

Coordination and response practice questions

30 questions • 89 marks • mark scheme at the back

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Name

Total / 89

Nervous control **Spec 14.1**

1 Which parts of the body make up the central nervous system (CNS)? [1 mark]

- A. ☐ Nerves outside the brain and spinal cord
- B. ☐ The brain and the spinal cord
- C. ☐ Sensory and motor neurones
- D. ☐ The brain and the nerves of the eye

2 Name the type of neurone that: (a) carries impulses from a receptor to the CNS [1] (b) carries impulses from the CNS to an effector [1] (c) is found only inside the CNS and links the other two types [1] [3 marks]

3 A person touches a hot object and their hand moves away before they feel pain. (a) Name the type of effector that moves the hand. [1] (b) Describe the path taken by the impulses from the receptor in the skin to the effector. [3] (c) Explain why this response is useful. [1] [5 marks]

4 State two features of a reflex action.

[2 marks]

5 **Supplement**

[1 mark]

Which sequence correctly describes the events at a synapse?

- A. ☐ neurotransmitter diffuses across the gap; neurotransmitter released from vesicles; neurotransmitter binds to receptor proteins; impulse starts in next neurone
- B. ☐ neurotransmitter released from vesicles; neurotransmitter diffuses across the gap; neurotransmitter binds to receptor proteins; impulse starts in next neurone
- C. ☐ neurotransmitter released from vesicles; neurotransmitter binds to receptor proteins; neurotransmitter diffuses across the gap; impulse starts in next neurone
- D. ☐ impulse starts in next neurone; neurotransmitter released from vesicles; neurotransmitter diffuses across the gap; neurotransmitter binds to receptor proteins

6 **Supplement**

[5 marks]

(a) State what is meant by a synapse. [1] (b) Describe how an impulse is passed from one neurone to the next at a synapse. [3] (c) State what synapses ensure about the direction in which impulses travel. [1]

Sense organs Spec 14.2

7 Which part of the eye has no light receptors because the optic nerve leaves the eye there? [1 mark]

- A. ☐ Pupil
- B. ☐ Cornea
- C. ☐ Blind spot
- D. ☐ Iris

8 State the function of each of these parts of the eye. (a) cornea [1] (b) iris [1] (c) lens [1] (d) optic nerve [1] **[4 marks]**

9 A person walks from a dim room into bright sunlight. Explain what happens to the pupil. **[3 marks]**

10 **Supplement** **[4 marks]**
Explain how the muscles in the iris cause the pupil to become wider in dim light.

11 **Supplement** **[1 mark]**
A person looks at a near object. Which row shows what happens in the eye?

- A. ☐ ciliary muscles contract; suspensory ligaments slack; lens thicker
- B. ☐ ciliary muscles contract; suspensory ligaments tight; lens thinner
- C. ☐ ciliary muscles relax; suspensory ligaments slack; lens thicker
- D. ☐ ciliary muscles relax; suspensory ligaments tight; lens thinner

12

Supplement

[5 marks]

A person looks at a book, then looks up at a tree far away. Explain how the eye changes to focus on the tree.

[illegible]

13

Supplement

[6 marks]

(a) State the function of the fovea. [1] (b) Rods and cones are light receptors in the retina. Explain why it is difficult to see colours in very dim light. [3] (c) Describe the distribution of rods and cones in the human retina. [2]

[illegible]

Hormones Spec 14.3

Spec 14.3

14

Which row correctly matches a gland with the hormone it secretes?

[1 mark]

- A. ☐ Pancreas and adrenaline
- B. ☐ Ovaries and testosterone
- C. ☐ Testes and testosterone
- D. ☐ Adrenal glands and insulin

15

Define the term hormone.

[3 marks]

[illegible]

- 16** Compare nervous control and hormonal control of the body. Refer to speed of action and duration of effect. **[4 marks]**

- 17** A student is suddenly frightened by a loud noise. The hormone adrenaline is secreted. **[3 marks]**
State three effects of adrenaline on the student.

- 18** **Supplement** **[3 marks]**
Explain how the effects of adrenaline on blood glucose concentration and heart rate help the body in a 'fight or flight' situation.

Homeostasis **Spec 14.4**

- 19** Which statement describes homeostasis? **[1 mark]**

- A. ☐ Responding to a stimulus
- B. ☐ Maintaining a constant internal environment
- C. ☐ Producing hormones in a gland
- D. ☐ Releasing energy from food

- 20** After a meal rich in carbohydrate, the concentration of glucose in the blood rises. Name the hormone that decreases the blood glucose concentration and name the organ that secretes it. **[2 marks]**

- 29** A student investigates phototropism in cress seedlings. Describe how the student could carry out the investigation and state two variables that should be kept the same. **[4 marks]**

- 30** **Supplement** **[3 marks]**

A potted plant is laid on its side in the dark. After two days the shoot has bent upwards. Explain this response.

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 (1)

2. [3]

- (a) sensory (neurone) (1)
- (b) motor (neurone) (1)
- (c) relay (neurone) (1) allow intermediate / connector neurone

3. [5]

- (a) muscle (1)
- (b) impulse in sensory neurone to the spinal cord / CNS (1)
- passes to a relay neurone (1)
- passes to a motor neurone (1)
- motor neurone carries impulse to the muscle / effector (1)
- (b) Max 3
- (c) any one from: rapid / automatic response; protects the body from harm / damage / injury (1)

4. [2]

- automatic (1) allow does not involve conscious thought / no decision
- rapid / fast (1)
- integrates / coordinates stimuli with the responses of effectors (1)
- protects the body (from harm) (1)
- Max 2

5. [1] **Supplement**

B B (1)

6. [5] **Supplement**

- (a) a junction between two neurones (1) allow a gap between two neurones
- (b) impulse stimulates release of neurotransmitter (molecules) from vesicles into the synaptic gap (1)
- neurotransmitter diffuses across the gap (1)
- neurotransmitter binds with receptor proteins on the next neurone (1)
- impulse is stimulated in the next neurone (1)
- (b) Max 3
- (c) (impulses travel in) one direction only (1) allow one way

7. [1]

C C (1)

8. [4]

- (a) refracts light (1) allow bends light / begins to focus light
- (b) controls how much light enters the pupil / eye (1) ignore controls the size of the pupil unless linked to light
- (c) focuses light on to the retina (1)
- (d) carries impulses to the brain (1) allow electrical signals; reject carries images / light / messages to the brain

9. [3]

- the pupil gets smaller / diameter decreases / constricts (1)
- so less light enters the eye (1)
- this protects the retina from damage (1) allow reflex is automatic / rapid

10. [4] Supplement

- radial muscles contract (1)
- circular muscles relax (1)
- the muscles are antagonistic / work against each other (1)
- so pupil diameter increases / pupil dilates and more light enters the eye (1)

11. [1] Supplement

A A (1)

12. [5] Supplement

- ciliary muscles relax (1)
- tension in the suspensory ligaments increases / ligaments pulled tight (1) reject suspensory ligaments contract / relax
- lens becomes thinner / less curved (1)
- light is refracted less (1)
- light is focused on the retina (1)

13. [6] Supplement

- (a) gives the sharpest vision / vision in the greatest detail (1) allow area with the highest density of cones
- (b) colour vision depends on cones (1)
- (b) there are three kinds of cone absorbing light of different colours (1)
- (b) cones are less sensitive to light than rods / rods are used for night vision (1) allow cones do not work in dim light
- (b) rods do not give colour vision / there is only one type of rod (1)
- (b) Max 3
- (c) cones are concentrated in the fovea (1)
- (c) rods are spread over the rest of the retina, more towards the edges / there are no rods in the fovea (1) ignore no receptors at the blind spot

14. [1]

C C (1)

15. [3]

- a chemical substance (1)
- produced by a gland (1)
- carried by the blood (1)
- alters the activity of one or more specific target organs (1)
- Max 3

16. [4]

- nervous control is fast / acts very quickly (1)
- hormonal control is slower / acts more slowly (1)
- effect of nervous control is short-lived / does not last long (1)
- effect of hormonal control lasts longer (1)

17. [3]

- increased breathing rate (1)
- increased heart rate (1)
- increased pupil diameter / pupils dilate (1)
- ignore sweating, 'more energy'

18. [3] Supplement

- adrenaline increases blood glucose concentration (1) allow glycogen converted to glucose (in the liver)
- faster heart rate delivers glucose and oxygen to muscles more quickly (1)
- glucose used in (aerobic) respiration (1)
- to release energy for muscle contraction / running (1)
- Max 3

19. [1]

B B (1)

20. [2]

- insulin (1)
- pancreas (1)

21. [4] Supplement

- the set point is the normal level / concentration of blood glucose (1)
- a change away from the set point is detected (1)
- a response occurs that reverses the change / brings the concentration back towards the set point (1)
- for example, if too high, insulin is secreted which lowers it / if too low, glucagon is secreted which raises it (1)
- when the set point is reached the response reduces / stops (1)
- Max 4

22. [5] Supplement

- after a meal, blood glucose concentration rises and the pancreas secretes insulin (1)
- insulin causes the liver to convert glucose to glycogen (1)
- blood glucose concentration decreases (1)
- when the concentration falls too low, the pancreas secretes glucagon (1)
- glucagon causes the liver to convert glycogen to glucose, released into the blood (1)
- blood glucose concentration increases (1)
- Max 5

23. [3] Supplement

- insulin injections (1)
- monitor / test blood glucose concentration (1)
- control the diet / amount of carbohydrate eaten (1)
- injected at mealtimes / dose matched to glucose concentration (1)
- Max 3

24. [1] Supplement

B B (1)

25. [4] Supplement

- receptors detect the change / the brain coordinates the response (1)
- vasoconstriction: arterioles supplying skin surface capillaries narrow (1)
- less blood flows near the skin surface so less heat is lost (1)
- shivering: muscles contract, respiration releases heat (1)
- hair erector muscles raise the hairs to trap air (insulation) (1)
- no sweating / less sweating (1)
- Max 4

26. [1]

C C (1)

27. [2]

- a response in which parts of a plant grow (1)
- towards or away from the direction of the light source (1)

28. [4] Supplement

- auxin is made in the shoot tip (1)
- auxin diffuses down the shoot (1)
- auxin is unequally distributed: more auxin on the shaded side (1)
- auxin stimulates cell elongation (1)
- cells on the shaded side elongate more so the shoot bends towards the light (1)
- Max 4

29. [4]

- grow seedlings in a box / container with a hole or slit so light comes from one side only (1)
- have a control set with light from all sides, or in the dark (1)
- leave for several days and observe / measure the direction of growth (1)
- same species / age / height of seedlings (1)
- same temperature / volume of water / light intensity (1)
- Max 4

30. [3] Supplement

- auxin is unequally distributed: more on the lower side of the shoot (1)
- auxin stimulates cell elongation, so cells on the lower side elongate more (1)
- shoot bends upwards / away from gravity (1)