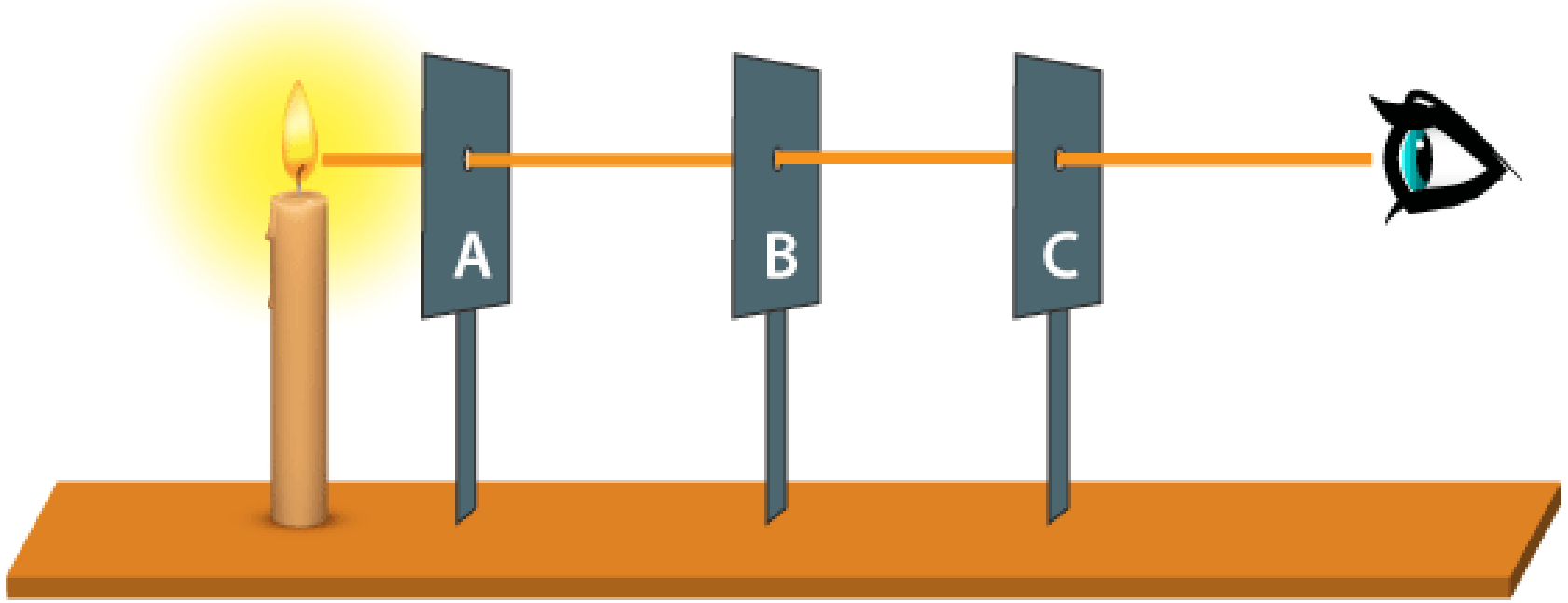
Physics – Grade 10

Unit Three – Optics



Chapter 9 – Propagation of light

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Quiz
Time
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Exercise 2

A pinhole camera is a simple camera without a lens.

It was invented by the Arabic scientist Ibn-Al-Haitham in the 11th century.

It is a small enclosed box with a tiny hole made in one of its sides.

When light from an object enters through the hole, an image of the object is collected onto a film on the opposite side of the box.

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Quiz	pinhole camera	20 min

In the adjacent figure, a pinhole camera is placed in front of a tree (object) of height AB = 5 m.

The tree is at a distance of 20 m from the pinhole O, which belongs to the perpendicular bisector of AB.

The image is collected on the film, which is at a distance of 40cm from the hole O.

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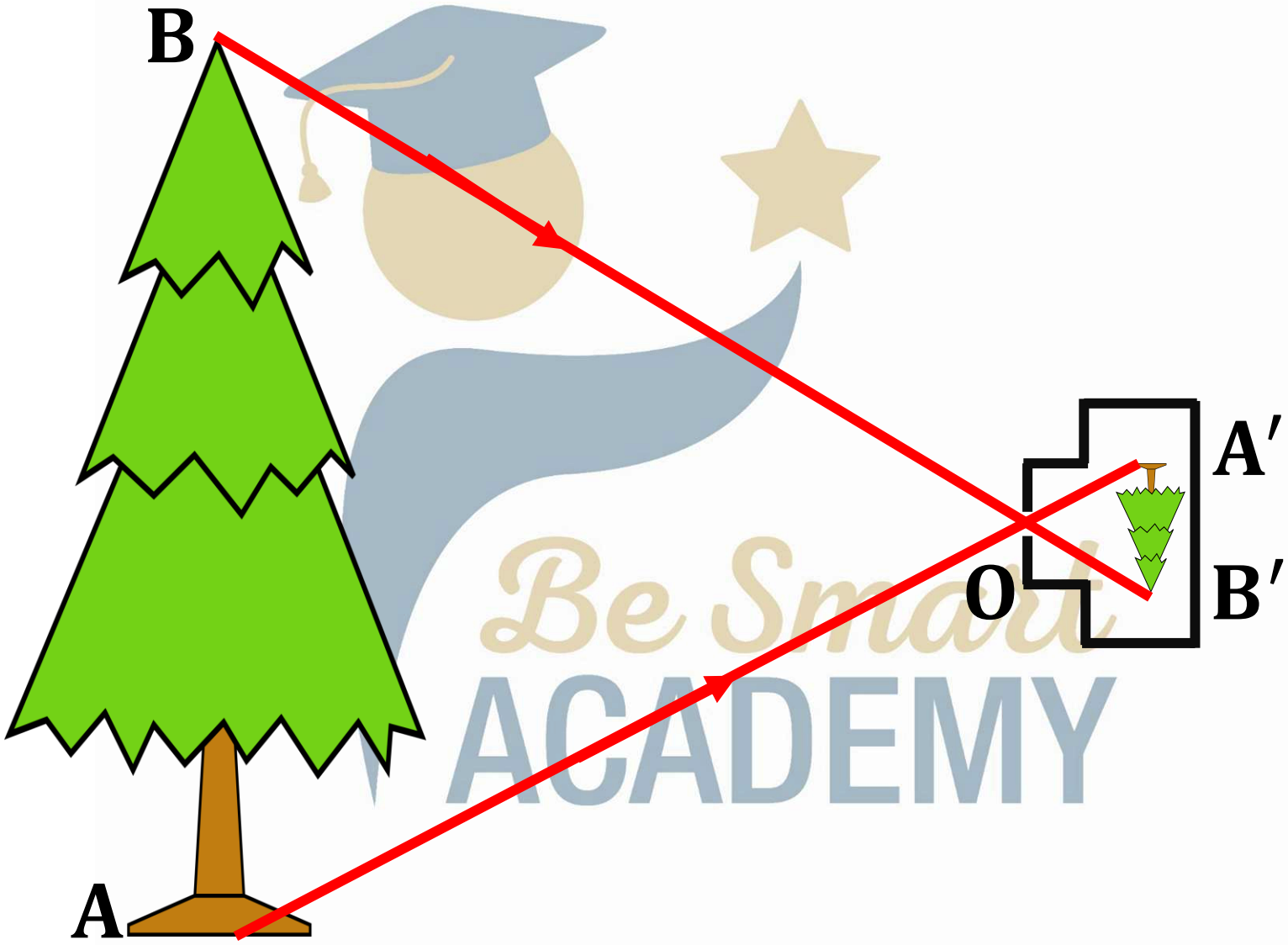
Quiz pinhole camera 20 min



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Quiz pinhole camera 20 min

1) Refer to the figure to:

a) Specify the nature of the image (real or virtual).

The image is real, sine it is collected on a screen

b) Indicate whether the image is erect or inverted.

The image is inverted

c) Determine the size A' B' of the image.

$$\frac{AB}{A'B'} = \frac{20}{40} \Rightarrow \frac{5}{A'B'} = \frac{20}{40} \Rightarrow A'B' = \frac{5 \times 40}{20}$$

$$A'B' = 10cm$$

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2) The function of the pinhole camera is based on a certain principle of light. State this principle.

The pinhole camera is based on rectilinear propagation of light.

The rectilinear propagation of light is a phenomenon which tells that light travels in a straight line.

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Quiz **pinhole camera** **20 min**

3) **The camera is displaced away from the tree along the perpendicular bisector of AB. How is the size of the image affected?**

$$\frac{AB}{A'B'} = \frac{\text{sistance between tree and camera}}{\text{distance netween image and camera}}$$

The size $A'B'$ and the distance between the tree & the camera is inversely proportional:

As the distance between the tree and the camera increase, the size $A'B'$ decrease.

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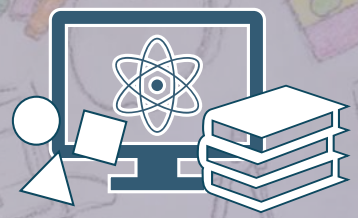
The End



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