14. Coordination and response

14.5 Tropic responses

Paper 3 and 4

Question Paper

Paper 3

Questions are applicable for both core and extended candidates

1 **(b)** Tropic responses were investigated in two plants, **X** and **Y**.

The plants were placed in separate boxes for 5 days.

Fig. 5.2 shows plants **X** and **Y** at the start of the investigation.

Both boxes had a hole on one side that let light in.

Plant **X** was kept in the same position.

Plant **Y** was placed on a platform that was continually rotated.

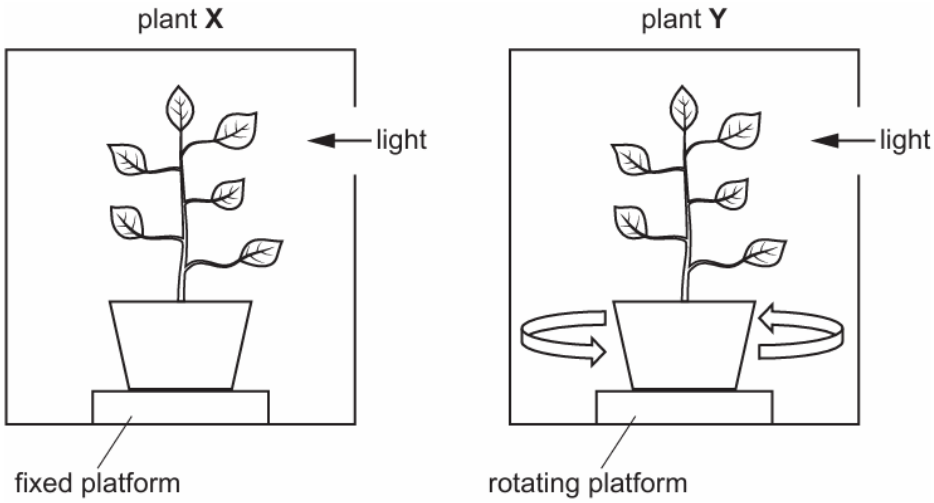

Fig. 5.2

(i) Predict **and** explain how the shape of plant **Y** will differ from the shape of plant **X** after 5 days of growth.

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..... [2]

(ii) State the name of the tropic response that would be seen in plant **X** in Fig. 5.2 after 5 days.

..... [1]

(iii) Suggest **and** explain the advantage to a plant of tropic responses in shoots.

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..... [2]

2 **(a)** A student investigated plant growth responses.

A seedling was attached to a support stand and placed under a lamp.

(i) Complete Fig. 7.1 by drawing the expected position of the root **and** shoot after seven days of growth.

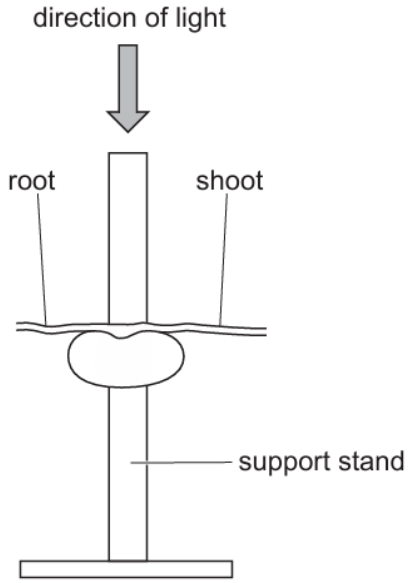

Fig. 7.1

[2]

(ii) State the type of growth response plants show in response to the direction of light.

..... [1]

(iii) State the type of nuclear division that is used for growth.

..... [1]

3 **(a)** A scientist investigated how the growth of plant shoots was affected by the direction of light.

A light source was placed on one side of a shoot and the scientist recorded the appearance of the shoot after a few days.

Fig. 4.1 shows his results.

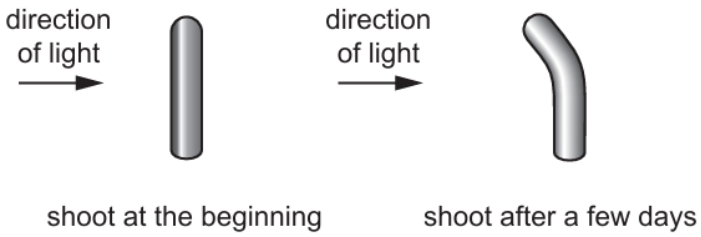

Fig. 4.1

(i) Describe the results shown in Fig. 4.1.

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..... [1]

(ii) State the name of the response to light shown in Fig. 4.1.

..... [1]

(iii) Explain the advantage to a plant of the response shown in Fig. 4.1.

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..... [2]

4 **(a)** Fig. 5.1 shows a seed that has germinated.

It is growing on damp cotton wool in the dark in a vertical position.

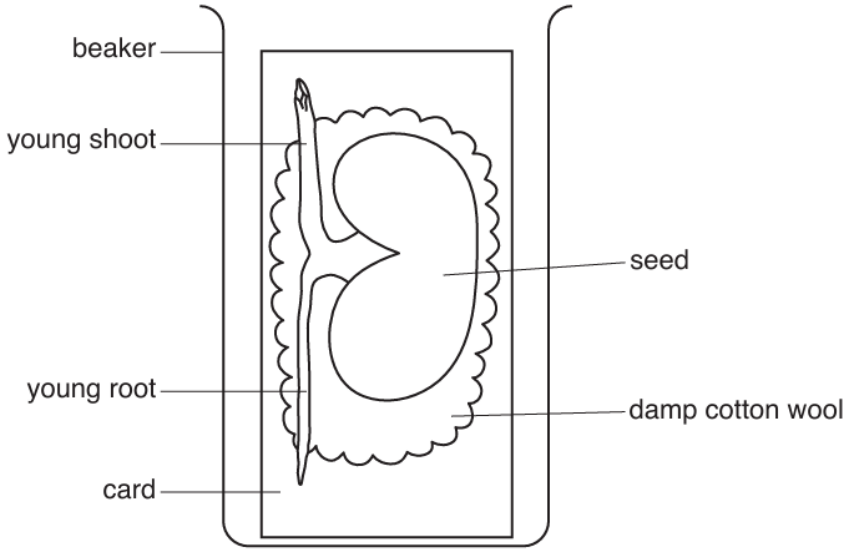

Fig. 5.1

The seedling was then rotated to a horizontal position and kept in the dark as shown in Fig. 5.2.

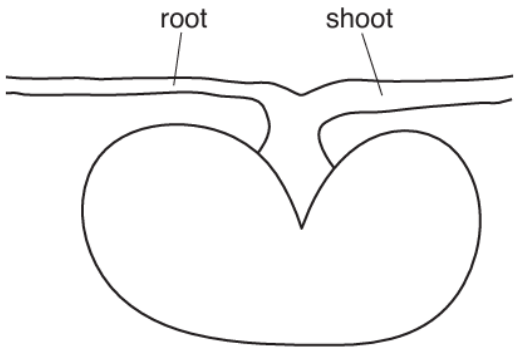

Fig. 5.2

(i) Complete Fig. 5.2 by drawing the expected appearance of the root and the shoot after five days in the dark. [2]

(ii) State the name of the response shown in Fig. 5.2.

..... [1]

Paper 4

Questions are applicable for both core and extended candidates unless indicated in the question

5 Two identical potted plants were used to investigate plant responses.

Plant **A** was placed on a clinostat that continually rotated. Plant **B** was not rotated.

Both plants were then placed on their sides and kept in the dark.

Fig. 4.1 shows the two plants at the start of the experiment and after seven days.

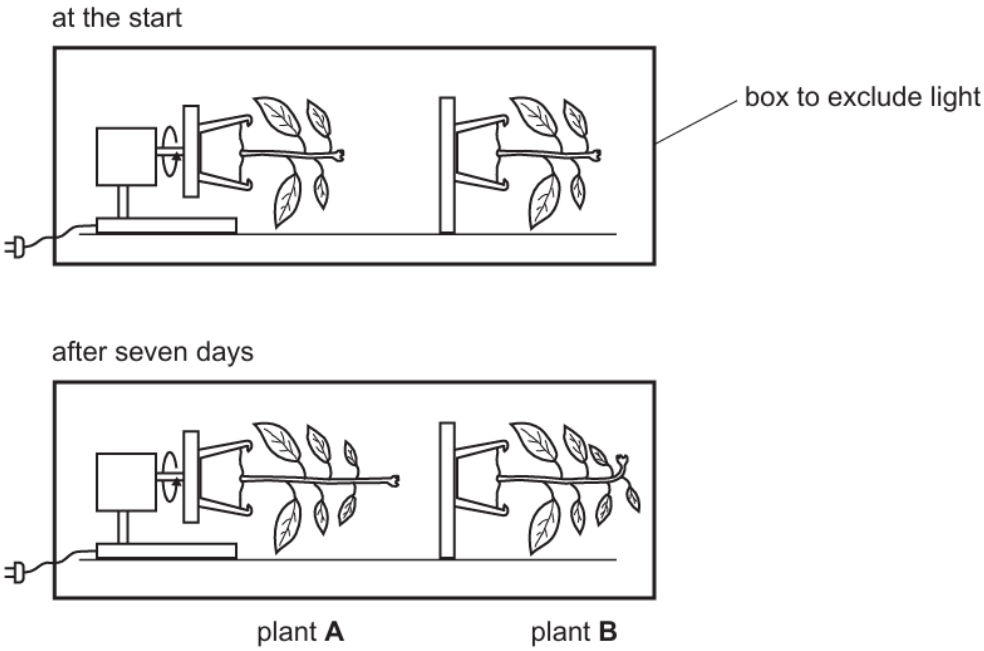

Fig. 4.1

(a) State the name of the response shown by the shoot of plant **B**.

..... [1]

(b) Explain the reason for constantly rotating plant **A**.

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..... [2]

(c) **(i)** State the name of the plant hormone that causes the response of the shoot of plant **B**.

(extended only)

..... [1]

(ii) Explain how the plant hormone causes the response of plant **B**. **(extended only)**

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..... [3]

(d) Seeds germinate in the soil. The seedlings that grow from seeds show the same response as shown by plant **B** in Fig. 4.1.

Explain the advantages of this response to the survival of seedlings and mature plants.

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..... [3]

6 **(c)** Cells just behind a shoot tip absorb water and grow in length. A plant hormone stimulates cell elongation and controls the response of stems to gravity.

(i) State the name of the plant hormone that stimulates cell elongation in stems. **(extended only)**

..... [1]

(ii) Explain how the response of stems to gravity is controlled. **(extended only)**

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..... [4]