NCERT Exemplar Solutions of Class 11 Biology – Chapter 15: Plant Growth and Development

MULTIPLE CHOICE QUESTIONS

1. Ethylene is used for

a. Retarding ripening of tomatoes
b. Hastening of ripening of fruits
c. Slowing down the ripening of apples
d. Both b and c

Solution: Option (b) is the answer.

Enhanced Explanation: Ethylene (C_2H_4) is a gaseous plant hormone that accelerates fruit ripening by triggering the breakdown of chlorophyll, conversion of starches to sugars, and softening of cell walls. It's commonly used commercially to ripen fruits like bananas and tomatoes after harvest.

---

2. Coconut water contains

a. ABA
b. Auxin
c. Cytokinin
d. Gibberellin

Solution: Option (c) is the answer.

Enhanced Explanation: Coconut water is rich in cytokinins, particularly zeatin. These hormones promote cell division and are essential for plant tissue culture. Coconut water is often used as a natural growth medium in plant cell cultures due to its high cytokinin content.

---

3. The effect of apical dominance can be overcome by which of the following hormone:

a. IAA
b. Ethylene
c. Gibberellin
d. Cytokinin

Solution: Option (d) is the answer.

Enhanced Explanation: Apical dominance is maintained by auxins (IAA) produced in the apical bud, which inhibit lateral bud growth. Cytokinins counteract this effect by promoting lateral bud development and breaking apical dominance, leading to bushy growth.

---

4. Match the following:

A. IAA **B.** ABA **C.** Ethylene **D.** GA **E.** Cytokinins

i. Herring sperm DNA **ii.** Bolting **iii.** Stomatal closure **iv.** Weed-free lawns **v.** Ripening of fruits

Options: a. A – iv, B – iii, C – v, D – ii, E – i

b. A – v, B – iii, C – iv, D – ii, E – i

c. A – iv, B – i, C – iv, D – iii, E – ii

d. A – v, B – iii, C – ii, D – i, E – iv

Solution: Option (a) is the answer.

Enhanced Explanation:

- **IAA (Auxin)** → Weed-free lawns (selective herbicide action)
- **ABA** → Stomatal closure (stress response)
- **Ethylene** → Ripening of fruits (promotes senescence)
- **GA (Gibberellin)** → Bolting (stem elongation before flowering)
- **Cytokinins** → Herring sperm DNA (source of natural cytokinins)

---

5. Apples are generally wrapped in waxed paper to

a. Prevent sunlight from changing its colour

b. Prevent aerobic respiration by checking the entry of O_2

c. Prevent ethylene formation due to injury

d. Make the apples look attractive

Solution: Option (b) is the answer.

Enhanced Explanation: Waxed paper creates a modified atmosphere around apples by reducing oxygen availability and increasing CO_2 levels. This slows down aerobic respiration and ethylene production, thereby extending shelf life and preventing over-ripening.

---

6. Growth can be measured in various ways. Which of these can be used as parameters to measure growth

a. Increase in cell number

b. Increase in cell size

c. Increase in length and weight

d. All the above

Solution: Option (d) is the answer.

Enhanced Explanation: Growth is a quantitative increase in living matter and can be measured through multiple parameters:

- **Cell number** (hyperplasia)
- **Cell size** (hypertrophy)
- **Length, weight, volume** (morphometric measurements)
- **Fresh and dry weight** (biomass accumulation)

---

7. The term synergistic action of hormones refers to

a. When two hormones act together but bring about the opposite effects
b. When two hormones act together and contribute to the same function
c. When one hormone affects more than one function
d. When many hormones bring about any one function
Solution: Option (b) is the answer.
Enhanced Explanation: Synergistic action occurs when two or more hormones work together to enhance or amplify the same physiological response. For example, auxins and cytokinins work synergistically in tissue culture to promote both cell division and cell elongation.

---

8. Plasticity in plant growth means that
a. Plant roots are extensible
b. Plant development is dependent on the environment
c. Stems can extend
d. None of the above
Solution: Option (b) is the answer.
Enhanced Explanation: Plasticity refers to the ability of plants to modify their growth and development in response to environmental conditions. This includes morphological changes, physiological adjustments, and developmental flexibility based on light, temperature, nutrients, and other environmental factors.

---

9. To increase sugar production in sugarcanes, they are sprayed with
a. IAA
b. Cytokinin
c. Gibberellin
d. Ethylene
Solution: Option (c) is the answer.
Enhanced Explanation: Gibberellins promote internode elongation in sugarcane, increasing stem length and consequently sugar storage capacity. This treatment can increase sugar yield by approximately 20 tons per acre by enhancing stem growth where sucrose is stored.

---

10. ABA acts antagonistically to
a. Ethylene
b. Cytokinin
c. Gibberellic acid
d. IAA
Solution: Option (c) is the answer.
Enhanced Explanation: ABA (Abscisic acid) and Gibberellic acid have opposing effects:

- **ABA**: Promotes dormancy, inhibits growth, closes stomata
- **GA**: Breaks dormancy, promotes growth, opens stomata This antagonistic relationship helps plants balance growth and stress responses.

---

11. Monocarpic plants are those which

a. Bear flowers with one ovary

b. Flower once and die

c. Bear only one flower

d. All of the above

Solution: Option (b) is the answer.

Enhanced Explanation: Monocarpic plants complete their life cycle with a single reproductive phase and then die. Examples include bamboo, wheat, and rice. This contrasts with polycarpic plants that can reproduce multiple times during their lifetime.

---

12. The photoperiod in plants is perceived at

a. Meristem

b. Flower

c. Floral buds

d. Leaves

Solution: Option (d) is the answer.

Enhanced Explanation: Leaves are the primary sites of photoperiod perception through phytochrome pigments. The light-sensing mechanism in leaves determines day length and triggers flowering responses, which are then transmitted to apical meristems through mobile flowering signals.