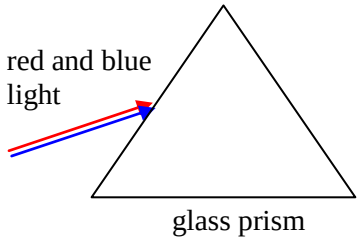
Extension worksheet – Option G, Worksheet 1

1 A ray consisting of red and blue light is incident on a glass prism as shown.



The refractive index of glass for red light is smaller than that for blue light. On the diagram above draw lines to show how the ray refracts into glass and as it exits back into air. [2]

2 The intensity of scattered radiation is related to the wavelength of light through $I \propto \frac{1}{\lambda^4}$. Use this relation to determine which colour is scattered the most. [1]

3 Use the result of question **2** to explain why the sky is blue. [2]

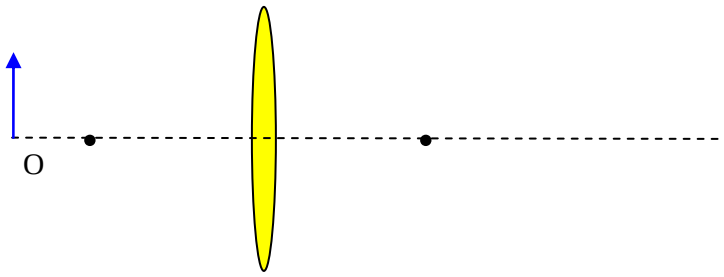
4 Carefully explain why the sky during a sunset is reddish in colour. [2]

5 State two differences between light from a laser and light from a filament lamp. [2]

6 State what is meant by **coherence**. [1]

7 State what is meant by the term **population inversion**. [1]

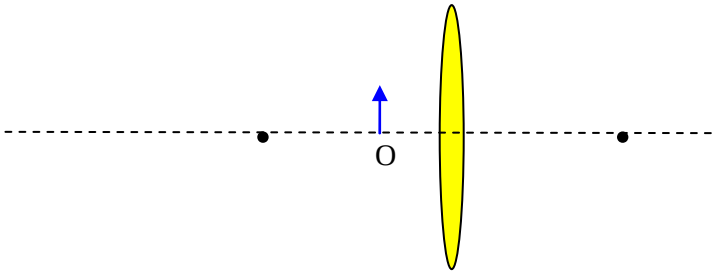
8 The diagram shows an object (O) in front of a converging lens. The focal points of the lens have been marked.



a On the diagram draw lines to show the construction of the image in the lens. [3]

b Determine if the image real or virtual. [2]

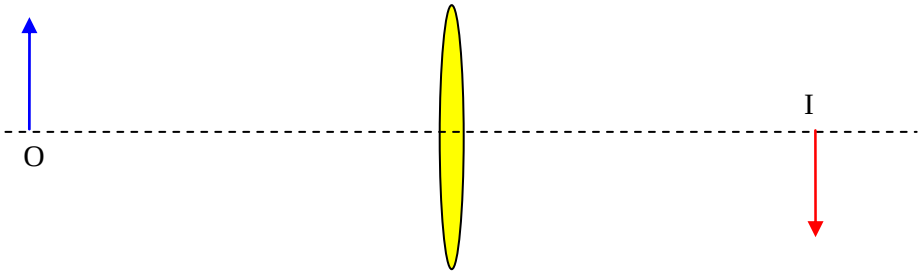
9 The diagram shows an object (O) in front of a converging lens. The focal points of the lens have been marked.



a Draw lines on the diagram to show the construction of the image in the lens. [3]

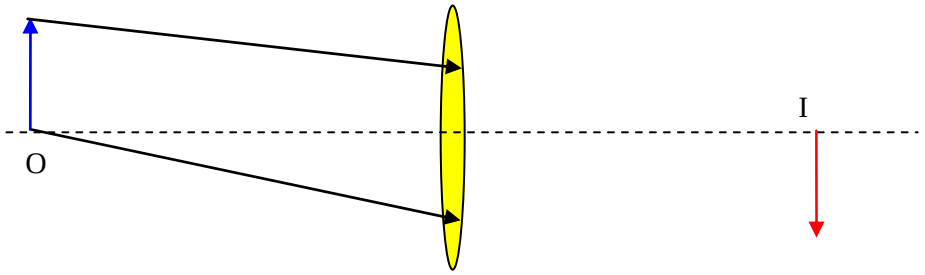
b Determine if the image real or virtual. [2]

10 The diagram shows an object (O) in front of a converging lens and its image (I) on the other side of the lens.



On the diagram draw lines to locate the focal points of the lens. [2]

11 The diagram shows an object (O) in front of a converging lens and its image (I) on the other side of the lens.



On the diagram draw lines to show the refraction of the rays in the lens. [2]