DPP
DAILY PRACTICE PROBLEMS

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Class : XIth Date :	**Solutions**	Subject : BIOLOGY DPP No. : 3

Topic :- Plant Growth & Development

1 **(a)**
Synthetic auxins are synthetic compounds which cause various physiological responses common to IAA. 2, 4-D (2, 4-dichlorophenoxy acetic acid) is a synthetic auxin and used as a weedicide.

2 **(d)**
Senescence occurs prior to death of an organ or organism. It can be defined as the total sum of deteriorative processes that naturally terminate the functional life of an organism.

3 **(a)**
ABA (Abscisic Acid) was discovered for its role in regulating abscission and dormancy. It acts as the general plant growth inhibitor and an inhibitor of plant metabolism. ABA inhibits seed germination

4 **(d)**
Vernalization is a process of shortening of the juvenile or vegetative phase and hastening flowering by a previous cold treatment. Vernalization or low temperature requirement of some plants can be replaced by **gibberellins.**

5 **(c)**
Growth is regarded as one of the most fundamental and conspicuous characteristics of a living being. Growth can be defined as the irreversible permanent increase in the size of an organ or its part or even of an individual cell. Generally growth is accompanined by metabolic process (both anabolic and catabolic), that occurs at the expanse of energy

6 **(c)**
Germination of seeds especially in cereals is triggered by soaking the seeds in water. After imbibition of water, the embryo seretes **gibberellin** which diffuses into aleurone layer and stimulates synthesis of amylase, protease, and lipase enzyme. The enzymes solubilize the reserve food of the seed.

7 **(b)**
Senescence is the process of ageing which is caused by increased entropy, cellular breakdown, reduced anabolic process and increased catabolic process. Cytokinins are amino purine derivatives which promote cell division and delay senescence by controlling protein synthesis.

8 **(a)**
Cytokinin promotes the nutrient mobilisation, which helps in the delay of leaf senescence

9 **(a)**
ABA was discovered during mid 1960's.
During mid 1960s, three independent researches reported the purification and chemical characterisation of three different kind of inhibitors as inhibitor B, abscission II and dormin. Later, three were proved chemically identical. It was named Abscisic Acid (ABA)

10 **(b)**
Functions of Auxin
(i) Auxin helps to initiate rooting in stem cuttings, an application widely used for plant propagation
(ii) Auxin promotes flowering, *e.g.*, in pineapples
(iii) It helps to prevent fruit and leaf drop at early stages
(iv) They promote the abscission of older mature leaves and fruits
(v) Apical dominance
(vi) Induce parthenocarpy in tomatoes
(vii) Controls xylem differentiation and helps in cell division

11 **(b)**

A – intrinsic, B – extrinsic, C – extrinsic

12 **(a)**

Indole -3 – acetic acid (IAA) is the best known natural auxin. It is growth promoting hormone.

13 **(c)**

A calendar year plant shows the period of active vegetative, growth, flowering, fruiting, senescence and dormancy. The different aspects or appearances of plants in different seasons of year is called phenology. They are controlled not only by seasons and other environmental factors, but also by metabolism, heredity, and internal signals

14 **(c)**

Absolute Growth Rate (AGR) is the comparison of total growth per unit time

Initial surface area $= 5$ cm^2, Final surface area $= 10$ cm^2

AGR = Final surface area – Initial surface area

$= 10 - 5 = 5$

Relative Growth Rate (RGR)

$$= \frac{\text{Final surface area} - \text{Initial surface area}}{\text{Initial surface area}} \times 100$$

$$= \frac{10 - 5}{5} \times 100 \Rightarrow 100 = 100$$

15 **(a)**

Vernalisation is a process of shortening of the juvenile or vegetative phase and faster flowering by previous cold treatment. It was firstly found by Lysenko (1928), a Russian worker

16 **(a)**

Nyctinastic or **sleep movement** is brought about by the alternation of day and night. These are also caused by the presence or absence of light (photonastic) as well as by the changes in temperature of the surrounding atmosphere (thermonastic).

17 **(a)**

A – Inhibited, B – Promoted

18 **(d)**

One single maize root apical meristem can give rise to more than 17,500 new cells per hour, whereas cells in watermelon may increase in size by up to 3,50,000 times. In the former, growth is expressed as an increase in cell number; the later expresses growth as an increase in size of the cell. While the growth of a pollen tube is measured in terms of its length, an increase in surface area denotes the growth in a dorsiventral leaf

19 **(d)**

It was a Russian Physiologist named **Dimitry N Neljubow** (1876-1926), who first established that **ethylene** affects plant growth. He identified ethylene in illuminating gas but showed that it causes a **triple response** on pea seedlings- inhibited stem elongation, increased stem thickening and a horizontal growth habit.

10 **(c)**
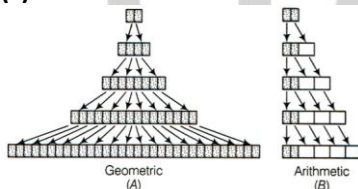
Diagrammatic representation of (A) Geometric and (B) Arithmetic growth.

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
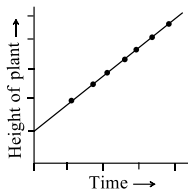
Constant linear growth, a plot of length L against time

$L_t = L_0 + rt$

$L_t =$ Length of time 't'

$L_0 =$ Length of time to

$r =$ Growth rate or elongation per unit time

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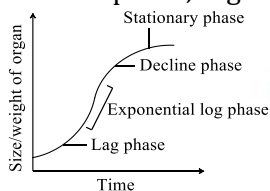
ANSWER-KEY									
Q.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A.	A	D	A	D	C	C	B	A	A	B
Q.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
A.	B	A	C	C	A	A	A	D	D	C