2021 ASSESSMENT MATERIALS

GCSE
BIOLOGY

Biology Test 3: Homeostasis and response (Higher)

Total number of marks: 37

0 9 Many human actions are reflexes.

0 9 . 1 Which **two** of the following are examples of reflex actions?

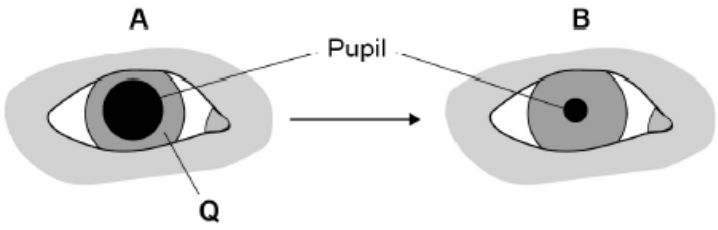
[2 marks]

Tick **two** boxes.

Jumping in the air to catch a ball	☐
Raising a hand to protect the eyes in bright light	☐
Releasing saliva when food enters the mouth	✓
Running away from danger	☐
Withdrawing the hand from a sharp object	✓

Figure 12 shows how the size of the pupil of the human eye can change by reflex action.

Figure 12



0 9 . 2 Name **one** stimulus that would cause the pupil to change in size from **A** to **B**, as shown in **Figure 12**.

[1 mark]

Bright light

0 9 . 3 Structure **Q** causes the change in size of the pupil.

Name structure **Q**.

[1 mark]

Iris

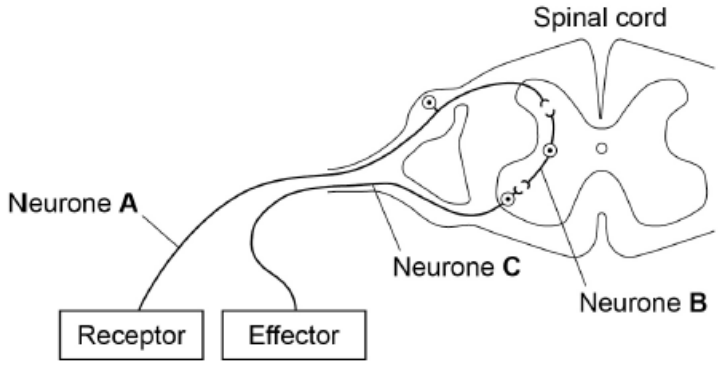
0 9 . 4 Describe how structure **Q** causes the change in the size of the pupil from **A** to **B**.

[1 mark]

The iris causes the muscles around the pupil to contract.

0 9 . 5 **Figure 13** shows some structures involved in the coordination of a reflex action.

Figure 13



Describe how the structures shown in **Figure 13** help to coordinate a reflex action.

[6 marks]

The receptor detects a stimulus in the environment and sends an electrical signal along the sensory neurone. The sensory neurone (A) conducts a signal to the spinal cord, which processes the signal and sends another electrical signal along a relay neurone (B) to another part of the spinal cord. The electrical signals pass from one neurone to the next via synapses. At the synapse, the electrical signals pass to the next neurone via chemical messages. The relay neurone then sends an electrical signal from the spinal cord to the effector (which could be a muscle or gland) via the motor neurone (C), resulting in contraction or secretion of hormones.

0 3 This question is about plant hormones.

0 3 . 1 Farmers can spray seeds with gibberellins to start germination.

What are **two** other uses of gibberellins?

[2 marks]

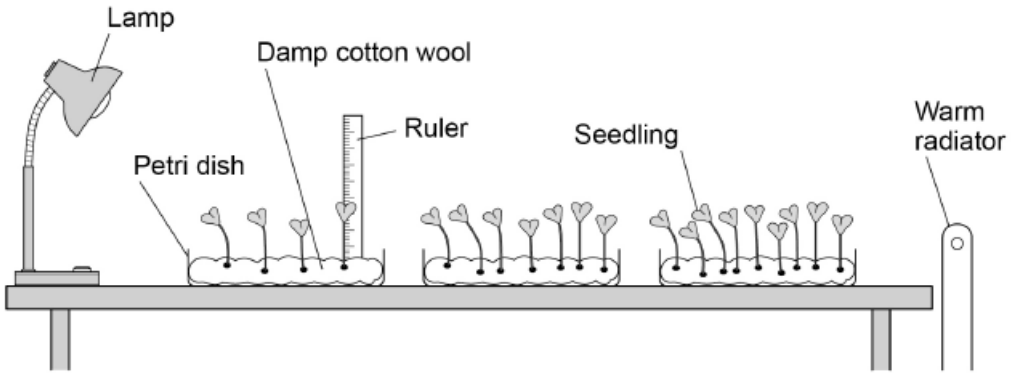
Tick (✓) **two** boxes.

- To help in tissue culture ☐
- To help roots form ☐
- To increase fruit size ☑
- To kill weeds ☐
- To promote flower production ☑

Students investigated the effect of light intensity on the height of seedlings.

Figure 3 shows the equipment.

Figure 3



0 3 . 2 Describe **two** improvements the students should make to their investigation.

[2 marks]

1 Ensure all of the seedlings are the same height at the start of the experiment.

2 Put the same number of seedlings in each dish.

Figure 4 shows a seedling growing towards a lamp.

Figure 4

0 3 . 3 Suggest how the students measured the length of the curved seedling in **Figure 4**.

[1 mark]

Using a flexible ruler.

0 3 . 4 Explain what happened to the growth of the seedling on side **Q** compared with the growth on side **P**.

[3 marks]

The light on side P caused the auxins in the plant to diffuse to side Q, causing the plant to grow faster on side Q and so the plant bent towards the light.

0 3 . 5 Bananas are often stored separately from other fruits because bananas release a plant hormone.

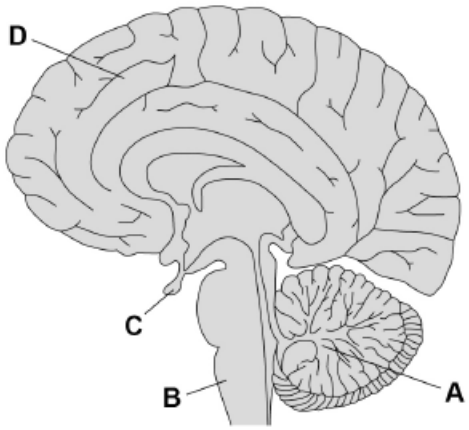
Why does storing bananas with other fruits cause the other fruits to ripen faster?

[1 mark]

Bananas produce ethene which causes fruit to ripen.

0 6 **Figure 7** shows the brain.

Figure 7



0 6 . 1 Which part of the brain becomes more active if a person balances on one leg instead of standing on two legs?

[1 mark]

Tick (✓) **one** box.

A ✓ B ☐ C ☐ D ☐

0 6 . 2 Name the part of the brain that is responsible for making a decision.

[1 mark]

cerebrum

0 6 . 3 In most MRI scanners the person being scanned needs to stay completely still.

A functional MRI (fMRI) scanner allows a person to move while the scanner makes images of the person's brain activity.

Suggest how the fMRI scanner could help to find out more about the brain damage a person has.

[3 marks]

Activate different parts of the brain, for example by telling the person to do various activities, and observe which parts light up and which areas are inactive i.e. damaged.

0 6 . 4 Describe how the brain receives information about light entering the eye.

You should include the names of structures in your answer.

[3 marks]

Light enters the eye through the cornea, which refracts the light. The pupil the dilates or contracts depending on the light intensity. The lens further refracts the light to focus it on the retina. The retina contains rods and cones which respond to different types of light and send electrical signals along the optic nerve to the brain.

0 6 Water conservation is important to the human body.

0 6 . 1 Which gland releases the hormone that controls water loss from the body?

[1 mark]

Tick (✓) **one** box.

- Adrenal ☐
- Pancreas ☐
- Pituitary ☑
- Thyroid ☐

0 6 . 2 Which hormone helps the kidneys to control water loss from the body?

[1 mark]

Tick (✓) **one** box.

- ADH ☑
- Adrenaline ☐
- LH ☐
- Thyroxine ☐

0 6 . 3 A man is walking across a desert.

The man has used up his supply of drinking water.

Explain how the gland you named in Question **06.1** and the kidneys reduce water loss.

[3 marks]

The hypothalamus detects a high concentration of solutes in plasma, meaning there is too little water in the body. The pituitary gland then releases ADH into the bloodstream, which causes the tubules in the kidneys to become more permeable, therefore more water is reabsorbed back into the bloodstream. A more concentrated and smaller volume of urine will be produced.

0 6 . 4 Some people have kidney failure.

Doctors may treat patients with kidney failure by either:

- dialysis
- a kidney transplant.

Explain **two** biological reasons why most doctors think that a kidney transplant is a better method of treatment than dialysis.

Do **not** refer to cost or convenience.

[4 marks]

Reason 1 Kidney transplantation is a long-term solution whereas dialysis can only be performed for a short time.

Reason 2 A kidney transplant allows the patient to live a fuller life for longer than a patient on dialysis.