

## Option C – Practical 1

### *Determination of magnification using an optical bench*

#### Safety

Wear safety glasses. Light source might get hot – avoid touching.

#### Apparatus and materials

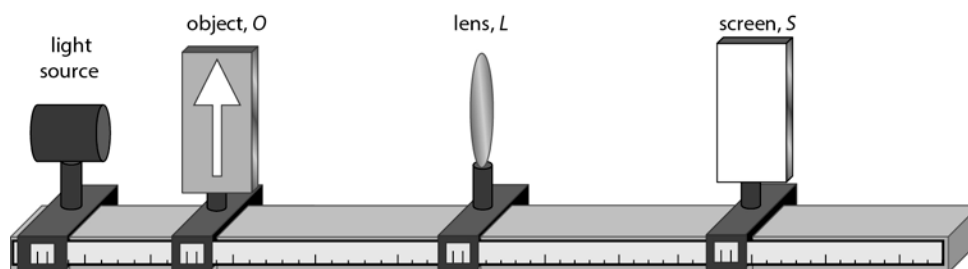
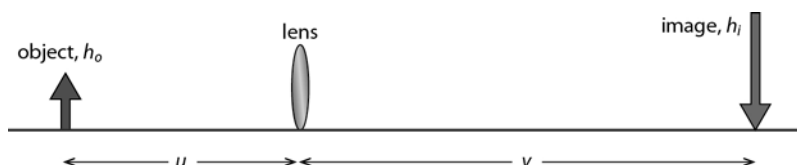
- optical bench
- light source
- object
- lens
- screen

#### Introduction

In this experiment you will determine the magnification using an optical bench.

When an object of height  $h_o$  is at a distance  $u$  from a lens and an image of height  $h_i$  is formed at a distance  $v$  from the lens, the magnification can be calculated by:

$$\text{Magnification} = \frac{h_i}{h_o} = \frac{v}{u}$$



#### Procedure

- 1 Measure the height of object,  $h_o$ .
- 2 Set the optical bench as shown in the diagram above.
- 3 Place the lens 15 cm away ( $u = 15\text{ cm}$ ) from the object. Move the screen until the image is focused (the image is clear).
- 4 Measure the height of the image  $h_i$  and the distance of the screen from the lens  $v$ . Record the measurements of  $u$ ,  $v$  and  $h_i$  in a table.

- 5 Calculate the magnification first using  $\frac{h_i}{h_o}$  and then using  $\frac{v}{u}$ . Add two more columns to the table and record these values.
- 6 Repeat steps 3–5 four more times, increasing  $u$  by 5 cm each time.

### Questions

- 1 Do you get the same value for the magnification when using  $\frac{h_i}{h_o}$  and  $\frac{v}{u}$ ?
- 2 Determine the focal length of the lens using the lens equation.