NAME:…………………………………………..……...INDEX…………………..………………………….

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SIGNATURE…………….… ………………………………

232/ 1

PHYSICS

PAPER 1/232

TIME 2hrs

SUKELLEMO JOINT EXAMINATION

**Kenya Certificate of Secondary Education 2020**

**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 cm³. 400 drops of water each of volume 0.015 cm³ 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 cm³ 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/s². Find the frictional resistance acting in the car. [3 mks]

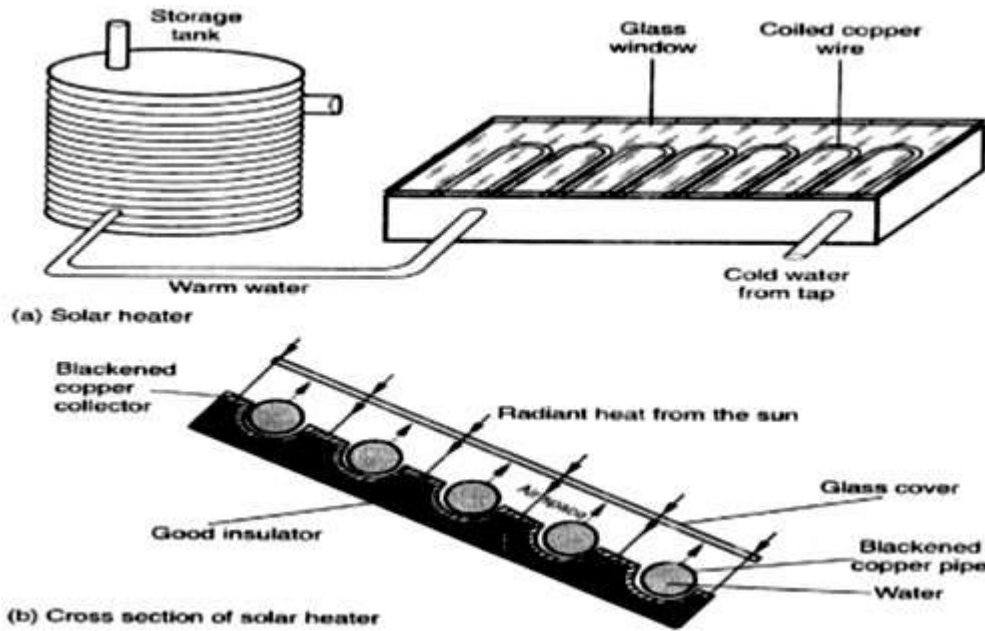……………………………………………………………………………………………………………………

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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:



(a) Solar heater

(b) Cross section of 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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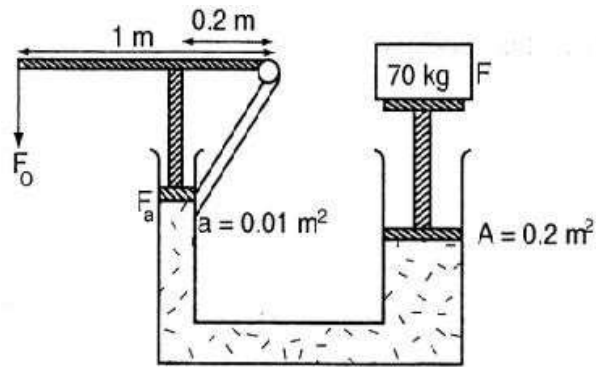
iv.    A man wants to fit a brass ring onto a steel rod of diameter equal to the inner diameter of the ring.  Explain how

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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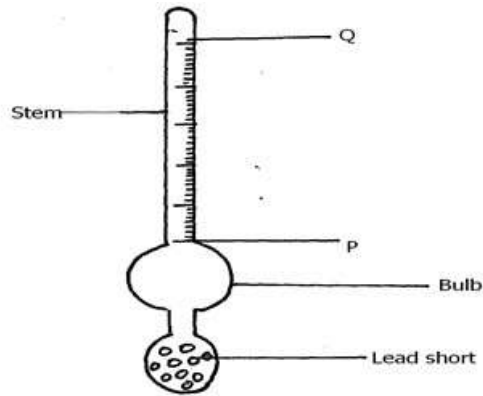…………………………………………………………………………………………………………………………

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b) The diagram below shows a car acid hydrometer.
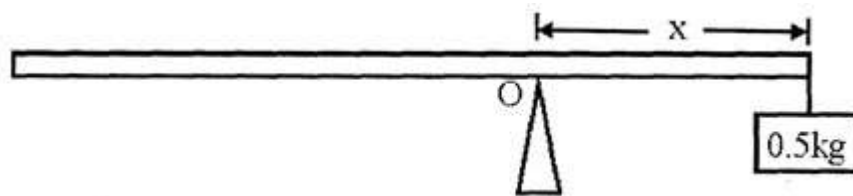


(i) Indicate on the diagram above the minimum and the maximum measurement to be taken.          [2 mks]

(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.

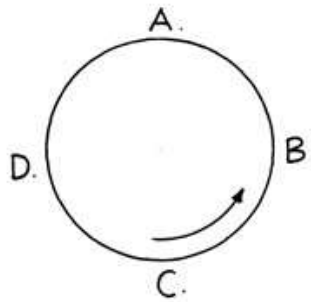                                                                                                          [3mks]

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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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