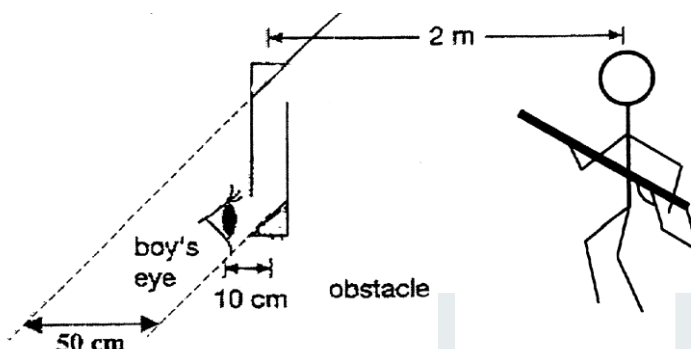


Physics

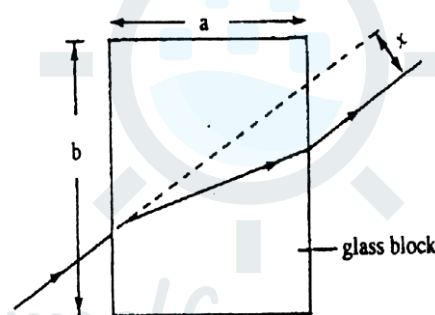
Topic: Light – Reflection and Refraction (WV4)
Worksheet 2

1. In a game of combat, a boy behind a shelter watches the movement of his enemy through a periscope as shown.
What is the distance of the enemy image from the boy?



- A 0.6m B 2.0m C 2.1m D 2.6m

2. The diagram shows a ray of light passing through a glass block. The distance between the original line of ray and the final line is marked x.

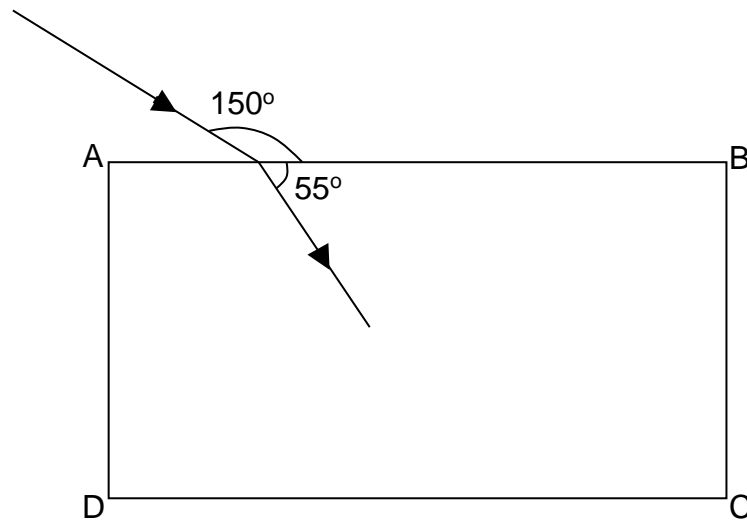


Which of the following does **not** influence the value of x?

- A. Width of the block, a.
B. Length of the block, b.
C. Angle of incidence.
D. Refractive index of the glass.
3. Which of the following describes the image formed in a plane mirror when compared to the object?

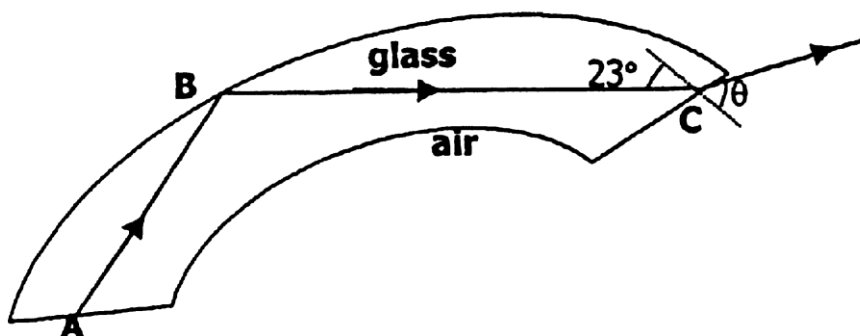
	<u>Image Type</u>	<u>Image size</u>
A.	Virtual	Smaller
B.	Virtual	Same
C.	Real	Smaller
D.	Real	Same

4. The diagram below shows a ray of light passing through a glass block ABCD.



- a. What is the angle of incidence? [1]
- b. What is the angle of refraction? [1]
- c. Calculate the refractive index of the glass block. [2]
- d. Complete the diagram to show the path of the light ray emerging from the glass block. [2]
- e. Light passing through the glass block is partially reflected at two places. Draw on the diagram, both the reflected rays. [2]
5. a. Define the critical angle between two media. [1]
- b. If the absolute refractive index of glass is 1.5, calculate the critical angle for a glass/air interface. [2]
- c. State two conditions for total internal reflection to occur. [2]

6. The figure shows a ray of light ABC moving along an optical fibre to its end at C.



- Explain why the ray does not leave the optical fibre at B.
 - Explain why the ray BC bends at C.
- If the refractive index of glass is 1.67, and the ray BC makes an angle of 23° with the normal to the glass surface at C, calculate the angle θ , shown on the figure.
 - State one advantage of optical fibre rather than copper cables for carrying telephone communications.

7. Fig. 11.1 shows the path of a ray of light through a glass prism with the apex angle A as 60° .

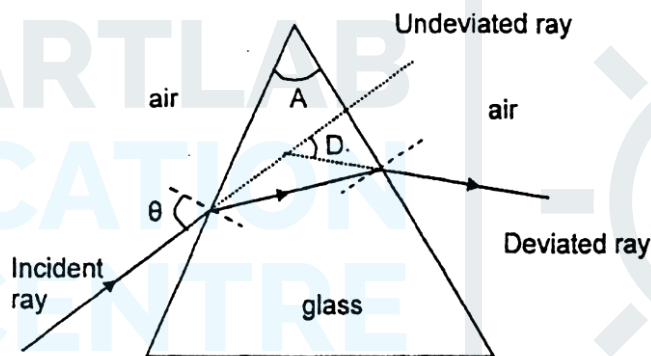


Fig. 11.1

a. It was suggested that the ray would follow exactly the same path if its direction was reversed. Describe how you would test this suggestion experimentally for the above ray.

b. As the angle of incidence θ is varied, the angle of deviation D also varies. The table below shows a set of experimental results measured.

θ in degree	33	35	37	41	44	50	56	60	65
D in degree	45	42	41	39	38	37	38	39	41

- Plot a graph of D against θ .
- Write down the value of the minimum angle of deviation D_m and the corresponding value of the angle of incidence.
- When the prism deviation is a minimum, the ray passes symmetrically through the prism. The refractive index n of the glass prism is then given by

$$n \sin \left(\frac{A}{2} \right) = \sin \left(\frac{A + D_m}{2} \right)$$

Use the equation to calculate a value of n.