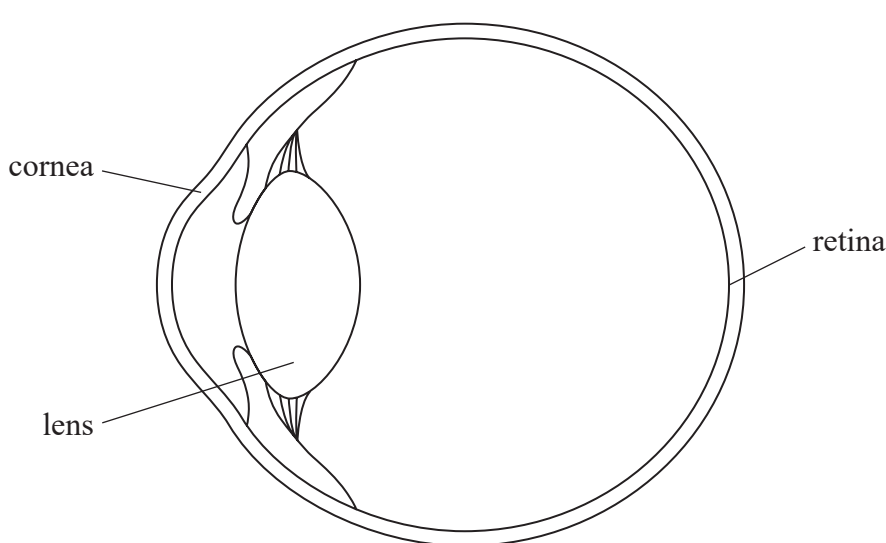


18 Light entering a normal eye is refracted by both the cornea and the lens before a focused image is formed on the retina.



- (a) It is suggested that the cornea provides 80% of the focusing power of the eye.

Determine whether this is correct.

focal length of cornea = 2.23 cm

focal length of lens for near object = 5.27 cm

(4)

- (b) Light from a point object forms a focused image on the retina.

The cornea and lens may be treated as a single lens of focal length 1.6 cm that is 2.4 cm from the retina.

- (i) Calculate the distance from the point object to this single lens when a focused image is formed on the retina.

(2)

Distance = .....

- (ii) A ray of light strikes the front of the cornea at an angle to the normal in air of  $15^\circ$ .

Calculate the angle of the ray to the normal in the cornea.

speed of light in air =  $3.00 \times 10^8 \text{ m s}^{-1}$

speed of light in cornea =  $2.18 \times 10^8 \text{ m s}^{-1}$

(3)

Angle to normal in cornea = .....

- (c) People swimming under water often wear goggles. The goggles enable them to see objects under water clearly whereas without goggles objects appear blurred.

Explain why wearing goggles has this effect.

speed of light in water =  $2.25 \times 10^8 \text{ m s}^{-1}$

(3)