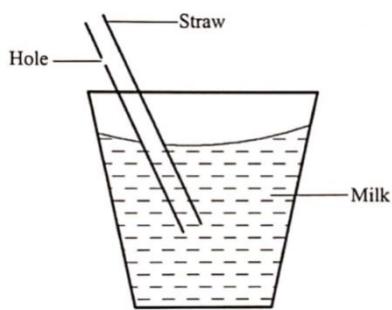
**Attempt all the questions in the spaces provided.**

1. A vernier calliper has a zero error of 0.10 cm. Sketch the reading of the vernier calliper when used to measure the size of a test tube of internal diameter 2.60 cm. (1 mark)  
.....  
.....
2. An empty density bottle weighs 25g when empty and 70g when full of fresh water. Determine the volume of the density bottle. (2 marks)
3. The **figure 1** below shows a flask filled with coloured water. The flask is fitted with a cork through which a tube is inserted. The flask is placed in crushed ice and allowed to cool.



**Figure 1**

- State and explain the observation made. (2 marks)  
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4. The **figure 2** below shows a straw with a hole in use to suck milk from a glass container.



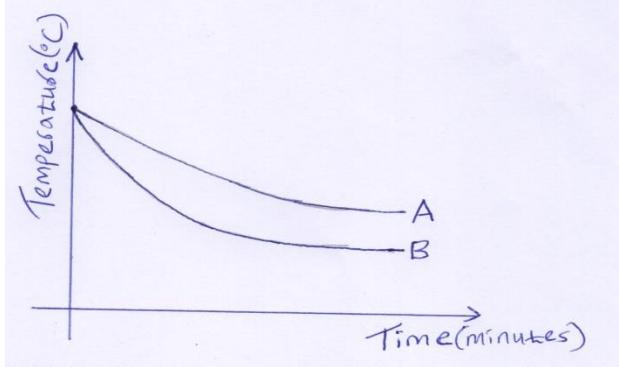
**Figure 2**

- State and explain the observation made upon sucking. (2 marks)  
.....  
.....

5. Two samples of bromine vapour are allowed to diffuse separately under different conditions, one in a vacuum and the other in air. It was observed that bromine diffused faster in vacuum than in air. Explain this observation. (1 mark)

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6. The **figure 3** below shows a graph of two containers having hot water and allowed to cool after sometime.

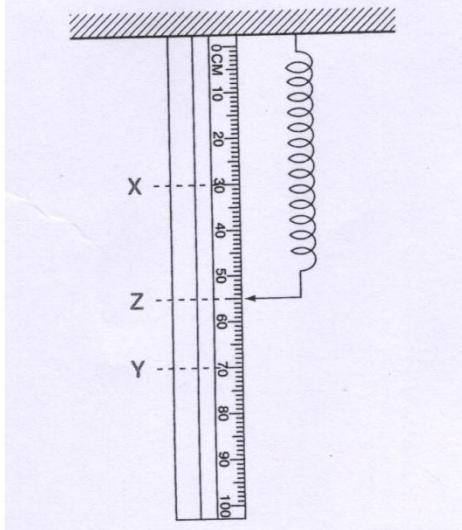


**Figure 3**

Graph A represents temperature in container A and B temperature in container B. With reason identify the graph that represents a container with dull surface. (2 marks)

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7. A student wanted to determine the mass of a stone using set up in **figure 4** below.



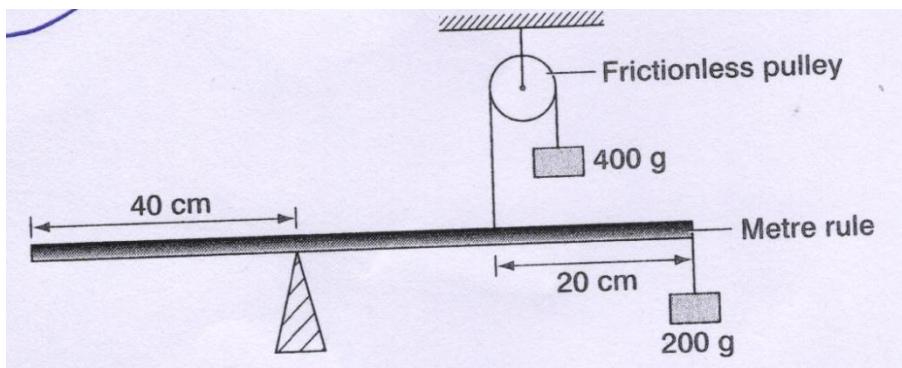
**Figure 4**

Initially, the pointer was at X. On hanging 200g mass on the spring, the pointer moved to point Y. When he replaced the 200g mass with the stone, the pointer moved to point Z. Given that the elastic limit of the spring was not exceeded, determine the mass of the stone.

(3 marks)

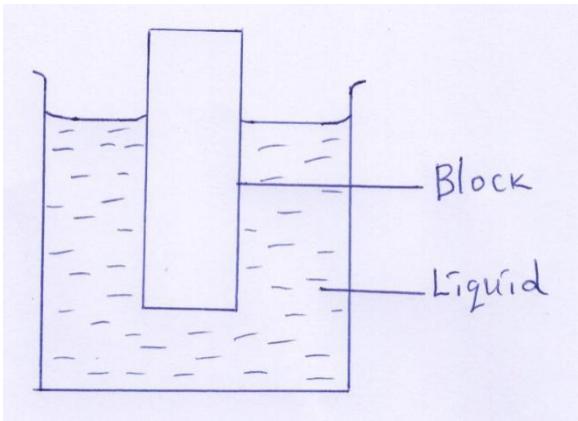
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8. It is dangerous to stand near the edge of a platform in a railway station when a train passes without stopping. Explain. (1 mark)

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.....
9. Sketch a velocity – time graph for a body projected vertically upwards until it falls back to its point of projection. (2 marks)
10. **Figure 5** below shows a uniform metre rule balanced on a knife edge.



**Figure 5**

- Determine the weight of the metre rule. (3 marks)  
.....  
.....
11. State the S.I unit of work done by a stone mason in lifting a stone. (1 mark)  
.....
12. A certain mass of oxygen gas occupies a volume of  $1.2 \text{ m}^3$  at a pressure of  $1.4 \times 10^5 \text{ Pa}$  and temperature  $15^\circ\text{C}$ . Find its volume when the temperature is  $0^\circ\text{C}$  at a pressure of  $1.1 \times 10^5 \text{ Pa}$ . (3 marks)  
.....  
.....
13. The **figure 6** below shows a block floating in a liquid.



**Figure 6**

When the liquid B is heated, it is observed that the block sinks further. Explain this observation.  
(2 marks)

.....  
.....

### **SECTION B (55 MARKS)**

14. (a) A ball is thrown horizontally from the top of a vertical tower and strikes the ground at a point 60m from the bottom of the tower. Given that the height of the tower is 50m, determine the;

(i) Time taken by the ball to hit the ground. (2 marks)

.....  
.....

(ii) Initial horizontal velocity of the ball. (2 marks)

.....  
.....

(iii) Vertical velocity of the ball just before striking the ground. (2 marks)

.....  
.....

- (b) State one factor that affects centripetal force acting on a body. (1 mark)

.....  
.....

- (c) A point on the rim of a wheel has a velocity of 5.6 m/s. If the rim has a radius of 0.4m, calculate;

(i) The angular velocity of the point. (2 marks)

.....  
.....

(ii) its centripetal acceleration. (2 marks)

- (d) State the reason why an object moving in a circular motion is said to be accelerating while the speed is constant. (1 mark)
- .....  
.....
15. (a) A body of mass  $M_1$  moving at velocity 'u' collides with another stationary body of mass  $M_2$ . Given that the two bodies coalesce after impact and move at a uniform velocity of  $V$ . Derive an expression for the final velocity of the bodies after the impact. (2 marks)
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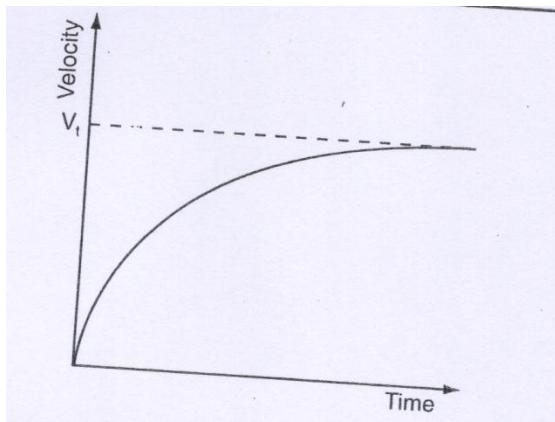
(b) Given the following apparatus.

- ✓ Empty density bottle of volume  $V$
- ✓ Liquid X
- ✓ Beam balance

Describe briefly how you can obtain the density of liquid X. (3 marks)

(c) (i) Define terminal velocity. (1 mark)

(ii) The **figure 7** below shows a velocity time graph for a small sphere falling through water.



**Figure 7**

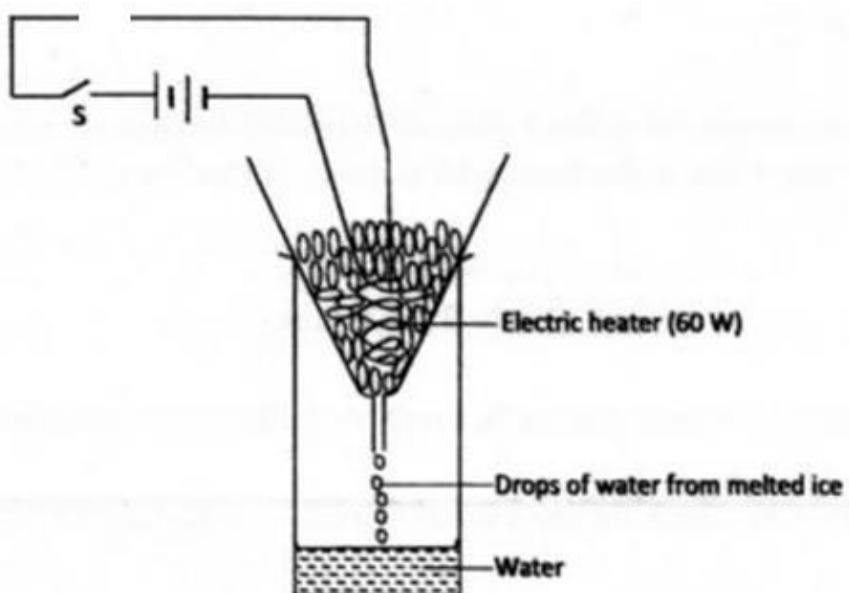
On the same axes sketch the graph for the sphere when allowed to fall through glycerine. (1 mark)

(iii) Explain the difference in the graphs in (ii) above. (1 mark)

- (d) A liquid flows along a horizontal pipe of cross section area  $24 \text{ cm}^2$  with a speed of  $3 \text{ m/s}$ . The speed increases to  $9 \text{ m/s}$  where there is a constriction. Calculate the cross-section area of the constriction. (2 marks)

16. (a) State the meaning of ‘specific latent heat of fusion’. (1 mark)

- (b) The **figure 8** below shows a setup of apparatus used in an experiment to determine the specific latent heat of fusion of ice.



**Figure 8**

- (i) On the diagram insert the ammeter and the voltmeter. (2 marks)  
(ii) From the experiment above, give the measurable quantities required to achieve the objective. (2 marks)

- (iii) The following readings were obtained after the heater was switched on for 10 minutes. (Mass of melted ice = 18g) Determine:  
I. Energy supplied by the 60W heater in the 10 minutes. (2 marks)

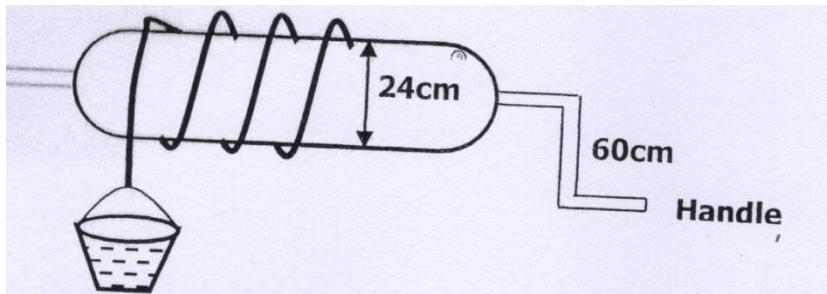
II. Specific latent heat of fusion of ice.

(3 marks)

- (iv) State any assumption in the experiment.

(1 mark)

17. The diagram below shows the different parts of a wheel and axle machine.



- (a) (i) Indicate on the diagram the effort and load.

(1 mark)

- (ii) Given that the handle wheel moved through a circular path of radius R and the axle moves through a circular path of radius r. Show that the velocity ratio of a wheel and axle is given by  $V.R = \frac{R}{r}$ . (2 marks)

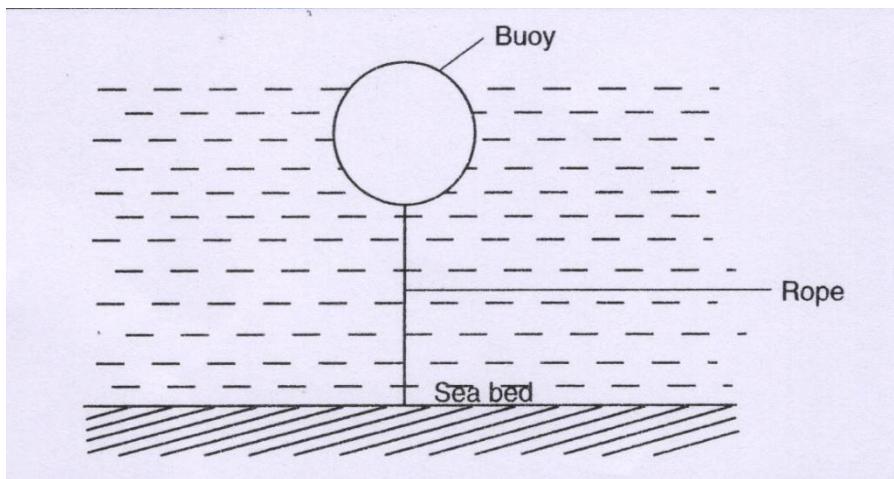
- (b) In a wheel and axle, the wheel's radius is 60cm, while the axle's diameter is 24cm. the effort is 1.0N and the load is 4N. Work out:

- (i) The velocity ratio. (2 marks)

(ii) The mechanical advantage. (2 marks)

(iii) The efficiency of the system. (2 marks)

18. (a) A spherical buoy of diameter 0.6m and mass 50kg is connected to a rope tied to a sea bed so that  $\frac{3}{4}$  of its volume is below the surface, as shown in the **figure 9** below.



**Figure 9**

(i) On the diagram, indicate two forces acting on the buoy apart from weight, W. (2 marks)

(ii) Determine:

I. The weight of the buoy (1 mark)

II. The upthrust on the buoy (2 marks)

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III. The tension, T, on the rope. (2 marks)

(b) The **figure 10** below shows a simple hydrometer.



State the reason why;

i. The upper stem is made narrow (1 mark)

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.....

ii. The lead shots are placed in the glass bulb. (1 mark)

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(c) The hydrometer above has a mass of 25g and allowed to float in oil of density  $0.8\text{g/cm}^3$  with 6 cm of its stem above the oil. If the cross-sectional area of the stem is  $0.5\text{cm}^2$ , find the length of its stem out of freshwater, if it is transferred and made to float in freshwater.  
(4 marks)