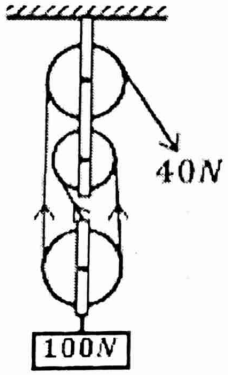
PHYSICS

NAME .....STREAM.....

ISTRUCTIONS **TIME**: 1 hour 45 minutes

- Answer **all** questions

1. The effort required to raise a load of **100N** is **40N** as shown below.



Calculate; a) Mechanical advantage (**2 mks**)

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. b) Efficiency (**2 mks**)

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c) Name two areas where pulleys are commonly applied in real life. (**2mks**)

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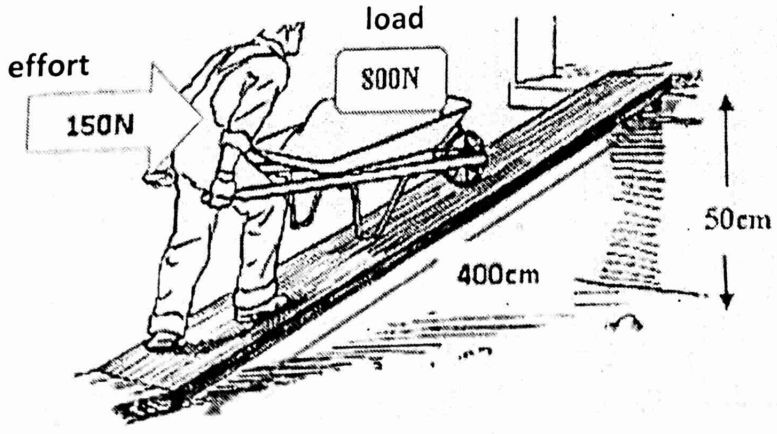
2. A loaded wheelbarrow weighting **800 N** is pushed up an inclined plane by a force of **150 N** parallel to the plane, if the plane rises **50 cm** for every **400 cm** length of the plane as shown below. Find the **velocity ratio, mechanical advantage. (4 mks)**



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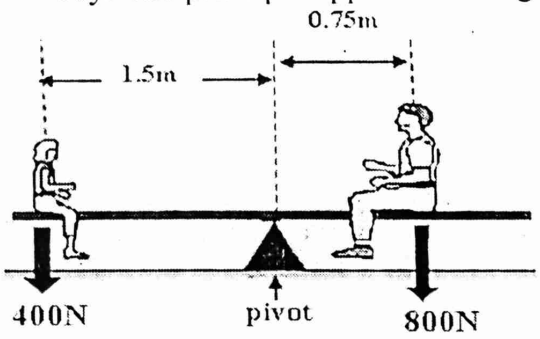
3. The figure below shows the two people playing on a seesaw, one big man and another small boy. The principle applied in this game is called.....(**1mk**)



a) State what would be observed if the smaller boy moved nearer the pivot (**1mk**)
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b) Which two factors affect moment of a force from above figure. (**2mks**)
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c) Use the information given in the diagram above to prove the principle of moments mathematically. (**2mks**)
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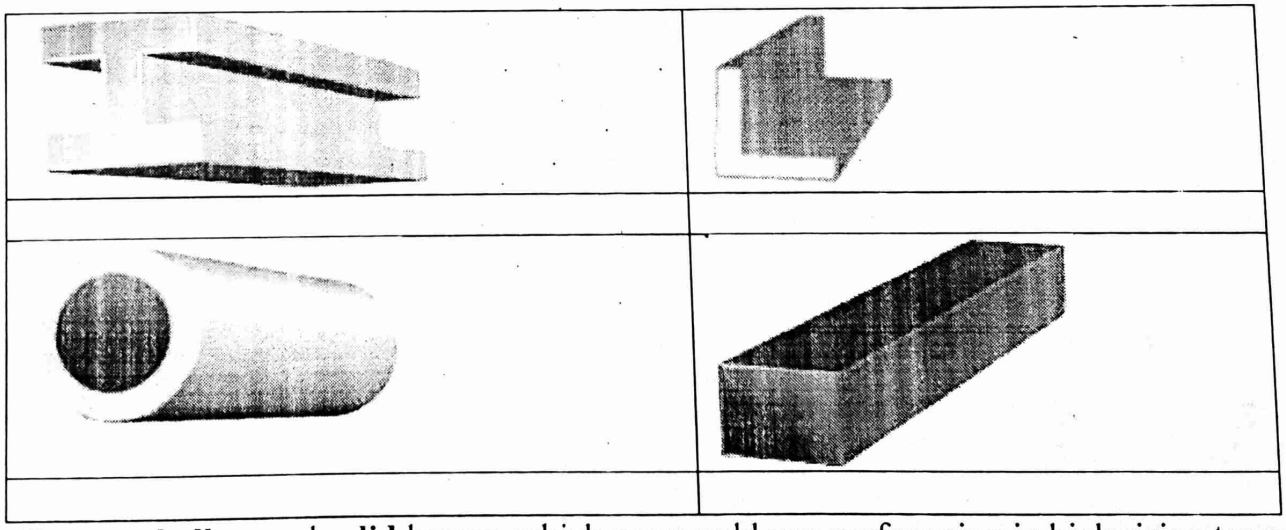
4. A beam is along piece of materials of uniform cross-sectional area. It can be wooden, metallic, concrete. It carries the weight of the part of the building or other structures.

a) Identify by naming the shapes of beams used in the structure shown below. (**2mks**)



b) Between **hollow** and **solid** beams, which one would you prefer using in high rising towers like **MAPEERA HOUSE**. Explain why you think so? (**2mks**)
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c) If you were provided with three types of beams which includes; **wooden**, **metallic**, **reinforced concrete**. *Using knowledge of mechanical properties, compressive strength and tensile strength*, identify the most commonly used beam in Uganda today and explain why it's the most used of the three beams above. (**2mks**)
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d) Name any two structures where beams are applicable (**1mk**)
(i).....(ii).....

e) Your dad wants to construct a strong gate at home using reinforced concrete beam. Guide your uncle by listing down the right components of **reinforced concrete** that he should buy from the hardware. **(3mks)**

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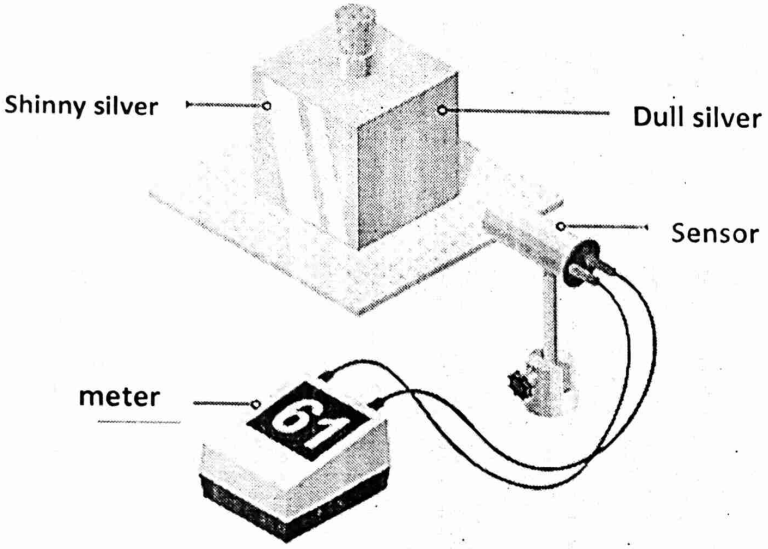

A student investigates how the surface of an object affects the **radiation** it emits. The image below shows the equipment he uses:

The cube has **four** different **surfaces**. He fills the cube with boiling water so that the temperature of each surface is the same. He uses the radiation sensor to measure the radiation emitted from each surface.

His readings are shown in the table below.

a) Draw a line from each surface colour to its correct meter reading. One has been done for you. **(3mks)**

b) Give a reason why the radiation sensor gives a different reading for each surface. **(2mks)**

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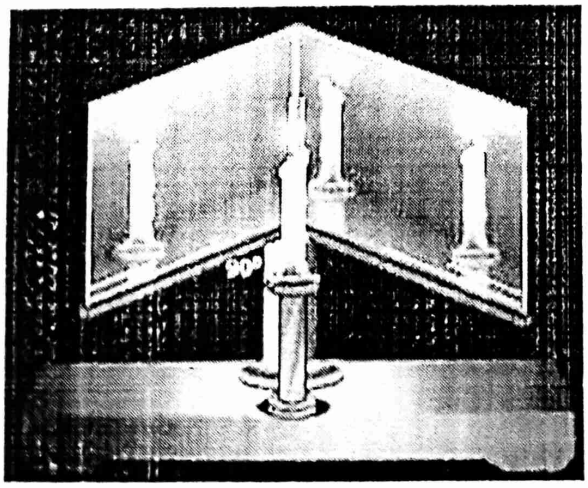
Surface colour	Meter reading
Shiny black	87
Dull black	61
Dull silver	70
Shiny silver	47

5. When mirrors are inclined to each other, a number of images may be formed. The picture below shows images of a candle placed between two plane mirrors inclined at 90^0 to each other



a) How many images are formed? ..... **(1mk)**

b) How many images would be formed if the mirrors were inclined at 60^0 to each other? **(2mks)**

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c) What are the features of images by plane mirror shown? **(2mks)**

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d) Where are plane mirrors commonly used today? **(2mks)**

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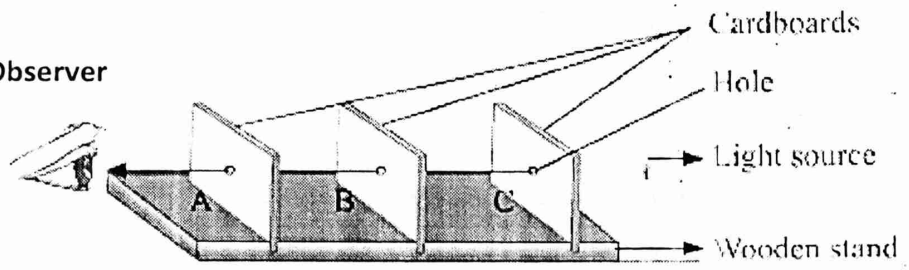
6. In a certain experiment to investigate nature of light, the following set up was arranged



a) What property of light is he investigating? (1mk)

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b) Describe the procedures followed when carrying out the above experiment. (**4mks**)

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c) What conclusion can you draw from the above investigation? (**1mk**)

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7. Most substances **expand** when they are **heated**. A balloon may become several times larger when it is heated. Solids expand so **little** that it is hard to measure. Gases expand almost **3,000** times more than solids when they are heated over the same amount of temperature.

a) Explain why this happens (**3mks**)

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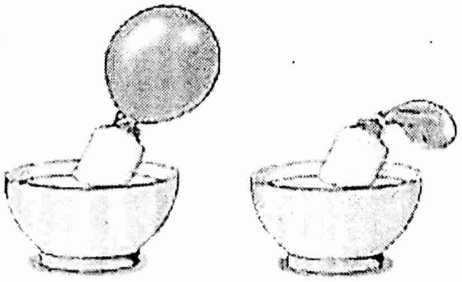
b) If an inflated balloon is tied at the mouth of a bottle and the bottle is placed in ice-cold water as shown in the picture below.



a) State and explain what happens to the balloon (**3mks**)

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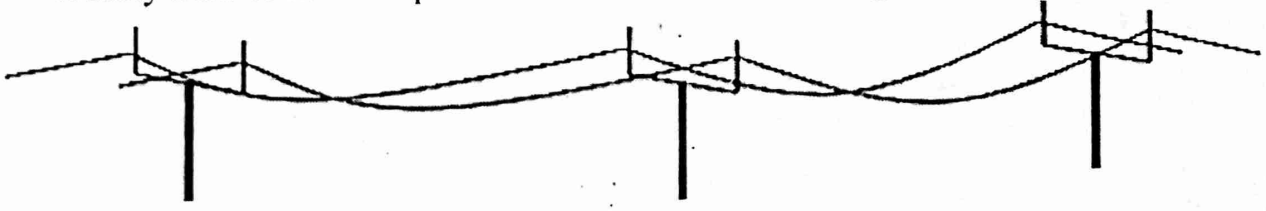
c) Transmission cables (wires) are normally not pulled tightly during installation but are loosely held or have loops at various intervals over long distances as shown below.



Explain why it is left to sag. (**2mks**) .....

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The end (Great effort deserves great reward)