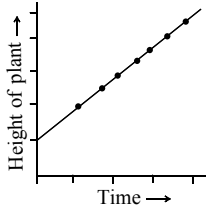


Topic :- Plant Growth & Development

- 1 **(b)**
In plants, some movements occur due to change of turgor pressure in cells particularly at the base of petiole of leaves and flowers. This turgor pressure change is related with change in osmotic pressure.
- 2 **(a)**
Ethylene is the only gaseous hormone. Main roles of ethylene are as follows:
1. It helps in ripening of fruits like mango, banana, etc. Due to this property, it is popularly known as ripening hormone.
 2. It accelerates apical dominance, senescence of leaves and flowers.
 3. It inhibits geotropism, flowering, etc.
- 3 **(c)**
Gibberellins are named after the fungus *Gibberella fujikurii* which caused disease in rice plants. Japanese plant pathologist **Eichi Kurosawa** investigated it as the Bakane (foolish seedling) disease.
- 4 **(a)**
Further away from the apex, *i.e.*, more proximal to the phase of elongation, lies the portion of axis which is undergoing the phase of maturation. The cells of this zone, attain their maximal size in terms of wall thickening and protoplasmic modifications
- 5 **(d)**
'**Cytokinin**' delay the senescence of leaves and prevents chlorophyll degradation. It can be shown by rapid bioassay technique. Cytokinin treated leaf tips retards the process of chlorophyll degradation as compared to untreated leaf discs.
- 6 **(a)**
Parts of the year when maximum vegetative growth occurs is known as growing season
- 7 **(a)**
Arithmetic Growth Rate The expression of arithmetic growth is exemplified by roots (or organ) elongating at constant rate. On plotting the length of an organ against time, a linear curve is obtained. Mathematically it is expressed as



Constant linear growth, a plot of length L against time

$$L_t = L_0 + rt$$

L_t = Length of time ' t '

L_0 = Length of time to

r = Growth rate or elongation per unit time

8 **(b)**

The ageing process of the leaves usually accompanies with loss of chlorophyll and rapid breakdown of proteins called as **senescence**. Spraying of cytokinin delays senescence and increases the rate of chlorophyll formation.

9 **(a)**

Plant follows different pathways in response to environment or phases of life to form different kind of structures. This ability is called plasticity, *e.g.*, heterophylly in cotton, coriander and larkspur

10 **(a)**

Opening and closing of flowers is a case of photonasty. Flowers of certain plants open in light and close down in dark.

11 **(c)**

Both (a) and (b).

During differentiation, cells undergoes few to major structural changes both in their cell wall and protoplasm. For example, to form tracheary elements, the cells would loose their protoplasm. They also develop a very strong, elastic, lignocellulosic secondary cell walls to carry water to long distances even under extreme tension

12 **(d)**

Abscissic acid also called stress hormone, is responsible for bud dormancy, seed dormancy, abscission, leaf senescence, etc.

13 **(c)**

The effect of photoperiods (relative length of day and night) or daily duration of light hours and dark periods on growth and development of plants is called **photoperiodism**. In other words, it involves the response of the organism to the environmental rhythms of light and darkness.

14 **(c)**

Short day plants generally require light period of less than 12 hours (*i.e.*, 8-10hrs) and continuous dark period of about 14-16 hrs for subsequent flowering. Most of the winter flowering plants belong to this category, *e.g.*, *Chrysanthemum*, *Xanthium* (cocklebur), *Dahila*, rice, sugarcane, potato, tobacco, soyeau (*Glycine max*), etc.

15 (d)

Rhizobium is a nitrogen fixing bacterium that inhabits the root nodules in leguminous crops. This bacterium leads to the production of plant hormone IAA (auxin), which is known to stimulate the nodule formation in legume plants.

16 (c)

Most plants structures have a determinate, limited growth with a definite final shape. Stems and roots show indeterminate growth, which have not a precisely established limit of growth fixed in advance.

Some exception are as follows determinate growth pattern of segmented stem of certain cactus and determined growth of root in many monocotyledons

17 (a)

(i) Generally, the plant hormones are same in function and chemical composition produced by different plant species

(ii) Generally, single plant hormone produce many effects

(iii) ABA, auxins, GA are acidic in nature

(iv) One hormone is generally produced by many parts of a plants

18 (b)

In the given graphs, graph 'e' represents the sigmoid growth curve.

Geometrical Growth In most system the initial growth is slow (lag phase), and it increases there after at a exponential rate (log or exponential phase). Both the progeny cells following mitotic cell division retains the ability to divide and continue to do so. However due to the limited nutrient supply, the growth slows down leading to stationary phase. If we plot the parameter of growth against time, a typical sigmoid curve is obtained.

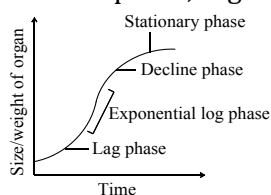
It has following stages

1. During lag phase, organism adapt themselves to growth conditions. It is the period where the individual organism are maturing and not yet able to divide. During the lag phases of the bacterial growth cycle, synthesis of RNA, enzyme and other molecules occurs

2. The log phase (sometimes called the logarithmic phase or the exponential phase) is a period characterised by cell doubling. The number of new organism appering per unit time is proportional to the present population.

3. The stationary phase is often due to a growth-limiting factor such as the depletion of an essential nutrient, and/or the formation of an inhibitory product such as an organic acid. Stationary phase results from a situation in which growth rate and death rate are equal

4. Death phase, organism run out of nutrients and die



19 (d)

Rooting on stem cutting is the function of auxin not cytokinin. Rooting on stem cutting is widely used for generation of new plants in short period of time

20 (d)

Site of vernalisation The stimulus of vernalization is perceived only by the meristematic cells, *e.g.*, shoot tip, embryo tip, root apex, developing leaves, etc.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	B	A	C	A	D	A	A	B	A	A
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	D	C	C	D	C	A	B	D	D

PE