



6. Why is abscisic acid also known as stress hormone?

Solution: A fairly high concentration of abscisic acid (ABA) is found in leaves of plants growing under stress conditions, such as drought, flooding, injury, mineral deficiency etc. It is accompanied by loss of turgor and closure of stomata. When such plants are transferred to normal conditions, they regain normal turgor and ABA concentration decreases. Since the synthesis of ABA is accelerated under stress condition and the same is destroyed or inactivated when stress is relieved, it is also known as stress hormone.

7. 'Both growth and differentiation in higher plants are open'.

Comment.

Solution: Plant growth is generally indeterminate. Higher plants possess specific areas called meristems which take part in the formation of new cells. The body of plants is built on a modular fashion where structure is never complete because the tips (with apical meristem) "are open ended - always growing and forming new organs to replace the older or senescent ones. Growth is invariably associated with differentiation. The exact trigger for differentiation is also not known. Not only the growth of plants are open-ended, their differentiation is also open. The same apical meristem cells give rise to different types of cells at maturity, e.g., xylem, phloem, parenchyma, sclerenchyma fibres, collenchyma, etc. Thus, both the processes are indeterminate, unlimited and develop into different structures at maturity i.e., both are open.

8. 'Both a short day plant and a long day plant can produce flower simultaneously in a given place'. Explain.

Solution: A short day plant (SDP) flowers only when it receives a long dark period and short photoperiod, e.g., Xanthium, Dahlia etc. On the other hand, a long day plant (LDP) will flower only when it receives a long photoperiod and short dark period, e.g., wheat, oat etc. Thus critical photoperiod is that continuous duration of light which must not be exceeded in SDP and should always be exceeded in LDP in order to bring them to flower. Xanthium requires light for less than 15.6 hrs and Henbane requires light for more than 11 hrs. Xanthium (a SDP) and Henbane (DP) will flower simultaneously in light period between 11 to 15.6 hrs.

9. Which one of the plant growth regulators would you use if you are asked to

- (a) induce rooting in a twig
- (b) quickly ripen a fruit
- (c) delay leaf senescence
- (d) induce growth in axillary buds
- (e) 'bolt' a rosette plant
- (f) induce immediate stomatal closure in leaves.

Solution: (a) Auxins like IBA, NAA.

- (b) Ethylene
- (c) Cytokinins
- (d) Cytokinins
- (e) Gibberellins
- (f) Absciscic acid (ABA)

10. Would a defoliated plant respond to photo- periodic cycle? Why?

Solution: No, a defoliated plant would not respond to photoperiodic cycle because photoperiodic stimulus is picked up by the leaves only. Even one leaf or a part of it is sufficient for this purpose. For perception of photoperiodic cycle, there must be the presence of leaves under inductive photoperiod, so that, the hormone responsible for flowering can be produced.

11. What would be expected to happen if:

- (a) GA_3 is applied to rice seedlings
- (b) dividing cells stop differentiating
- (c) a rotten fruit gets mixed with unripe fruits
- (d) you forget to add cytokinin to the culture medium.

Solution:

- (a) The coleoptile will elongate rapidly, as GA_3 helps in cell growth.
- (b) The development of callus (mass of undifferentiated cells) will take place.
- (c) The unripe fruits will ripe quickly because of the increased rate of respiration due to emission of ethylene from rotten fruit.
- (d) Cell division will retard and shoot will not initiate from the callus.

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