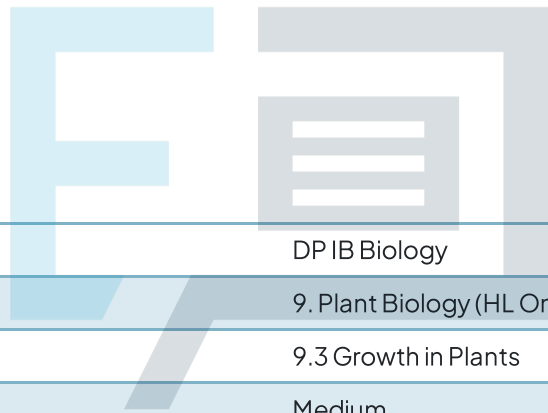




9.3 Growth in Plants

Mark Schemes



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

Exam Papers Practice

To be used by all students preparing for DP IB Biology HL
Students of other boards may also find this useful

1

The correct answer is **C**.

- **A** and **D** are incorrect as removing the apical meristem would remove the effect of apical dominance on the axillary buds and lead to more lateral branching in the plant
- **B** is incorrect because it is the lateral meristems in the stem of the shrub that would lead to an increase in diameter

2

The correct answer is **A**.

Remember that the protoderm cells will give rise to epidermal tissue in a plant while the procambium will eventually form the vascular tissue (xylem and phloem).

3

The correct answer is **A** as that part of the stem is growing away from gravity.

B and **D** are incorrect as tropisms are the result of a change in the direction of new growth towards or away from a particular stimulus, it is not due to the plant parts "bending". **C** is not growing away from gravity so it is not negatively gravitropic

4

The correct answer is **B**.

Even though axillary buds that are located further away from the shoot apical meristem are more likely to develop into branches, this is not due to the presence of auxins but (amongst other reasons) due to the lower concentration of auxins present in the lower parts of the plant. This reduces the effect of apical dominance on these buds.

5

The correct answer is **B**.

When light energy is absorbed by phototropins, it changes their shape which enables them to bind to receptors inside the cell. These receptors are believed to control the transcription of genes which code for PIN3 proteins. These proteins are involved in the transportation of auxin to areas where growth is needed.

6

The correct answer is **D**.

When a shoot receives light from one direction only, the auxins produced at the tip will move towards the shady side of the shoot where it will stimulate cell elongation. This will result in the tip of the shoot growing towards the direction of light.

7

The correct answer is **A**.

Statement **II**, **III** and **IV** are incorrect because the PIN3 transporter proteins will distribute themselves towards the lower side of the root. Therefore auxin will be transported to the lower side of the root where it will accumulate and inhibit cell elongation. Cells will elongate at a higher rate at the upper side of the root which causes a change in the direction of growth towards gravity.

Exam Papers Practice

8

The correct answer is **C**. The greatest advantage of using the microarray has been to provide a way for scientists to detect gene expression within a certain species.

- **A and D** are incorrect as microarrays are not typically used to directly determine the concentration of plant growth substances in different parts of the plant
- **B** is incorrect since the data gathered from a microarray cannot necessarily be used to predict the level of gene expression in another species

9

The correct answer is **D**.

The ratio of auxin to cytokinin in the growth medium determines how the explant will develop. If the amount of auxin to cytokinin is equal, then a callus will develop. If the auxin concentration is more than 10 times that of cytokinin then the explants will develop roots while a auxin concentration of less than 10 times that of cytokinin will stimulate shoots to grow.

10

The correct answer is **C**.

Micropropagation results in many identical copies (clones) being produced of the same plant species. It cannot be used to create new varieties of plant species, as that would require different sets of genetic material to be combined, such as is the case in sexual reproduction.