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 ripening of apples
   d. Both b and c

2. Coconut water contains
   a. ABA
   b. Auxin
   c. Cytokinin
   d. Gibberellin

3. The affect of apical dominance can be overcome by which of the following hormone:
   a. IAA
   b. Ethylene
   c. Gibberellin
   d. Cytokinin

4. Match the following:

A.	IAA	i.	Herring sperm DNA
B.	ABA	ii.	Bolting
C.	Ethylene	iii.	Stomatal closure
D.	GA	iv.	Weed-free lawns
E.	Cytokinins	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

5. Apples are generally wrapped in waxed paper to
   a. Prevent sunlight for 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

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

7. The term synergistic action of hormones refers to
   a. When two hormones act together but bring about 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.

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

9. To increase sugar production in sugarcanes, they are sprayed with
   a. IAA
   b. Cytokinin
   c. Gibberellin
   d. Ethylene

10. ABA acts antagonistic to
   a. Ethylene
   b. Cytokinin
   c. Gibberlic acid
   d. IAA

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

12. The photoperiod in plants is perceived at
    a. Meristem
    b. Flower
    c. Floral buds
    d. Leaves

VERY SHORT ANSWER TYPE QUESTIONS

1. Fill in the places with appropriate word/ words.
    a. A phase of growth which is maximum and fastest is _____.
    b. Apical dominance as expressed in dicotyledonous plants is due to the presence of more _____ in the apical bud than in the lateral ones.
    c. In addition to auxin, a _____ must be supplied to culture medium to obtain a good callus in plant tissue culture.
    d. _____ of a vegetative plants are the sites of photoperiodic perception.

2. Plant growth substances (PGS) have innumerable practical applications. Name the PGS you should use to
    a. Increase yield of sugar cane.
    b. Promote lateral shoot growth.
    c. Cause sprouting of potato tuber.
    d. Inhibit seed germination.

3. A primary root grows from 5 cm to 19 cm in a week. Calculate the growth rate and relative growth rate over the period.

4. Gibberellins were first discovered in Japan when rice plants were suffering from bakane (the foolish seedling disease) caused by a fungus *Gibberella fujikuroi.*
    a. Give two functions of this phytohormone.
    b. Which property of Gibberellin caused foolish seedling disease in rice?

5. Gibberellins promote the formation of _____ flowers on genetically _____ plants in *Cannabis* whereas ethylene promotes formation of _____ flowers on genetically _____ plants.

6. Classify the following plants into Long-Day Plants (LDP), Short Day Plants (SDP) and Day Neutral Plants (DNP) *Xanthium*, Henbane (*Hyoscyamus niger*), Spinach, Rice, Strawberry, *Bryophyllum*, Sunflower, Tomato, Maize.

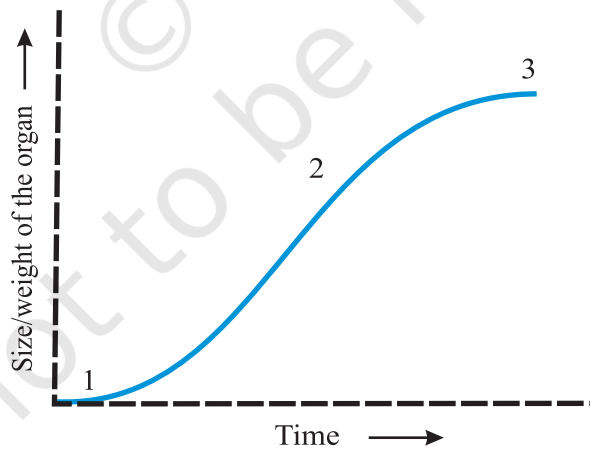
7. A farmer grows cucumber plants in his field. He wants to increase the number of female flowers in them. Which plant growth regulator can be applied to achieve this?

8. Where are the following hormones synthesized in plants
   a. IAA
   b. Gibberellins
   c. Cytokinins

9. In botanical gardens and tea gardens, gardeners trim the plants regularly so that they remain bushy. Does this practice have any scientific explanation?

10. Light plays an important role in the life of all organisms. Name any three physiological processes in plants which are affected by light.

11. In the figure of Sigmoid growth curve given below, label segments 1, 2 and 3.



12. Growth is one of the characteristic of all living organisms? Do unicellular organisms also grow? If so, what are the parameters?

13. The rice seedlings infected with fungus *Gibberlla fujikuroi* is called foolish seedlings? What was the reason behind it?

SHORT ANSWER TYPE QUESTIONS

1. *Nicotiana tabacum*, a Short Day Plant, when exposed to more than critical period of light fails to flower. Explain.

2. What are the structural characteristics of
   a. Meristematic cells near root tip
   b. The cells in the elongation zone of the root

3. Does the growth pattern in plants differ from that in animals? Do all the parts of plant grow indefinitely? If not, name the regions of plant, which can grow indefinitely.

4. Explain in 2-3 lines each of the following terms with the help of examples taken from different plant tissues
   a. Differentiation
   b. De-differentiation
   c. Redifferentiation

5. Auxins are growth hormones capable of promoting cell elongation. They have been used in horticulture to promote growth, flowering and rooting. Explain the meaning of the following terms related to auxins.
   a. auxin precursors
   b. anti-auxins
   c. synthetic auxins

6. The role of ethylene and abscissic acid is both positive and negative. Justify the statement.

7. While experimentation, why do you think it is difficult to assign any affect seen to any single hormone?

8. What is the mechanism underlying the phenomenon by which the terminal/apical bud suppresses the growth of lateral buds? Suggest measures to overcome this phenomenon.

9. In animals there are special glands secreting hormones, whereas there are no glands in plants. Where are plant hormones formed? How are the hormones translocated to the site of activity?

10. Many discoveries in science have been accidental. This is true for plant hormones also. Can you justify this statement by giving an example? Also what term is used for such accidental findings?

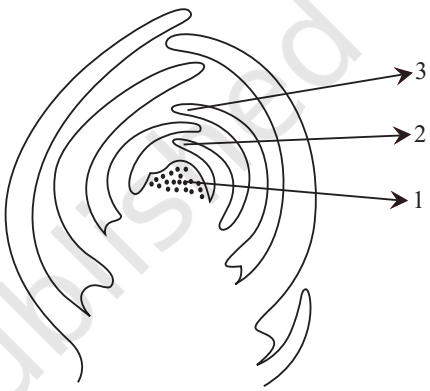
11. To get a carpet like grass lawns are mowed regularly. Is there any scientific explanation for this?

12. In a slide showing different types of cells can you identify which type of the cell may be meristematic and the one which is incapable of dividing and how?

13. A rubber band stretches and reverts back to its original position. Bubble gum stretches, but it would not return to its original position.

    Is there any difference between the two processes? Discuss it with respect to plant growth (Hint: Elasticity (reversible) Plasticity (irreversible))

14. Label the diagram
    a. This is which part of a dicotyledonous plant?
    b. If we remove part 1 from the plant, what will happen?



15. Both animals and plants grow. Why do we say that growth and differentiation in plants is open and not so in animals? Does this statement hold true for sponges also?

16. Define parthenocarpy. Name the plant hormone used to induce parthenocarpy.

17. While eating watermelons, all of us wish it was seedless. As a plant physiologist can you suggest any method by which this can be achieved.

18. A gardener finds some broad-leaved dicot weeds growing in his lawns. What can be done to get rid of the weeds efficiently?

19. On germination a seed first produces shoot with leaves, flowers appear later,
    a. Why do you think this happens?
    b. How is this advantageous to the plant?

20. Fill in the blanks:
    a. Maximum growth is observed in _____ phase.
    b. Apical dominance is due to _____

c. _____ hormone initiate rooting

d. Pigment involved in Photoperception in flowering plants is _____

LONG ANSWER TYPE QUESTIONS

1. Some varieties of wheat are known as spring wheat while others are called winter wheat. Former variety is sown, and planted in spring and is harvested by the end of the same season. However, winter varieties, if planted in spring, fail to flower or produce mature grains within a span of a flowering season. Explain, why?

2. It is known that some varieties of wheat are sown in autumn but are harvested around next mid summer.
   a. What could be the probable reason for this?
   b. What term is used for this promotion of flowering under low temperature?
   c. Which plant hormone can replace the cold treatment?

3. Name a hormone which
   a. is gaseous in nature
   b. is responsible for phototropism
   c. induces femaleness in flowers of cucumber
   d. is used for killing weeds (dicots)
   e. induces flowering in long day plants