

BISHOP CIPRIANO KIHANGIRE SSS
SENIOR THREE PHYSICS EOT 1 ASSESSMENT 2023

INSTRUCIONS: Attempt all questions

Question 1 and 2 to be attempted in spaces provided, questions 3 and 4 to be attempted in the answer booklet.

Time : 1 Hr 30 min

1. A plumber noticed that the bath in Etomet's home was not functioning satisfactorily because the water pressure at the showerhead shown in Figure 4 was too low.

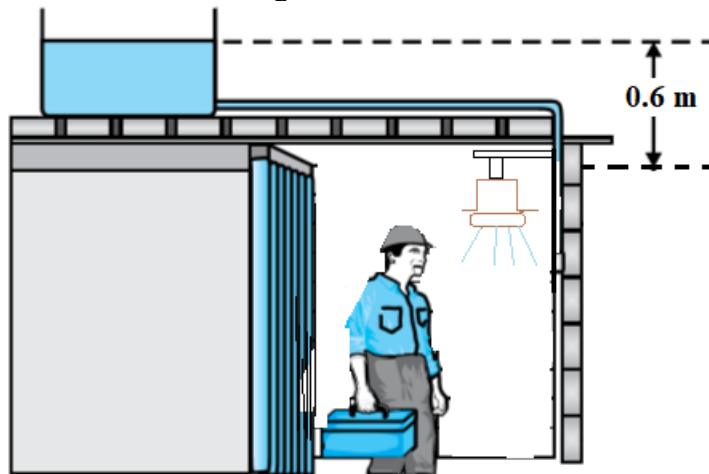


Figure 4

Taking density of water = 1000 kg m^{-3} , $g = 10 \text{ N kg}^{-1}$,

What is the water pressure at the showerhead?

(3 marks)

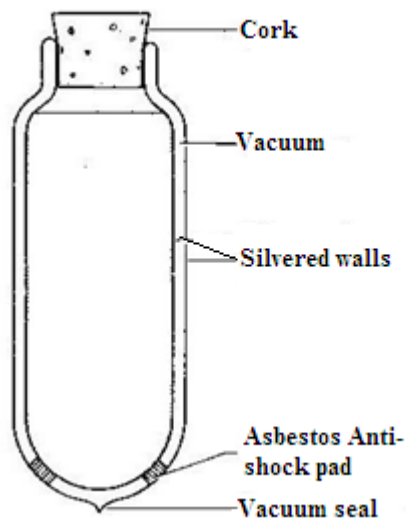
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a) What must the plumber do to increase the water pressure at the showerhead to $15,000 \text{ Pa}$?

(2marks)

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2. The figure below shows a thermos flask used to maintain the temperature of tea.



You have been asked to respond to the following issues which have been brought to you by the user.

a) The plastic cork of the flask is worn out and the owner of the flask is considering replacing it with a metallic stopper which would be more lasting.

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(2.5 marks)

b) The outer wall of the flask has developed a small crack. The owner does not consider this to be a major issue as the liquid inside the flask will remain intact. .

(2.5 marks)

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3 a) Your friend wants to buy a mirror to be used as a shaving mirror. He has been told that a concave mirror is by far better than a plane mirror for that purpose.

Your friend does not agree to the suggestion and says that “sometimes you cannot see your image in the concave mirror”.

As a physics student who has learnt about curved mirrors, write to your friend a letter in which you explain

i) why a concave mirror is better than a plane mirror as a shaving mirror. (2 marks)

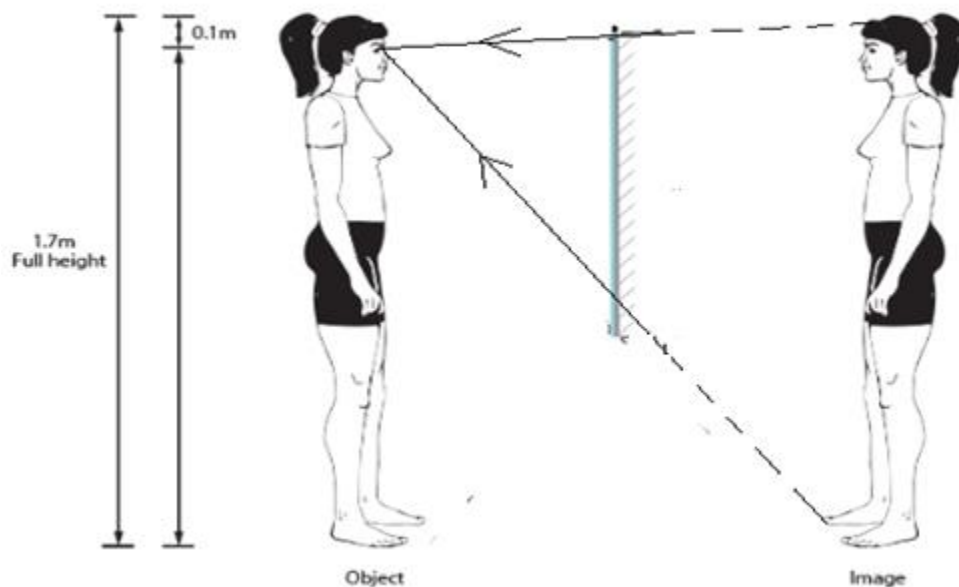
ii) What causes the image not to be seen in the concave mirror and suggest how it should be used to form the required image.

(2 marks)

b) A cloth seller wants to buy a plane mirror plane mirror which he will fix on a wall so that customers can see how they look in the cloth.

He mainly sells to adults whose average height is 170cm, with the eye level 10 cm from the hair

Below is a diagram illustrating how the image of the customer is formed behind the mirror.



i) State the characteristics of the image formed by the mirror (3 marks)

ii) The diagram shows how reflected rays form the image.

On the diagram in the question paper, indicate how rays from the hair and feet reach the mirror to result into the image. (3 marks)

iii) Help the cloth seller determine the minimum size of the mirror for the customer to see the whole of herself. (4 marks)

c) Nantongo Susan a student of senior three is investigating the nature of the image formed by a concave mirror. She places a lighting candle of height 10cm along the axis at a distance of 40cm Infront of a concave mirror of focal length 25cm.

By scale drawing,

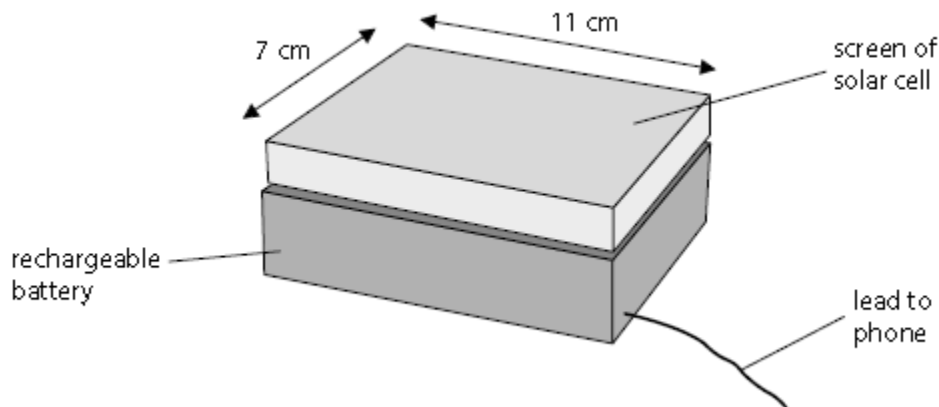
i) Determine the image position

ii) Image height

iii) magnification of the image

(6 marks)

4 (a) The figure below shows a solar-powered charger for a mobile phone.



The screen of the solar cell takes in energy from the Sun.

i) Describe the energy transformations from the Sun to the phone battery (3 marks)

(ii) Each second, 0.12 J of energy from the Sun reaches 1 cm² of the screen.

Calculate the total amount of energy reaching the whole screen in 10 seconds

(4 marks)

b) The table below shows energy sources and the percentage of usage in Uganda

Energy source	2022	2030
Hydroelectricity	80%	55%
Biogas	10%	5%
Heavy fuel oil	7%	28%
Solar power	3%	8%
Wind	0%	4%

Due to the discovery of oil and advancement in technology, Uganda is expecting that there will be significant changes in the percentage usage of energy by 2030.

i) Identify the renewable and non-renewable sources of energy. (3 marks)

ii) Discuss how the changes in energy usage are likely to affect the environment

(4 marks)

c) An object of mass 200Kg is thrown vertically upwards with a velocity of 10ms⁻¹.

- i) Determine the kinetic energy at the point it was thrown upwards.**
- ii) Determine the height of the object above the ground at a velocity of 3ms^{-1} as it moves upwards.**
- iii) Determine the maximum height that will be reached by the object (6 marks)**