

The nervous system and the eye: practice questions

7 questions • 24 marks • mark scheme at the back

For Pearson Edexcel International GCSE Biology 4BI1 and Science (Double Award) 4SD0. **Biology only** is not in the Double Award and is only examined on Paper 2.

Name

Total / 24

1 What makes up the central nervous system? [1 mark]

- A. ☐ The brain and the nerves
- B. ☐ The brain and the spinal cord
- C. ☐ The spinal cord and the sense organs
- D. ☐ The brain and the sense organs

2 Describe how a sense organ and the central nervous system bring about a rapid response to a stimulus. [3 marks]

3 Explain how an impulse passes from one neurone to the next at a synapse. [4 marks]

4 A person touches a hot object and pulls their finger away. Name the receptor type involved, the neurone that carries impulses to the spinal cord, and the effector. [3 marks]

5 State the function of each of these parts of the eye: (a) cornea (b) retina (c) optic nerve. **[3 marks]**

.....

.....

.....

.....

6 Explain how the eye changes to focus on a near object. **[4 marks]**

.....

.....

.....

.....

.....

7 A person walks out of a dark cinema into bright sunshine. Explain how the iris responds to the change and why this response is a reflex. **[6 marks]**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

B B the brain and the spinal cord (1)

2. [3]

- receptors in the sense organ are stimulated (1)
- electrical impulses travel along nerves to the central nervous system (1)
- electrical impulses travel along nerves from the central nervous system to an effector (muscle or gland), which responds (1)

3. [4]

- (electrical) impulse arrives at the end of the first neurone (1)
- neurotransmitter released into the synapse / gap (1)
- neurotransmitter diffuses across the gap (1)
- binds to receptors on the next neurone, which starts a new (electrical) impulse (1)

4. [3]

- temperature (or pain) receptor in the skin (1) allow heat receptor
- sensory neurone (1)
- (arm) muscle (1) do not accept motor neurone

5. [3]

- (a) refracts light (as it enters the eye) (1)
- (b) contains the light receptors (rods and cones) (1)
- (c) carries impulses from the retina to the brain (1)

6. [4]

- ciliary muscles contract (1)
- suspensory ligaments loosen (1)
- lens becomes thicker / more curved (1) allow more convex / fatter
- light is refracted more so is focused on the retina (1)

7. [6]

Level 3 5-6	Explains the change in pupil size in bright light, names both sets of iris muscle and what each does, and links the response to protecting the retina and to the reflex pathway being automatic and fast.
Level 2 3-4	Describes the pupil getting smaller and mentions at least one set of muscles, with some reason for the response or some link to a reflex. Explanation is incomplete.
Level 1 1-2	States that the pupil gets smaller or that it is a reflex, with little or no explanation.

Indicative content

- bright light stimulates receptors in the retina
- impulses sent along neurones to the CNS and then to the iris (effector)
- circular muscles of the iris contract
- radial muscles relax
- pupil gets smaller
- less light enters the eye, protecting the retina from damage
- a reflex is fast and automatic and does not involve conscious thought