

Past-paper walk-through

Sense organs ■ 14.2

eXercise

Questions in this set

- 0610/21 N25 Q21 ■ 1 mark
- 0610/22 N25 Q19 ■ 1 mark
- 0610/23 N25 Q20 ■ 1 mark
- 0610/21 J25 Q22 ■ 1 mark
- 0610/22 J25 Q24 ■ 1 mark
- 0610/23 J25 Q24 ■ 1 mark
- 0610/41 J25 Q2 ■ 14 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 21

0610/21 N25 ■ Q21 ■ 1 mark

- 21** When moving from an area with low light intensity to an area with high light intensity, how do the circular and radial muscles of the iris react?

	circular muscles	radial muscles
A	contract	no change
B	contract	relax
C	relax	contract
D	relax	no change

Solution 21

Answer: **B**

Why

- In bright light the pupil must get smaller, to protect the retina.
- The circular muscles of the iris contract to narrow it.
- The radial muscles relax at the same time – the two sets always work in opposition.

Question 19

0610/22 N25 ■ Q19 ■ 1 mark

- 19** A person looks at a distant object in a dark area. The person then moves to a bright area and looks at a near object.

Which statement describes some of the changes that take place in the person's eyes?

- A** The circular muscles of the iris contract, the pupil constricts, the ciliary muscles relax and the lens gets thicker.
- B** The radial muscles of the iris relax, the circular muscles of the iris contract, the pupil constricts and the lens gets thinner.
- C** The radial muscles of the iris relax, the pupil constricts, the ciliary muscles contract and the lens gets thicker.
- D** The radial muscles of the iris relax, the pupil dilates, the ciliary muscles relax and the lens gets thicker.

Solution 19

Answer: **C**

Why

- Moving into bright light makes the pupil constrict, as the circular muscles contract.
- Looking at a *near* object makes the ciliary muscles contract and the lens become fatter.
- So both changes happen together: a smaller pupil and a more rounded lens.

Question 20

0610/23 N25 ■ Q20 ■ 1 mark

- 20** Which row shows the state of the ciliary muscles and suspensory ligaments when the eye is focusing on a near object?

	ciliary muscles	suspensory ligaments
A	contracted	slack
B	contracted	tense
C	relaxed	slack
D	relaxed	tense

Solution 20

Answer: **A**

Why

- For a *near* object the lens must be fatter.
- The ciliary muscles contract, which reduces the pull on the lens.
- So the suspensory ligaments go slack and the lens becomes more rounded.

Question 22

0610/21 J25 ■ Q22 ■ 1 mark

22 Which row shows the function of rod cells?

	night vision	colour vision
A	yes	yes
B	yes	no
C	no	yes

Question 22

no	no	yes
D	no	no

Solution 22

Answer: **B**

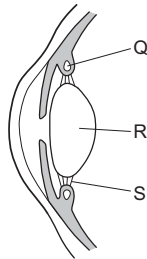
Why

- Rod cells work in dim light, so they give night vision.
- They cannot distinguish colour – that is the job of the cone cells.
- So rods give night vision but not colour vision.

Question 24

0610/22 J25 ■ Q24 ■ 1 mark

- 24** The diagram shows a vertical section through part of a human eye. A fly is coming nearer to the eye. The eye begins to focus the image of the fly on the retina.



How do the labelled parts of the diagram change?

Question 24

	Q	R	S
A	contracts	becomes thinner	becomes tighter
B	relaxes	becomes fatter	becomes slacker
C	contracts	becomes fatter	becomes slacker
D	relaxes	becomes thinner	becomes tighter

Solution 24

Answer: **C**

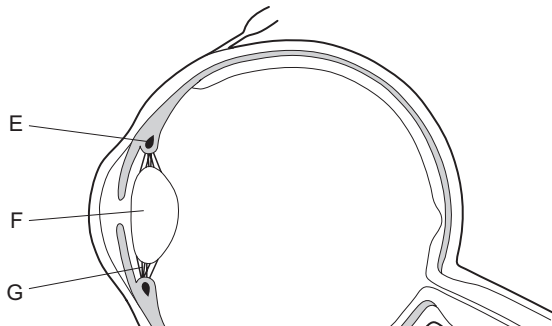
Why

- To focus on a *nearer* object the lens must become more powerful, so it needs to be fatter.
- The ciliary muscles contract, which slackens the suspensory ligaments.
- The lens then springs into a more rounded shape, refracting the light more strongly.

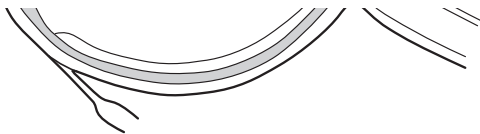
Question 24

0610/23 J25 ■ Q24 ■ 1 mark

24 The diagram shows a cross-section of an eye.



Question 24



Which row is correct when a person views a near object?

	E	F	G	refraction
A	contracts	becomes thinner	pulled less	more
B	contracts	becomes thicker	pulled less	more
C	relaxes	becomes thinner	pulled less	less
D	relaxes	becomes thicker	pulled more	less

Question 24

Solution 24

Answer: **B**

Why

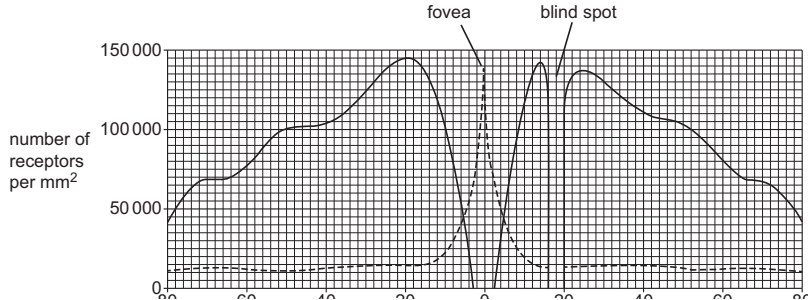
- For a *near* object the lens must become fatter and refract the light more.
- The ciliary muscles contract, which slackens the suspensory ligaments.
- The lens then becomes thicker and refraction increases.

Question 2

0610/41 J25 ■ Q2 ■ 14 marks

- 2 (a) The human retina contains receptor cells called rods and cones.

Fig. 2.1 shows the distribution of receptor cells in a human retina.



Question 2

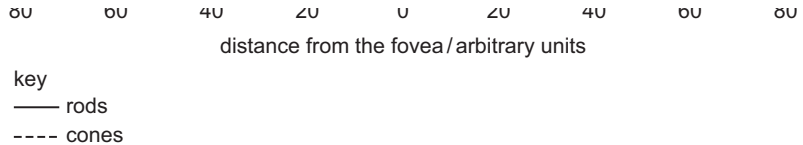


Fig. 2.1

Using the information in Fig. 2.1, describe the differences in the distribution of rods and cones.

Question 2

(b) Nocturnal animals are active at night.

Suggest how the number of receptor cells in the retina of a nocturnal animal differs from those in the retina of an animal that is active in the day.

Explain your suggestion.

Question 2

(c) In humans, the size of the iris increases in bright light conditions.

During this response one effector in the iris contracts and one effector relaxes.

(i) State the name of this response.

Question 2

- (ii) State the name of the effector that contracts in this response.

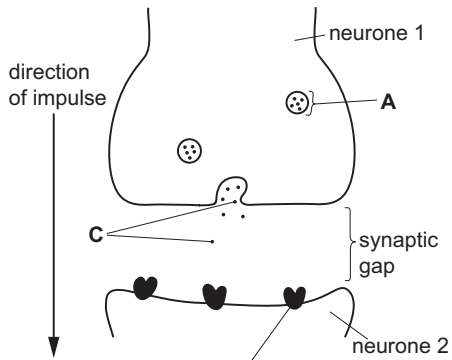
Question 2

- (iii) State the name of the type of action shown by the paired effectors during this response.

Question 2

(d) The optic nerve contains many neurones.

Fig. 2.2 shows a synapse between two neurones.



Question 2

/

Question 2



B

Fig. 2.2

- (i) State the names of the parts labelled **A**, **B** and **C** in Fig. 2.2.

Question 2

Question 2

Question 2

[3]

- (ii) Explain how part **C** in Fig. 2.2 moves across the synaptic gap.

Question 2

[Total: 14]

Solution 2

(a) Mark scheme

- any four from:
 - 1
 - (overall) there are more rods than cones / ora ;
 - 2
 - (number of) cones, peaks / are greater, at fovea / at 0 arbitrary units ;
 - 3
 - idea that (number of) rods peak either side or are increasing going towards
 - the fovea / 0 arbitrary units ;

Solution 2

- 4
- no rods present at, fovea / 0 arbitrary units ;
- 5
- idea that (number of) cones outside of fovea are (approximately),
- equal / constant ;
- 6
- (number of) rods greater on left hand-side of fovea ;
- 4

Solution 2

(b) Mark scheme

- more rod (cells) / greater proportion of rod cells / AW ;
- ref. to (greater sensitivity) for, night vision / low light conditions / AW ;
- OR
- fewer cones ;
- colour vision less important / AW ;
- 2 explanation must be linked to the correct
- difference

Solution 2

(c)(i)

Mark scheme

- pupil reflex ;
- 1

(c)(ii)

Mark scheme

- circular muscle (of the iris) ;
- 1

Solution 2

(c)(iii)

Mark scheme

- antagonistic ;
- 1 A involuntary
- 0610/41
- May/June 2025
- Guidance

Solution 2

(d)(i)

Mark scheme

- A – vesicle ;
- B – receptor (protein) ;
- C – (named) neurotransmitters ;
- 3

Solution 2

(d)(ii) Mark scheme

- diffusion ;
- by random movement of particles
- OR
- from higher concentration to lower concentration / down concentration
- gradient ;
- 2
- Guidance