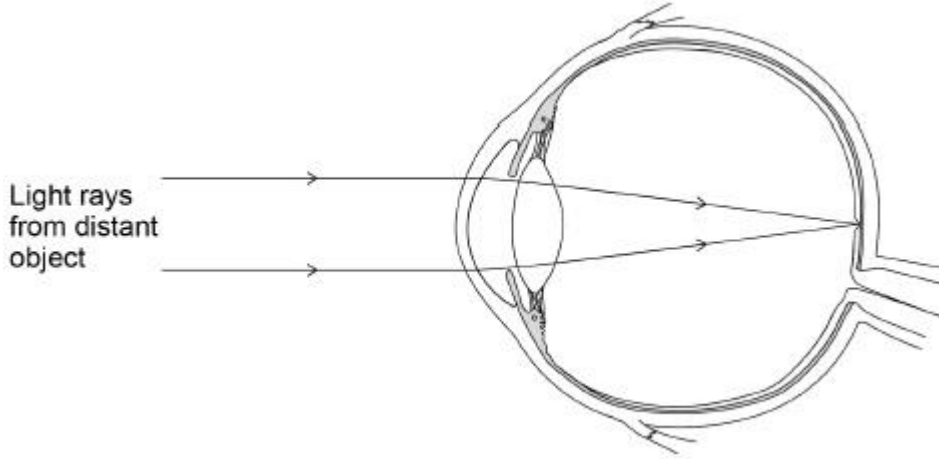


Q1.

The human eye can focus on objects at different distances.

Figure 1 shows how a clear image of a **distant** object is formed in a person’s eye.

Figure 1



(a) Explain how the person’s eye could adjust to form a clear image of a **nearer** object.

(6)

(b) Explain why a long-sighted person has difficulty seeing near objects clearly.

(2)

(c) Long-sightedness can be corrected by wearing spectacles.

Describe how spectacle lenses can correct long-sightedness.

(3)

(Total 11 marks)

Mark schemes

Q1.

- (a) ciliary muscles contract 1
- (so ciliary muscles have a) smaller diameter 1
- (so) suspensory ligaments loosen / slacken
*do **not** accept 'relax'* 1
- (so) lens thickens **or** lens becomes more curved / rounded
allow lens becomes fatter
ignore lens becomes bigger 1
- (thicker) lens is more convergent
*allow light rays bent (inwards) more **or** light refracted more* 1
- light rays / image focused on retina
allow light rays meet on retina 1
- (b) eye(-ball) is (too) short **or** lens cannot be thickened enough
*allow ciliary muscles (too) weak **or** lens not (sufficiently) elastic* 1
- (so) light 'focuses' behind retina
allow (so) image forms behind retina 1
- (c) convex / converging lens
allow shape described eg thicker in middle 1
- light rays bent / refracted (inwards) more
allow changes direction of light rays further inwards 1
- light rays focused on retina
*allow light rays brought to a point on retina **or** light rays converge on retina **or** focused / clear image forms on retina* 1

[11]