KCSE MOCKS

PHYSICS PAPER 1

Consists 3 KCSE Mock set Exams.

(Class of KCSE March 2021)

For Marking Schemes Contact Mr Machuki
0795491185

PRE-MOCK 1

NAME:……..……..INDEX……..…….

ADM…… SCHOOL:……..

SIGNATURE……..… ……

232/ 1

PHYSICS

PAPER 1

TIME 2hrs

KCSE PRE-MOCK 1

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- *write your name and your class in spaces provided*
- *This paper consists of two sections, **section A** and **section B***
- *Answer **ALL** the questions in each section in the spaces provided.*
- *Mathematical tables and Electronic calculators may be used*
- *All working must be clearly shown where necessary.*

For Examiner's Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1-10	25	
B	11	12	
	12	11	
	13	15	
	14	17	
	TOTAL	**80**	

SECTION A (25 MARKS)

Answer <u>ALL</u> the questions in this section in the spaces provided

1. The level of water in a burette is at 30 cm^3. 400 drops of water each of volume 0.015 cm^3 was removed from the burette. Determine the new level of water in the burette [3 mks]

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2. Calculate the temperature change of water as it falls through a height of 20 m. (Take g = 10 N/kg and s.h.c of water = 4200 J/kg/K) [3 mks]

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3. State the SI unit of density [1 mk]

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4. Give a reason why heat transfer by radiation is faster than heat transfer by conduction [1 mk]

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5. A railway truck of mass 4000 kg moving at 3 m/s collides with a stationary truck of mass 2000 kg. The couplings join and the trucks move off together. Calculate their common velocity after collision. [3 mks]

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6. State the principle of moments [1 mk]

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7. An air bubble with a volume of 1 cm^3 escapes from the helmet of a diver at a depth of 200 m below the water surface. What will be the volume of the bubble immediately it breaks the surface of water? (Take atmospheric pressure = 10 m of water) [4 mks]

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8. Calculate the acceleration due to gravity on a planet where an object released from rest falls through a height of 54.2 m in 1.08 s. [3 mks]

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9. State the three factors on which the rate of heat flow depends on. [3 mks]

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10. Under a driving force of 3000 N, a car of mass 1200 kg has an acceleration of 1.3 m/s^2. Find the frictional resistance acting in the car. [3 mks]

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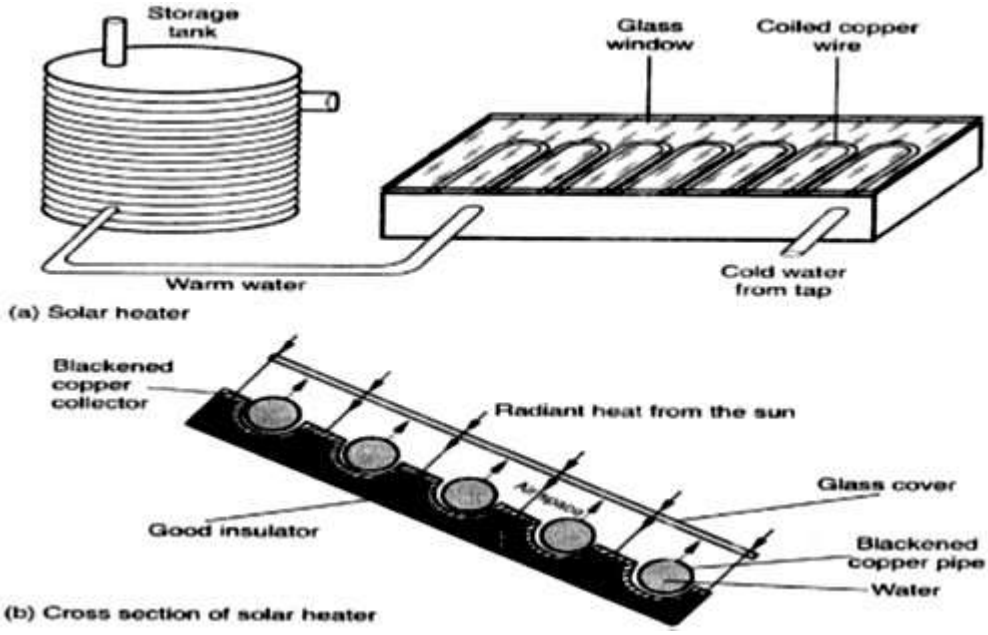
SECTION B (55 MARKS)

Answer ALL the questions in this section 11.

a) Explain the following as regards the solar heater:



i) Why the pipe is fixed to a dark-coloured collector plate. [1 mk]

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ii) Why the pipe is made of copper [1 mk]

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iii) Why the pipe is coiled several times [1 mk]

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iv) Why the collector plate is fixed to an insulator. [1 mk]

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v) Why the panel front is covered with glass. [1 mk]

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b). Liquids expand when heated and contract when cooled. However this is not always true for water.

i. What name is given to the behavior of water? [1 mk]

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ii. States two importance of this behavior of water. [2 mks]

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iii. State any two disadvantages of this behavior. [2 mk]

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iv. A man wants to fit a brass ring onto a steel rod of diameter equal to the inner diameter of the ring. Explain how this can be achieved [2 mk]

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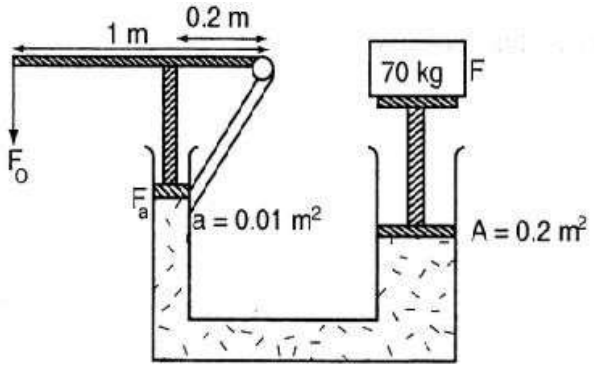
12. The figure below shows a hydraulic press supporting a load F.



a) What properties of liquids make them suitable for use in hydraulic machines such as the one above? [2 mks]

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b) If **A** and **a** are areas of cross-section of the pistons, and the lengths of the arm are as given, find:

i. The force F_o [3 mks]

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ii. The mechanical advantage [1 mks]

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iii. The efficiency of the machine [3 mks]

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iv. State two reasons why the efficiency of a pulley system is always less than 100% [2 mks]

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13. a) You are provided with the following:-

- A block of wood
- A spring balance
- Thin thread
- Overflow can
- A small measuring cylinder
- Some liquid

With the aid of a labeled diagram describe an experiment to the law of floatation. [4 mks]

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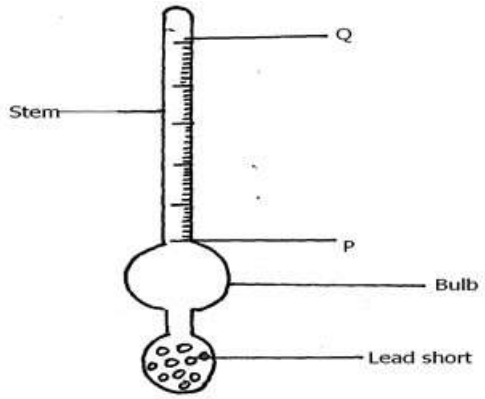
b) The diagram below shows a car acid hydrometer.



(i) Indicate on the diagram above the minimum and the maximum measurement to be taken. [2 mks]

(ii) State the reason why the bulb is wide. [2 mks]

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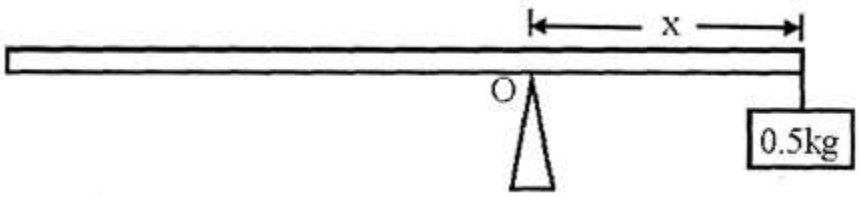
c) (I) Figure below shows a uniform plank of weight 20N and length 1.0m balanced by a 0.5kg mass at a distance x from the pivot point O.



Determine the value of X [2 mks]

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(II) When the block is completely immersed in water the pivot **O** must shift by 0.05 m to the left for the system to balance. The density of water is 1000 kgm^{-3}.Determine:

i) The upthrust U on the block. [3 mks]

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ii) The volume of the block. [2 mks]

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14. a) i) Distinguish between elastic and inelastic collisions. [2 mks]

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ii) A body of mass 5 kg is ejected vertically to a height of 7.2 m from the ground when a force acts on it for 0.1s. Calculate the force used to eject the body.

[3mks]

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b) i) Explain why the moon is said to be accelerating when revolving around the earth at constant speed [2mks]

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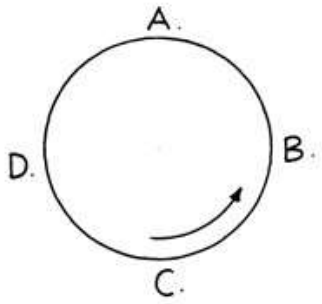
c) A stone is whirled in a vertical circle as shown in the figure below using a string of length 40 cm. A, B, C and D are various positions of the stone in its motion. The stone makes 2 revolutions per second and has a mass of 100g.



i) Calculate:

I. The angular velocity [3mks]

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II. The tension on the string at position A [3 mks]

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(ii) At C where the stone has acquired a constant angular speed, the string cuts. The stone takes 0.5 seconds to land on the ground. How high is point C above the ground. [2 mks]

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iii) How far does it travel horizontally before hitting the ground. [2 mks]

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MOCK 1

NAME:……. INDEX NO:…….. ……

SCHOOL…… SIGNATURE:…….....

231/1
PHYSICS
PAPER 1 (THEORY)
TIME: 2 HOURS

KCSE MOCK 1

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index number in the spaces provided above.
(b) Sign and write the date of the examination in the spaces provided above.
(c) This paper consists of sections: A and B.
(d) Answer all the questions in sections A and B in the spaces provided.
(e) All working must be clearly shown.
(f) Mathematical tables and electronic calculators may be used.

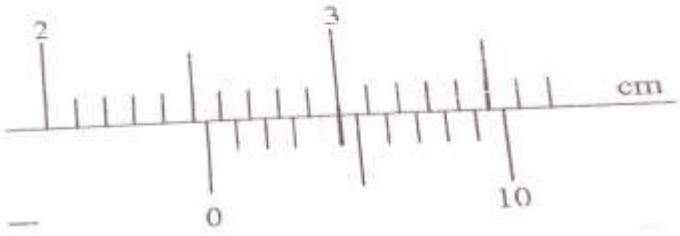
Take g = 10N/kg

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-11	25	
B	12	11	
	13	10	
	14	12	
	15	7	
	16	6	
	17	9	
TOTAL SCORE		80	

SECTION A – 25 MARKS (ANSWER ALL THE QUESTIONS)

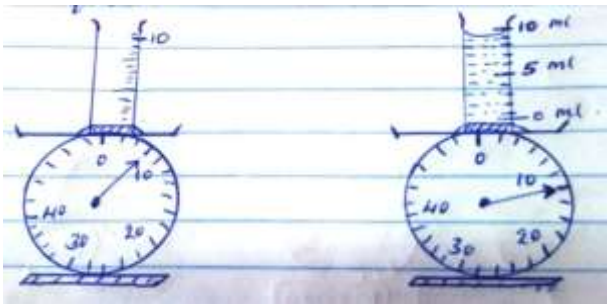
1. The vernier callipers in the figure below has a zero error of -0.05cm.



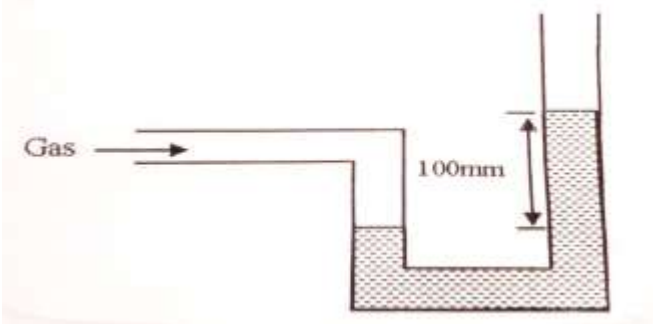
State the actual reading of the measuring instrument (2 marks)

2. Fig.1(a) and (b) shows a set – up to determine the density of a liquid. The balance is calibrated in grams.

Determine the density of the liquid. (3mks)



3. The figure below shows an open-ended monometer with water connected to a gas supply



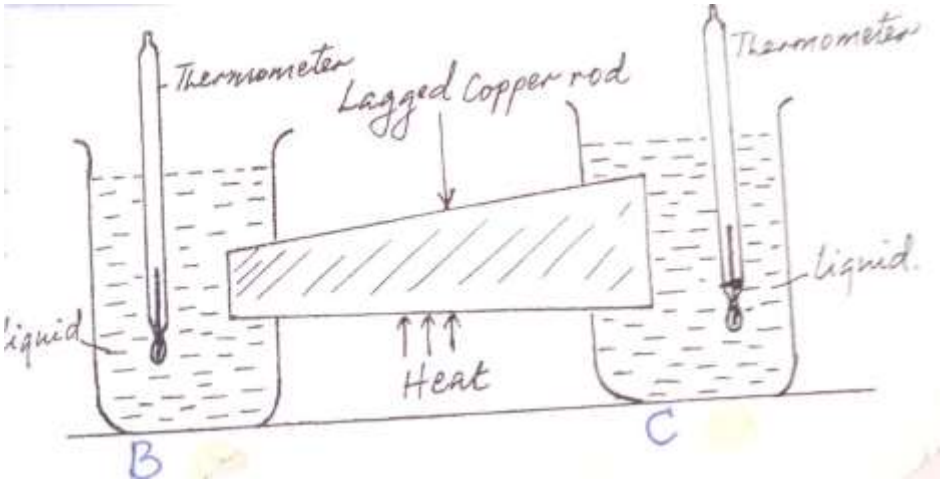
If a mercury barometer reads 760mm, calculate the pressure of gas (give your answer in N/m^2).

(Density water = 1 g/cm^3, density of mercury = 13.6 g/cm^3 (3 marks)

4.An object weighs 49N on earth where gravitational acceleration is 9.8N/Kg and 40.5N on another planet. Determine the gravitational acceleration on the planet (2 marks)

5.A measuring cylinder contains $20cm^3$ of water. $10cm^3$ of salt is added and stirred. Explain why the new volume is not $30cm^3$ (2 marks)

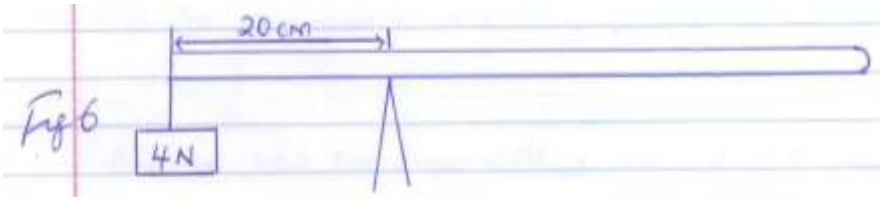
6.The figure below shows samples of same liquid B and C being heated through a well-lagged copper rod of non-uniform thickness. A thermometer is placed on each sample for some time.



If the rod is heated at the middle, state and explain which of thermometers records a higher temperature (2 marks)

7. Give one reason why boiling water cannot be used to sterilize a clinical thermometer (1mark)

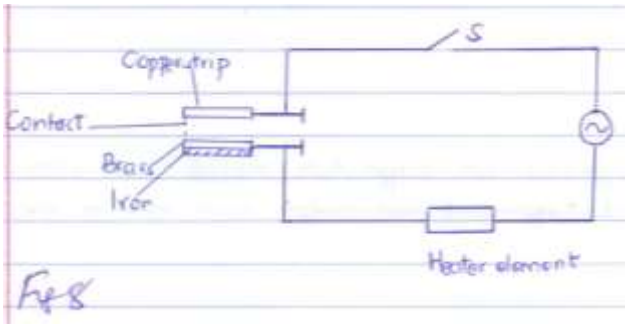
8. The figure 6 below shows a uniform 50cm rod. It is balanced horizontally by a load of 4N on one end. Calculate the weight of the rod 2mks)



9. Explain why a car feels lighter as it travel at a higher velocity. (2mks)

10. Pure water at 0^0c is heated up to 10^0c. Sketch the graph of volume against temperature on the axes given below 2mks)

11. The figure 8 below shows a circuit diagram for a device for controlling the temperature in a room.



i) Explain the purpose of the metallic strip 2mks)

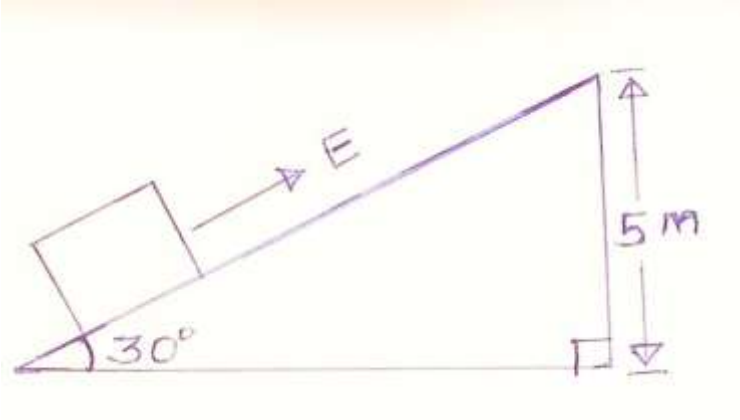
ii) Describe how the circuit controls the temperature when the switch S is closed 2mks)

SECTION B – 55 MARKS (ANSWER ALL THE QUESTIONS)

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

(b) A man pushes a load of mass 80kg up an inclined plane through a vertical height of 5m as shown below. The inclined plane makes and angle of 30^0 to the horizontal (take g to be $10m/s^2$)

(i) Determine the velocity ratio of the inclined plane. (2 marks)

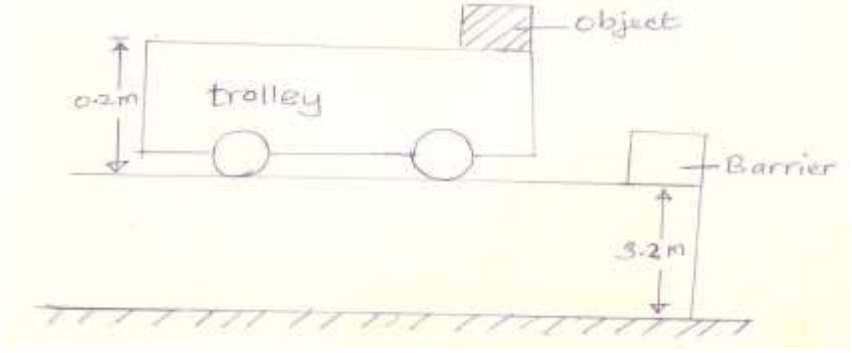


(ii) If the efficiency of the plane is 75% determine:

(I) The mechanical advantage (2 marks)

(II) The effort E, needed to pull the load up the plane. (2 marks)

(c) A trolley of height 0.2m moving on a horizontal bench of height 3.2m strikes a barrier at the edge of the bench. The object on top of the trolley flies off on impact and lands on the ground 2.5m from the edge of the bench as shown below. Use this information to answer the questions that follow:



(i) Give a reason why the object on the trolley flies off on impact (2 marks)

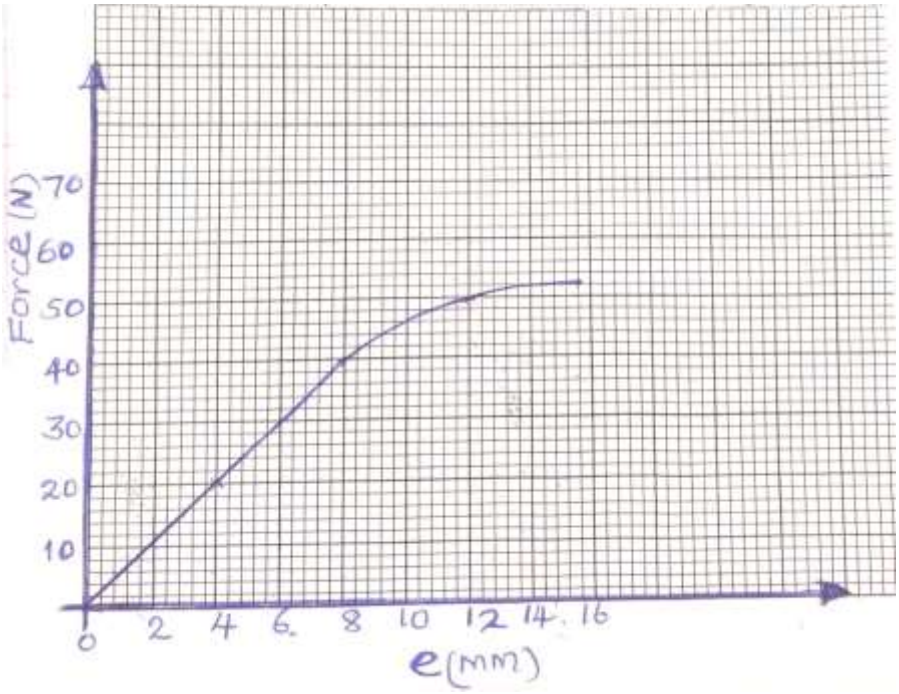
(ii) Determine the time taken by the object to land on the ground (2 marks)

13. (a) State Hooke's Law (1 Mark)

(b) (i) A vertical spring of unstretched length of 30cm is clamped at its upper end. When sand is placed in a pan attached to the lower end of the spring its length becomes 45cm. When 20g mass is placed on top of the sand the length increases to 55cm. Determine the mass of the sand (3 marks)

(ii) If the spring in (b)(i) above is compressed from its original length to a length of 24cm, calculate the work done in compressing the spring. (3 marks)

(c) The graph below shows the relationship between (F) against extension (e) of a spring.

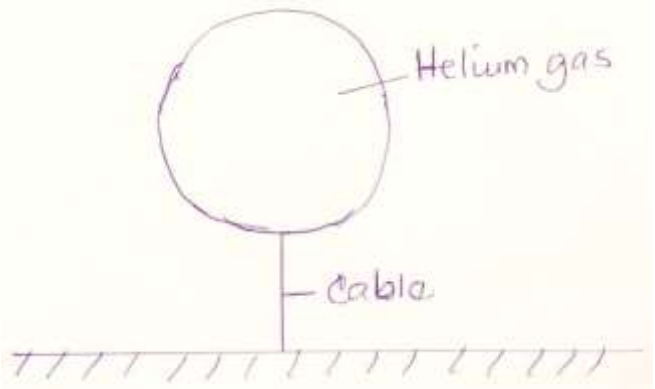


Determine the spring constant of the spring (3 marks)

14. (a) State Archimedes Principle (1 mark)

(b) Explain one application of Archimedes Principle in real life situation (2 marks)

(c) The mass of the fabric of a large balloon is 500g. The balloon is inflated with 2000m^3 of helium gas. The balloon is attached to a cable tied on the ground as shown. (Density of helium and air are 0.18g/cm^3 and 1.3g/cm^3 respectively.

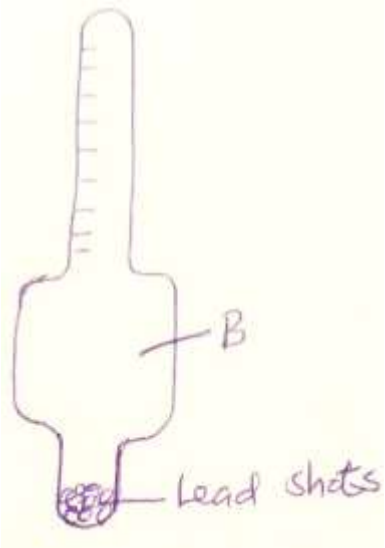


(i) State 3 forces acting on the set up. (3 marks)

(ii) Determine the tension in the cable (3 marks)

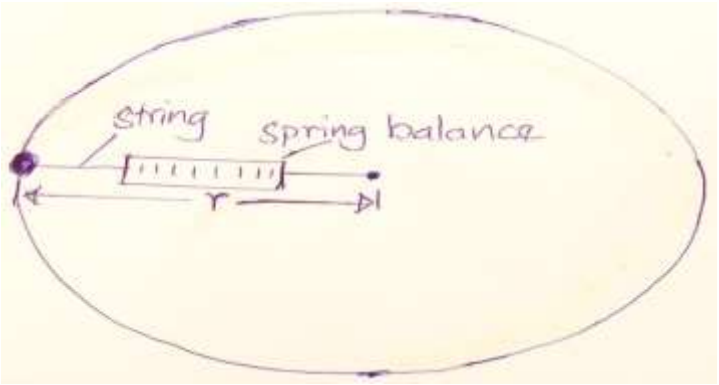
(iii) Calculate the acceleration of the balloon if the cable is cut. (2 marks)

(d) The diagram below shows a hydrometer.



Why is the part marked B wider? (1 mark)

15. The diagram below shows a spring balance tied to an object of mass M and rotated in a circular path of radius r.



(a) (i) State the force that keeps the object moving in a circular path. (1mark)

(ii) The speed of the object is constant but the body is accelerating on the circular path. Explain (1 mark)

(b) (i) If the object is whirled faster, what would happen to the spring balance reading? (1 mark)

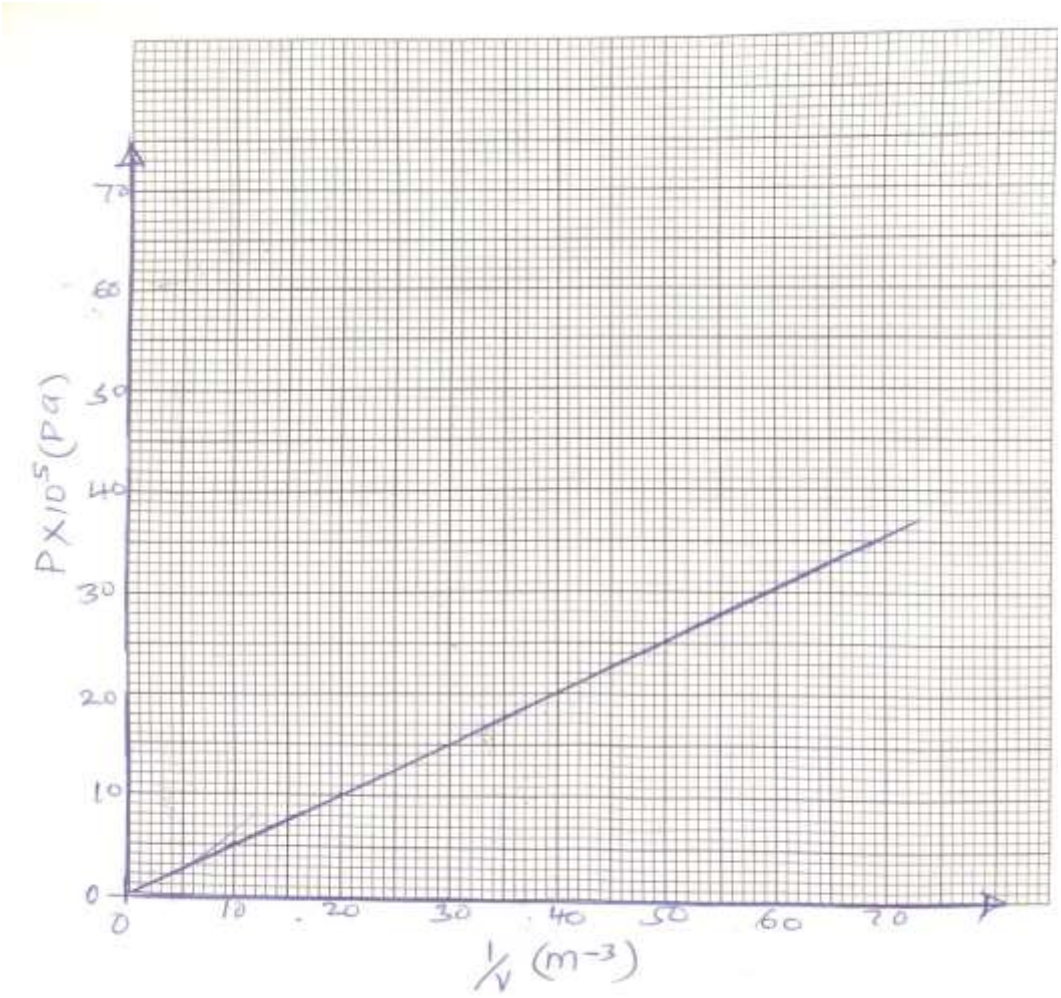
(ii) Give a reason for your answer in b (i) above (1mark)

(iii) As the object is whirled round, the sting snaps and cuts off. Describe the subsequent path of the object (1 mark)

(c) If the mass m of the object s 500g and radius r is 50cm. determine the velocity of the body if the spring balances reads 81N (3 marks)

16. (a) State the pressure law for an ideal gas. (1 mark)

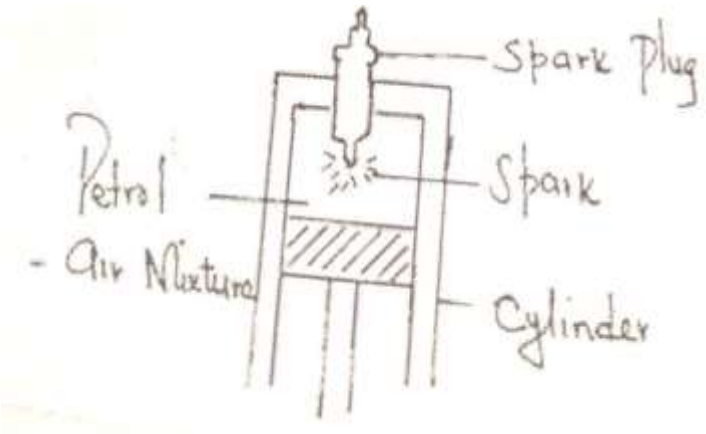
(b) The pressure P of a fixed mass of gas at constant temperature of T = 200k is varied continuously and the values of corresponding volume recorded. A graph of P against $\frac{1}{v}$ is shown on the graph below.



Use the graph to:

(i) Determine the volume of the gas when pressure reads 2.8 x 10^5 pa (2marks)

(d) The petrol air mixture in the cylinder of a car engine is ignited when the piston is in the position shown below.



Use kinetic theory of matter to explain why the piston moves down. (3 marks)

17.(a) Define the term specific heat capacity. (1mk)

(b) 100g of steam of 100^0C was passed into cold water at 27^oC. The temperature of the mixture became 500C. Taking specific heat capacity of water as $4200Jkg^{-1}K^{-1}$ and specific latent heat of vaporization of water as $2260kJkg^{-1}$ and that heat losses were negligible. Determine

(i) Quantity of heat lost by steam. (2mks)

(ii) Quantity of heat gained by water. (3mks)

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

POST MOCK 1

Name ……..…… Index No: ……..…….…

Candidate's Signature ……...……. Date: …….

232/1
PHYSICS
(THEORY)
Paper 1

Time: 2 Hours

KCSE POST MOCK 1

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTION TO CANDIDATES

- Write your name, index number and school in the spaces provided.
- This paper consists of TWO sections: A and B
- Answer ALL questions in section I and II in the spaces provided.
- ALL workings MUST be clearly shown.
- Mathematical tables and electronic calculators may be used.

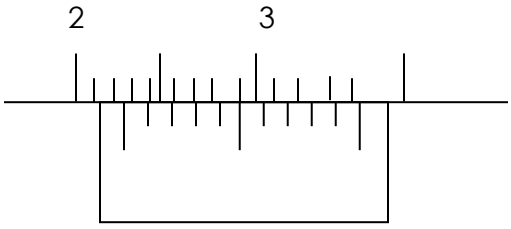
For examiner's use only:

Section	Question	Maximum score	Candidate's score
A	1 – 10	25	
B	11 12 13 14 15	11 12 11 10 11	
	Total	80	

*This paper consists of **11** printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.*

SECTION A (25 Marks)

1. Figure below shows part of a scale of a vernier calipers. What is the reading indicted by the scale? (2 marks)



2. A horse pipe of internal diameter 4 cm is connected to a sprinkler with 25 holes each of diameter 0.04 cm, the water in the pipe flows at a speed of 5 cm/s. Determine the velocity with which the water leaves the sprinkler. (3 marks)

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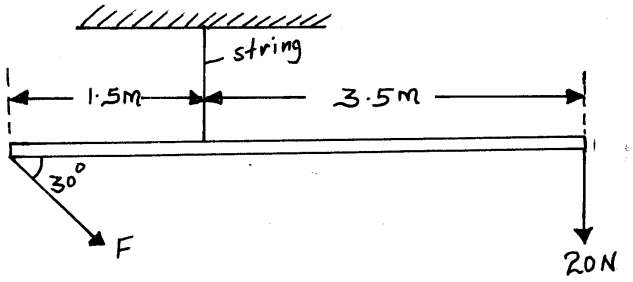
3. The figure below shows a uniform bar of weight 8N. It is acted on by two forces as shown.



Determine the value of F. (3 marks)

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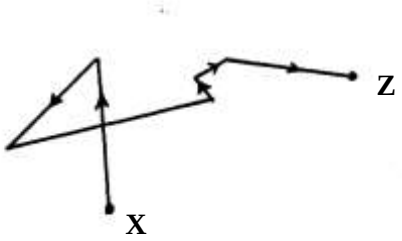
4. The figure below shows a path taken by a gas molecule moving from point x to z



(a) Explain how this movement can be observed (1 mark)

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(b) State in full, the law of motion that governs movement from x to z (1 mark)

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5. a) State **one** factor that a bimetallic strip relies on for its working (1 mark)

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b) Two objects made of the same material and having the same mass are heated to a temperature of 35^{o}C above that of the atmosphere and then allowed to cool in still air for 30 minutes. State one factor that will determine their final temperature (1 mark)

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6. (a) What is surface tension? (1 mark)

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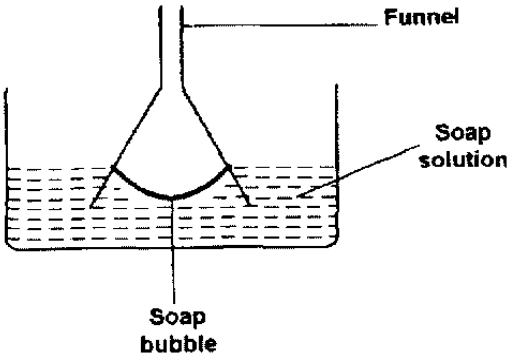
(b) The figure below shows a funnel dipped into a liquid soap solution.



Explain what happens to the soap bubble when the funnel is removed. (2 marks)

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7. A solid displaces 8.5cm^3 of liquid when floating on a certain liquid and 11.5cm^3 when fully submerged in the liquid. The density of the solid is 0.8g/cm^3, determine upthrust on the solid when it is floating (3 marks)

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8. Fifty drops of oil have a volume of 1.0cm^3. If a drop of oil forms an oil patch of diameter 20cm, determine the size of the oil molecule. (2 marks)

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9. In a faulty mercury-in-glass thermometer was found that the mercury level stands at 3 cm mark in the tube at 0^0 C and 18 cm when in steam above boiling water at normal atmospheric pressure. Calculate the temperature when the mercury stands at 12 cm mark. (3 marks)

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10. Give two reasons why mercury is preferred to water in the manufacturing of barometers (2 marks)

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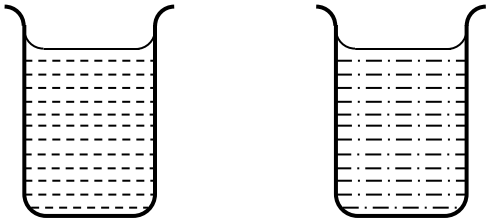
SECTION B (55 Marks)

11. (a) The figure below shows two containers filled with two different liquids to the same height.



It was found that the pressure at the bottom of A is greater than that at B. Explain (1 mark)

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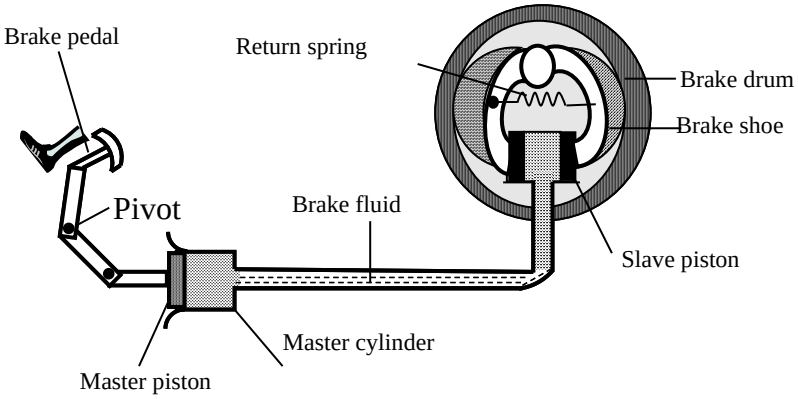
(b) The figure below shows a car braking system. The brake fluid is an oily liquid.



The brake drum rotates with the wheel of the car.

(i) Explain how pushing the brake pedal makes the brake rub against the drum. (4 marks)

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(ii) The cross-sectional area of the master piston is $2.0cm^2$. A force of 140N is applied to the master piston.

(I) Calculate the pressure created in the brake fluid by the master piston. (2 marks)

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(II) The cross-sectional area of each slave piston is $2.8cm^2$. Calculate the force exerted on each slave piston by the brake fluid. (2 marks)

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(III) The force exerted on the master piston is greater than the force applied by the foot on the brake pedal. Using the principle of moments, explain this. (2 marks)

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12. (a) State two factors that affect the magnitude of centripetal force of an object moving along a curved path. (2 marks)

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(b) A stone is tied to a light string of length 0.5m. If the stone has a mass of 20g and is swung in a vertical circle with a uniform angular velocity of 6 revolutions per second, determine.

(i) The period T. (2 marks)

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(ii) The tension of the string when the stone is at
I. The bottom of the swing. (3 marks)

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II. The top of the swing. (2 marks)

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III. The linear velocity. (3 marks)

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13. a) Define the term uniform acceleration. (1 mark)

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b) A rocket was launched vertically upwards with uniform acceleration of $100ms^{-2}$ for 20 seconds. After this the rocket was acted upon only by a constant gravitational force.

(i) Calculate the maximum height reached by the rocket (3 marks)

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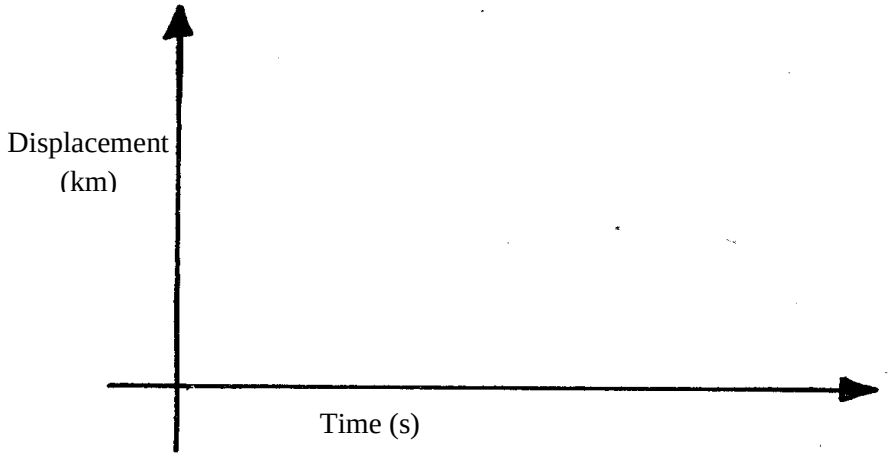
(ii) Draw to scale, on the axes provided below, the displacement – time graph for the motion of the rocket. (2 marks)



(iii) State Newton's second law of motion. (1 mark)

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(iv) A car of mass 800Kg is initially moving at a speed of 25m/s. Calculate the constant force required to bring the car to rest over a distance of 20m. (4 marks)

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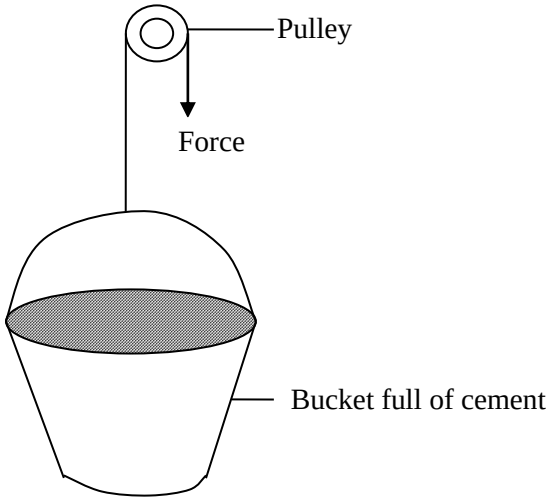
14. A worker on a building site raises a bucket full of cement at a slow steady speed using the pulley as shown below.



The weight of the bucket and cement is 200N. The force F exerted by the worker is 210N

a) State why F is bigger than the weight of the bucket and cement. (1 mark)

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b) The bucket is raised through a height by 4m. Determine the distance through which the worker pulls the rope. (1 mark)

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c) How much work is done on the bucket and cement? (2 marks)

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d) State the kind of energy gained by the bucket. (1 mark)

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e) Determine the total work done be the worker. (3 marks)

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f) Calculate the efficiency of the machine used by the water. (2 marks)

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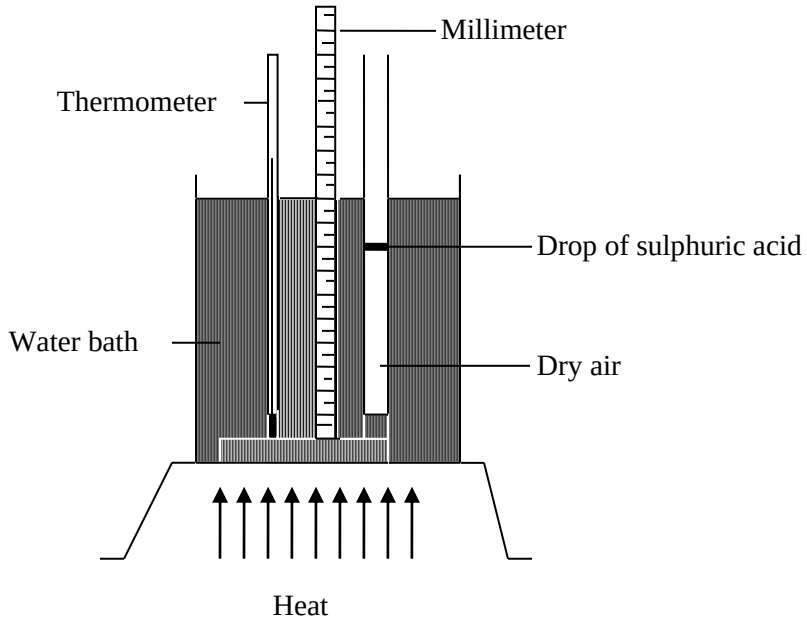
15. (a) The figure below shows a set-up that may be used to verify Charles' law.



(i) State the measurements that should be taken in the experiment. (2 marks)

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(ii) Explain how the measurements taken in (i) above may be used to verify Charles' law.

(2 marks)

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(iii) A certain mass of hydrogen gas occupies a volume of 1.6cm^3 at a pressure of 1.5 x 10^5 pa and temperature of 12^o C. Determine its volume when the temperature is 0^{o}C at a pressure of 1.0 x 10^5 pa. (2 marks)

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(b) (i) An electric kettle connected to a 250V mains supply draws a current of 4.0A. It contains 1 litre of water with 1 kg of ice, all at 0^{0}C. Neglecting all heat losses, including heat absorbed by the kettle, find the time taken for all the ice to be just melted. (Take specific latent heat of fusion to be 3.34 x 10^5 J/kg and latent heat of vaporization is 2.26 x 10^6 J/kg Specific heat capacity of water is 4.2J/g). (2 marks)

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(ii) Determine the time taken until half the contents of the kettle boils away. (3 marks)

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