

9.3 Growth in Plants

Question Paper

Course	DP IB Biology
Section	9. Plant Biology (HL Only)
Topic	9.3 Growth in Plants
Difficulty	Medium

Time allowed: 20
Score: /10
Percentage: /100

Question 1

A gardener accidentally cut off the apical meristem while pruning a shrub in her garden. After a few weeks she noticed some changes in the growth of the shrub.

Which of the following would most accurately describe these changes?

- A. The shrub would grow much taller and the axillary buds would be inhibited
- B. The main stem of the shrub would greatly increase in diameter
- C. The axillary buds will develop and lead to greater branching in the shrub
- D. The axillary buds will be inhibited leading to less branching in the shrub

[1 mark]

Question 2

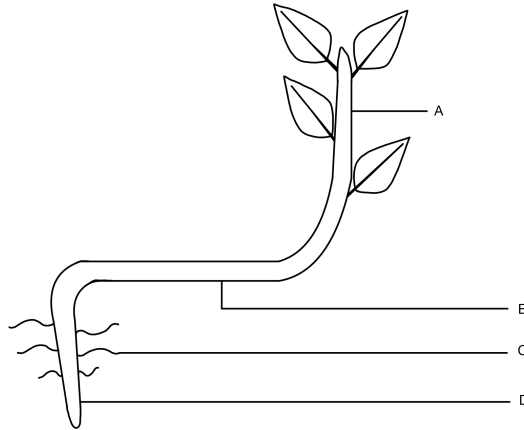
Which of the following meristems is correctly matched with the tissue that it can form?

	Meristem	Tissue
A	Ground tissue	Parenchyma forming the pith
B	Protoderm	Collenchyma forming supportive tissue
C	Procambium	Epidermis
D	Protoderm	Xylem and Phloem

[1 mark]

Question 3

A pot plant falls over and after a few days shows the following growth pattern.



Which of the following is the most accurate explanation for the growth shown at each of the labels on the diagram?

- A. This part of the stem demonstrates negative gravitropism in order to receive the maximum amount of sunlight for photosynthesis
- B. This part of the stem shows positive phototropism as it will bend towards the light
- C. The lateral roots demonstrates negative gravitropism as they are not growing towards gravity
- D. The main root shows positive gravitropism as it is bending towards gravity

[1 mark]

Question 4

What would **not** be considered a function of auxins?

- A. Stimulates cell elongation in shoots, leading to an increase in plant height
- B. Stimulates the development of axillary buds further away from the shoot apical meristem
- C. Inhibits the development of axillary buds close to the shoot apical meristem
- D. Inhibits cell elongation in root cells, therefore slowing down root growth

[1 mark]

Question 5

The following steps describe the possible pathway of gene expression affecting the transport of auxin in a plant.

- I. This affects the expression of certain genes coding for PIN3 proteins
- II. There is a change in their 3D shape
- III. Light energy is absorbed by phototropins
- IV. Phototropins bind to receptors inside the cell

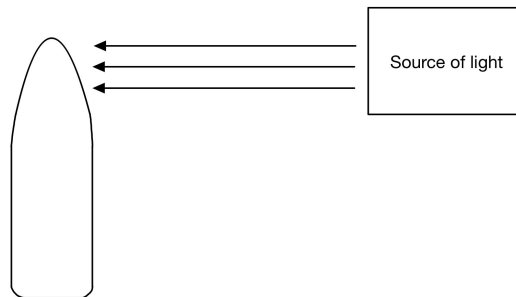
Which of the following represents the correct order of these steps?

- A. IV → I → II → III
- B. III → II → IV → I
- C. IV → II → III → I
- D. III → IV → II → I

[1 mark]

Question 6

Which would be the most accurate description and explanation for the growth response that would be observed in the shoot tip below?



	Description	Explanation
A	The shoot tip grows away from the light source	Auxins inhibit cell elongation on the shady side of the shoot tip
B	The shoot tip grows towards the light source	Auxins inhibit cell elongation on the side of the light source
C	The shoot tip continues to grow straight up	Auxins are evenly distributed across the shoot tip
D	The shoot tip grows towards the light source	Auxins cause cell elongation on the shady side of the shoot tip

[1 mark]

Question 7

Which of the following would explain the reason why a root turned on its side shows positive gravitropism?

- I. Statoliths will accumulate on the lower side of cells due to gravity
- II. PIN3 transporter proteins will distribute to the upper side of the root
- III. High concentration of auxin on the upper side of the root will inhibit cell elongation
- IV. Cells elongate at a higher rate at the lower side of the root

- A. I only
- B. I and II only
- C. I, III and IV
- D. II, III and IV

[1 mark]

Question 8

Microarrays have provided more advanced opportunities for scientists to understand plant growth responses.

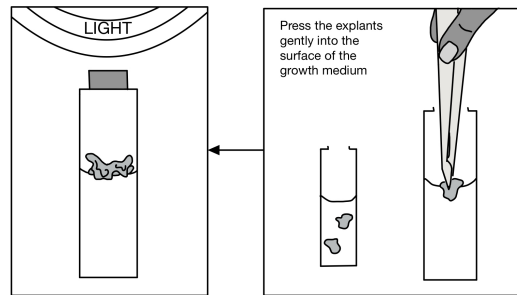
What has been the greatest advantage of using microarrays in this field of study?

- A. It provides a visible way to determine the concentration of plant growth substances in certain cells
- B. Predictions can be made regarding the expression of certain genes in different plant species
- C. It provides a visible way to determine the level of gene expression in certain cells
- D. The distribution of plant growth substance levels can be determined in different parts of the plant

[1 mark]

Question 9

The following diagram shows part of the process of micropropagation.



What property of the growth medium correctly describes how the explants will develop?

	Auxin : Cytokinin	Description of plant development
A	Greater than 10 : 1	The explant will develop shoots and begin to photosynthesise
B	1 : 1	Development of both roots and shoots will take place
C	Less than 10 : 1	The explant will develop roots and can be planted in soil
D	1 : 1	Develop into an undifferentiated group of cells called a callus

[1 mark]

Question 10

Which of the following would **not** be considered an application of micropropagation?

- A. Producing many copies of new varieties of endangered plant species to allow for replanting in the wild
- B. Producing strains of existing plant varieties that are free from viral, fungal and bacterial infections
- C. Creating new varieties of endangered plant species to allow for replanting in the wild
- D. Preserving favourable characteristics in commercially valuable plant species

[1 mark]