

Past-paper walk-through

Coordination and response ■ 14.1

eXercise

Questions in this set

- 0610/22 N25 Q18 ■ 1 mark
- 0610/23 N25 Q21 ■ 1 mark
- 0610/21 J25 Q21 ■ 1 mark
- 0610/23 J25 Q23 ■ 1 mark
- 0610/41 J25 Q2 ■ 14 marks

Reading the mark scheme

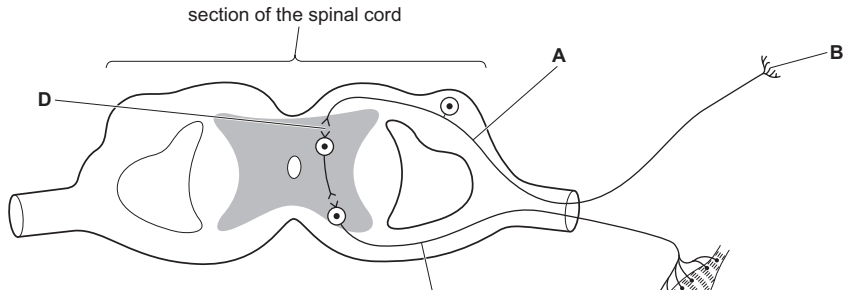
- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner 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 18

0610/22 N25 ■ Q18 ■ 1 mark

18 The diagram shows the parts of the nervous system involved in a reflex arc.

Which letter identifies a synapse?



Question 18

C



Solution 18

Answer: **D**

Why

- A synapse is the junction *between* two neurones.
- In a reflex arc there is one between the sensory and relay neurones and one between the relay and motor neurones.
- So look for a gap where two separate neurones meet, not a point within a single neurone.

Question 21

0610/23 N25 ■ Q21 ■ 1 mark

21 Events that occur at a synapse are listed.

They are **not** in the correct order.

- 1 An impulse is stimulated in the next neurone.
- 2 An impulse stimulates the release of neurotransmitter molecules from vesicles into the synaptic gap.
- 3 Neurotransmitter molecules bind with receptor proteins on the next neurone.
- 4 The neurotransmitter molecules diffuse across the gap.

What is the actual sequence of events?

A 2 → 4 → 1 → 3

B 2 → 4 → 3 → 1

Question 21

C $4 \rightarrow 2 \rightarrow 1 \rightarrow 3$

D $4 \rightarrow 2 \rightarrow 3 \rightarrow 1$

Solution 21

Answer: **B**

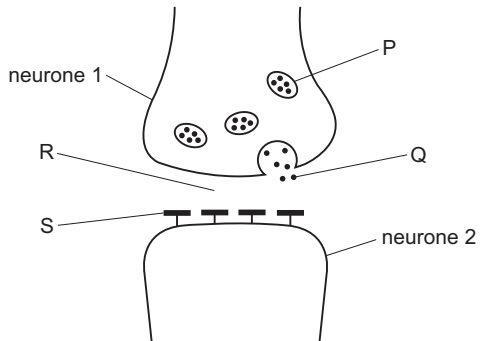
Why

- An impulse arrives and triggers the release of neurotransmitter into the gap.
- The neurotransmitter diffuses across and binds to receptors on the next neurone.
- That then starts a new impulse – so release comes before diffusion, and diffusion before the new impulse.

Question 21

0610/21 J25 ■ Q21 ■ 1 mark

21 The diagram shows a synapse.



Question 21

What are the labelled parts?

	P	Q	R	S
A	synaptic gap	neurotransmitter	vesicle	receptor
B	synaptic gap	receptor	vesicle	neurotransmitter
C	vesicle	neurotransmitter	synaptic gap	receptor
D	vesicle	receptor	synaptic gap	neurotransmitter

Solution 21

Answer: **C**

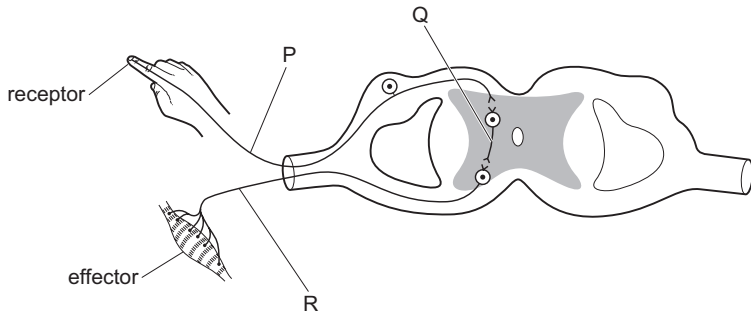
Why

- A synapse has a gap between the two neurones, crossed chemically.
- Vesicles in the first neurone release neurotransmitter into the gap.
- The neurotransmitter then binds to receptors on the second neurone.

Question 23

0610/23 J25 ■ Q23 ■ 1 mark

23 The diagram shows a simple reflex arc.



Question 23

What are the names of the structures labelled P, Q and R?

	P	Q	R
A	motor neurone	relay neurone	sensory neurone
B	motor neurone	sensory neurone	relay neurone
C	sensory neurone	motor neurone	relay neurone
D	sensory neurone	relay neurone	motor neurone

Solution 23

Answer: **D**

Why

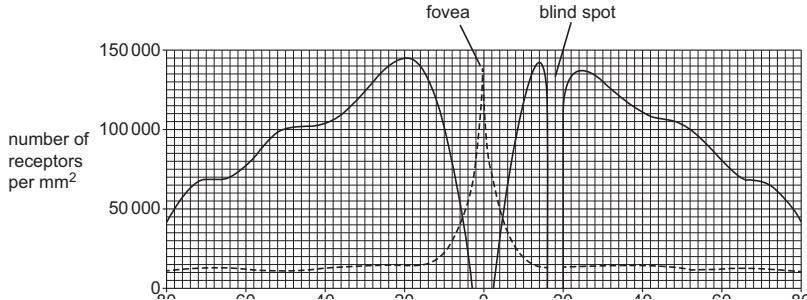
- A reflex arc runs receptor, sensory neurone, relay neurone, motor neurone, effector.
- So the first structure after the receptor is the sensory neurone.
- The last one before the effector is the motor neurone, with the relay neurone between them.

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

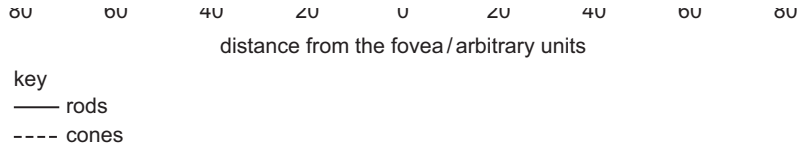


Fig. 2.1

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.

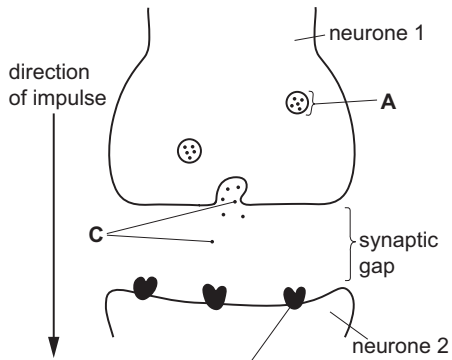
Question 2

- (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