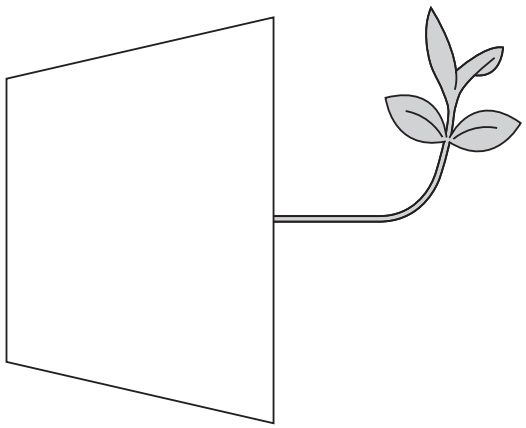
1 Flowering plants can respond to their environment through tropic responses. These involve root or shoot tips growing towards or away from a stimulus.

A student set up an experiment to investigate how shoots respond to gravity.

He placed a potted plant on its side and looked at its growth after 5 days. The diagram shows what he saw.



(a) (i) Explain the benefit to the plant of this response.

(1)

growing upwards helps the plant find light for photosynthesis and avoid being in the shade from other plants.

(ii) Give one variable that the student should keep the same in his experiment and suggest how he could do this.

(2)

He should keep the plant at a consistent temperature, this could be achieved by keeping the plant indoors

(iii) Suggest a suitable control for this experiment.

(1)

a plant of the same age and species growing in an upright pot.

(b) Plants can respond to drought by closing their stomata.

(i) Suggest how a plant benefits from closing its stomata when less water is available in the soil.

(1)

closing stomata reduces water loss by transpiration.

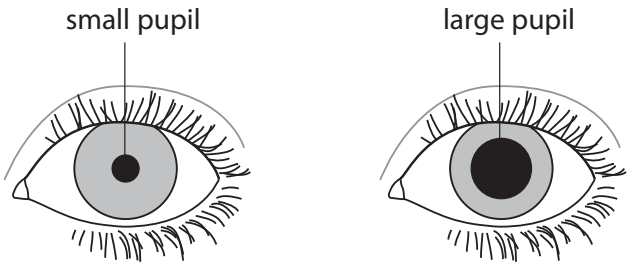
(ii) Explain the disadvantages to the plant of closing its stomata.

(2)

closing stomata slows the uptake of oxygen from the atmosphere which is needed for respiration. Also closing stomata slows the rate at which CO2 can leave the plant so the waste product can build up in the leaves, harming them.

(Total for Question = 7 marks)

2 The diagram shows the difference in the pupil diameter of the eye in bright light and after moving into dim light. The difference is caused by a reflex action.



Bright light **Dim light**

(a) The table gives descriptions of parts of the reflex arc involved with the reflex action.

Complete the table by naming each part.

One has been done for you.

(3)

Description of part	Name
contains light receptor cells	retina
neurone that sends impulses into the brain	optic nerve
microscopic gap between neurones	synapse
contains muscle effector cells	iris

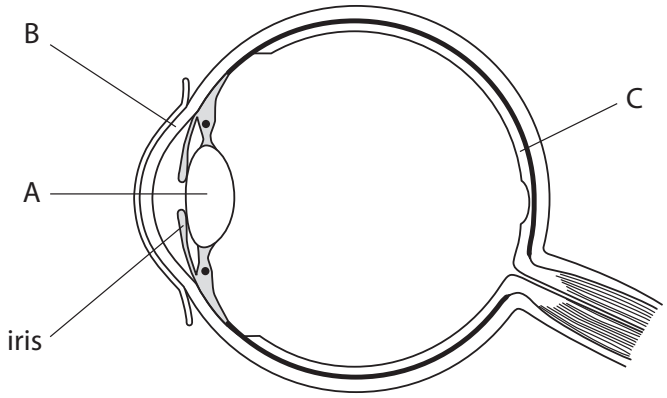
(b) Explain how the lens changes when you view a near object.

(4)

the annular ciliary muscles contract and the radial ciliary muscles relax, squashing the lens into a rounder shape.

(Total for Question = 7 marks)

5 The diagram shows a section through an eye with the iris and parts A, B and C labelled.



(a) Name parts A, B and C.

(3)

A **lens**

B **cornea**

C **retina**

(b) When you move from a bright room into a dark room you cannot see very well for a while. After a brief time, a change in the iris helps you to see more clearly.

(i) The iris contains muscle tissue.

What is meant by the term **tissue**?

(1)

a collection of cells of the same type

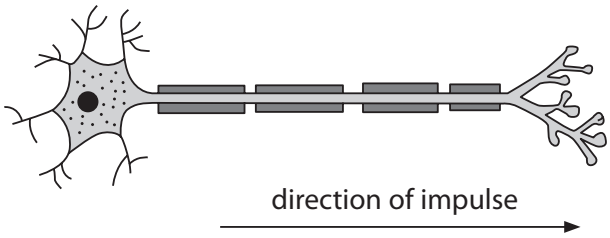
(ii) Describe the changes that take place in the iris when moving into the dark room and explain how they help you to see more clearly.

(3)

the radial muscles of the iris contract and the circular muscles relax allowing the pupil to widen. When the pupil is wider it allows more light to enter the eye and hit the retina making it easier to see in a darkened room.

(Total for Question = 7 marks)

1 The diagram shows an animal cell called a neurone.



(a) Name the three structures found in a plant cell that are not found in a neurone.

(3)

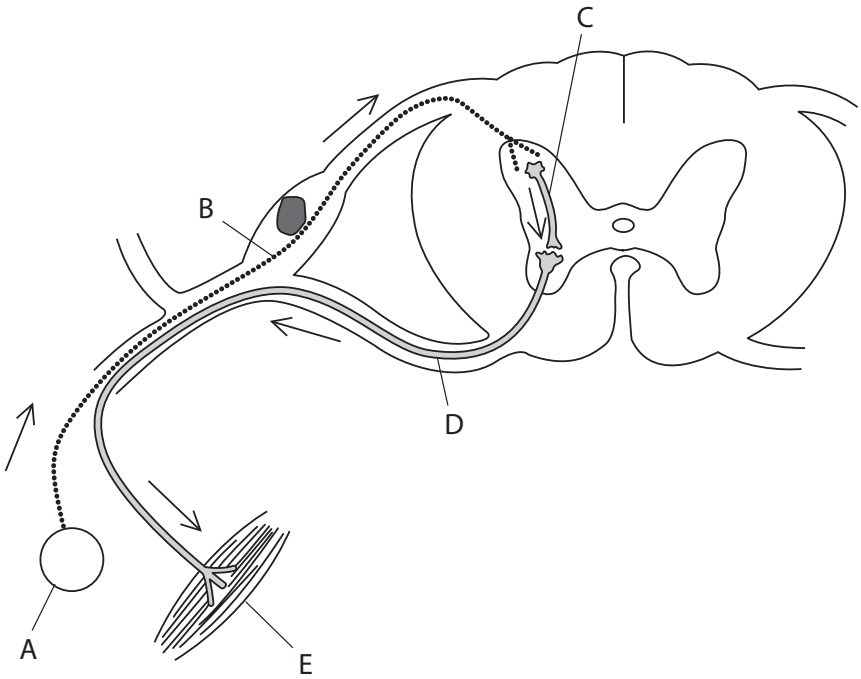
1 cell wall

2 chloroplast

3 large central vacuole

(b) Neurones are involved in the reflex arc that helps humans respond to stimuli.

The diagram shows a reflex arc with parts labelled A, B, C, D and E.
The arrows show the direction of the nerve impulse.



(i) Complete the table by naming each part of the reflex arc.
One has been done for you.

(4)

Part	Name
A	receptor
B	sensory neurone
C	relay neurone
D	motor neurone
E	effector muscle

(ii) There is a small gap between neurone B and neurone C.

What is the name of the small gaps between neurones?

(1)

synapses

(c) Nerve impulses can travel along neurones at 120 m/s.
The distance between the spinal cord and the foot of a human is 90 cm.

Calculate the time, in seconds, that it would take a nerve impulse to travel from the spinal cord to the foot of this human.
Show your working.

(2)

t = d/s
t = 0.9 / 120 =

time = 0.0075 seconds

(Total for Question = 10 marks)