Plant Growth and Development

Question1

Match List-I with List-II :

	List-I		List-II
A.	Abscisic acid	I	Promotes female flowers in cucumber
B.	Ethylene	II	Helps seeds to withstand desiccation
C.	Gibberellin	III	Helps in nutrient mobilisation
D.	Cytokinin	IV	Promotes bolting in beet, cabbage etc

Choose the correct answer from the options given below:

[NEET 2024 Re]

Options:

A.

A-II, B-III, C-IV, D-I

B.

A-III, B-II, C-I, D-IV

C.

A-II, B-I, C-IV, D-III

D.

A-II, B-I, C-III, D-IV

Answer: C

Solution:

Abscisic acid ⟶ Helps seeds to withstand desiccation

Ethylene ⟶ Promotes female flowers in cucumber

Gibberellin ⟶ Promotes bolting in beet, cabbage etc.

Cytokinin ⟶ Helps in nutrient mobilisation

Hence, the correct answer is option (3)

Question2

F. Skoog observed that callus proliferated from the internodal segments of tobacco stem when auxin was supplied with one of the following

except :

[NEET 2024 Re]

Options:

A.

Extract of Vascular tissues

B.

Coconut milk

C.

Abscisic acid

D.

Yeast Extract

Answer: C

Solution:

F. Skoog observed that from the internodal segments of tobacco stems the callus proliferated only if in addition to auxins the nutrient medium was supplied with the extracts of vascular tissues, yeast extract, coconut milk or DNA. Miller et al.later identified and crystallised the cytokinesis promoting active substance that they termed kinetin.

Question3

Given below are some statements about plant growth regulators.
A. All GAs are acidic in nature.
B. Auxins are antagonists to GAs.
C. Zeatin was isolated from coconut milk.
D. Ethylene induces flowering in Mango.
E. Abscisic acid induces parthenocarpy.

Choose the correct set of statements from the options given below:

[NEET 2024 Re]

Options:

A.

A, C, D

B.

B, E

C.

A, B, C

D.

B, D, E

Answer: A

Solution:

Abscisic acid is antagonistic to Gibberellic acid.

Auxins induce parthenocarpy in certain fruits, such as, tomatoes.

Question4

Auxin is used by gardeners to prepare weed-free lawns. But no damage is caused to grass as auxin

[NEET 2024]

Options:

A.

promotes apical dominance.

B.

promotes abscission of mature leaves only.

C.

does not affect mature monocotyledonous plants.

D.

can help in cell division in grasses, to produce growth.

Answer: C

Solution:

Auxin does not affect mature monocot plants. In monocots, especially grasses show limited translocation and cause rapid degradation of external auxin.

Question5

Formation of interfascicular cambium from fully developed parenchyma cells is an example for

[NEET 2024]

Options:

A.

Differentiation

B.

Redifferentiation

C.

Dedifferentiation

D.

Maturation

Answer: C

Solution:

The phenomenon of formation of interfascicular cambium from fully differentiated parenchyma cells is called dedifferentiation.

Question6

Spraying sugarcane crop with which of the following plant growth regulators, increases the length of stem, thus, increasing the yield?

[NEET 2024]

Options:

A.

Auxin

B.

Gibberellin

C.

Cytokinin

D.

Abscisic acid

Answer: B

Solution:

Sugarcanes store carbohydrate as sugar in their stems. Spraying sugarcane crop with gibberellins increases the length of the stem, thus increasing the yield.

Question7

Which hormone promotes internode/petiole elongation in deep water rice?

[NEET 2023]

Options:

A.

Kinetin

B.

Ethylene

C.

2, 4-D

D.

GA_3

Answer: B

Solution:

Solution:

Ethylene promotes rapid internode/petiole elongation in deep water rice plants.

Question8

In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as

[NEET 2023]

Options:

A.

Dedifferentiation

B.

Development

C.

Senescence

D.

Differentiation

Answer: A

Solution:

In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as dedifferentiation.

Dedifferentiation is a phenomenon by which the living differentiated plant cells, that by now have lost the capacity to divide can regain the capacity of division under certain conditions.

Question9

Spraying of which of the following phytohormone on juvenile conifers helps hastening the maturity period, that leads early seed production?

[NEET 2023]

Options:

A.

Gibberellic Acid

B.

Zeatin

C.

Abscisic Acid

D.

Indole-3-butyric Acid

Answer: A

Solution:

Solution:

Spraying juvenile conifers with gibberellins (GAs) hastens the maturity period, thus leading to early seed production.

Question10

The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called:
[NEET Re-2022]

Options:

A. Differentiation

B. Redifferentiation

C. Development

D. Plasticity

Answer: D

Solution:

Plasticity - it is the ability of the plants to follow different pathways in response to the environment leading to formation of different kinds of structures.

Question11

Which of the following growth regulators is an adenine derivative ? [NEET Re-2022]

Options:

A. Abscisic acid

B. Auxin

C. Cytokinin

D. Ethylene

Answer: C

Solution:

Cytokinin is an adenine derivative.

Auxin is derived from tryptophan amino acid.

Abscisic acid is derived from violaxanthin.

Ethylene is a gaseous hormone derived from methionine.

Question12

The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called as: [NEET Re-2022]

Options:

A. Secondary growth

B. Differentiation

C. Dedifferentiation

D. Redifferentiation

Answer: C

Solution:

Solution:

The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called Dedifferentiation.

Question13

Which one of the following plants does not show plasticity? [NEET-2022]

Options:

A. Cotton

B. Coriander

C. Buttercup

D. Maize

Answer: D

Solution:

Solution:

Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called plasticity e.g. heterophylly in cotton, coriander and larkspur. In such plants, leaves of juvenile plant are different in a shape from those in mature plants.

Maize does not show plasticity.

Question14

The gaseous plant growth regulator is used in plants to : [NEET-2022]

Options:

A. speed up the malting process

B. promote root growth and roothair formation to increase the absorption surface

C. help overcome apical dominance

D. kill dicotyledonous weeds in the fields

Answer: B

Solution:

Ethylene is a gaseous plant hormone. It induces development of adventitious roots on various types of cutting. It promotes the development of lateral roots and growth of root hairs. Cytokinin helps to overcome the apical dominance.

Auxin is used to kill dicot weeds. Gibberellin speeds up the malting process

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Question15

The site of perception of light in plants during photoperiodism is [NEET 2021]

Options:

A. Shoot apex

B. Stem

C. Axillary bud

D. Leaf

Answer: D

Solution:

Solution:
• The site of perception of light in plants during photoperiodism is leaf.
• The site of perception of low temperature stimulus during vernalisation is shoot apex and embryo.
• Axillary bud are not sites of perception of photoperiod.

Question16

The plant hormone used to destroy weeds in a field [NEET 2021]

Options:

A. IAA

B. NAA

C. 2, 4-D

D. IBA

Answer: C

Solution:

Some synthetic auxins are used as weedicides.

2,4-D is widely used to remove broad leaved weeds or dicotyledonous weeds in cereal crops or monocotyledonous plants.
IAA and IBA are natural auxins.
NAA is a synthetic auxin.

Question17

Which of the following is not an inhibitory substance governing seed dormancy?
[2020]

Options:

A. Abscisic acid

B. Phenolic acid

C. Para-ascorbic acid

D. Gibberellic acid

Answer: D

Solution:

(d) Gibberellic acid breaks seed dormancy.
It activate synthesis of alpha-amylase which breakdown starch into simple sugar
The Phytohormones gibberellic acid (GA)has essential signaling functions in multiple processes during plant development. In rice,GA signaling plays an important role in spikelet fertility.

Question18

Name the plant growth regulator which upon spraying on sugarcane crop, increases the length of stem, thus increasing the yield of sugarcane crop.
[2020]

Options:

A. Gibberellin

B. Ethylene

C. Abscisic acid

D. Cytokinin

Answer: A

Solution:

(a) Spraying sugarcane crop with gibberellins increases the length of the stem, thus increasing the yield by as much as 20 tonnes per acre.

Question19

Removal of shoot tips is a very useful technique to boost the production of tealeaves. This is because :
[2019]

Options:

A. Gibberellins delay senescence of leaves.

B. Gibberellins prevent bolting and areinactivated.

C. Auxins prevent leaf drop at early stages.

D. Effect of auxins is removed and growth of lateral buds is enhanced.

Answer: D

Solution:

Solution:
Auxin shows apical dominance. Removal of auxin by removal of shoot tips prevents the apical dominance and promotes the growth of lateral buds which is a very useful in tea leaves production.

Question20

In order to increase the yield of sugarcane crop, which of the following plant growth regulators should be sprayed?
[2019]

Options:

A. Cytokinins

B. Ethylene

C. Auxins

D. Gibberellins

Answer: D

Solution:

Gibberellins (GAs) regulate various developmental processes, including stem elongation, germination, dormancy,

flowering,flower development and leaf and fruit senescence. When gibberellin is sprayed on sugarcane crop, the length of the stem increases.

Question21

It takes very long time for pineapple plants to produce flowers. Which combination of hormones can be applied to artificially induce flowering in pineapple plants throughout the year to increase yield? [2019]

Options:

A. Auxin and Ethylene

B. Gibberellin and Cytokinin

C. Gibberellin and Abscisic acid

D. Cytokinin and Abscisic acid

Answer: A

Solution:

Solution:
A pineapple plant flowers only once,and produces one pineapple. Then it dies. But before it dies it also produces offspring.
Auxin and ethylene can be applied to artificially induce flowering in pineapple to increase yield throughout the year. Applied auxin mimic the action of ethylene by stimulating ethylene formation, and that ethylene, not auxin, causes pineapples to flower. Ethylene initiates flowering and synchronising fruit-set in pineapples.

Question22

What is the site of perception of photoperiod necessary for induction of flowering in plants ? (2019)

Options:

A. Lateral buds

B. Pulvinus

C. Shoot apex

D. Leaves

Answer: D

Solution:

During flowering, photoperiodic stimulus is perceived by leaves of plants.

Question23

Fruit and leaf drop at early stages can be prevented by the application of
(NEET 2017)

Options:

A. ethylene

B. auxins

C. gibberellic acid

D. cytokinins.

Answer: B

Solution:

Solution:
(b): In low concentrations, auxins such as 2, 4− D(2, 4− Dichlorophenoxy acetic acid) is useful in preventing, pre-harvest fruit drop and leaf drop.

Question24

You are given a tissue with its potential for differentiation in an artificial culture. Which of the following pairs of hormones would you add to the medium to secure shoots as well as roots?
(NEET II 2016)

Options:

A. IAA and gibberellin

B. Auxin and cytokinin

C. Auxin and abscisic acid

D. Gibberellin and abscisic acid

Answer: B

Solution:

(b) : Cytokinin and auxin are two plant hormones that are supplied to the tissue culture medium in definite proportions. They bring about cell division and differentiation of callus. A low auxin to cytokinin ratio promotes shoot formation whereas a high auxin to cytokinin ratio promotes rooting of callus.

Question25

Phytochrome is a
(NEET II 2016)

Options:

A. flavoprotein

B. glycoprotein

C. lipoprotein

D. chromoprotein

Answer: D

Solution:

Solution:
(d) : Phytochrome is a chromoprotein, plant pigment that can detect the presence or absence of light and is involved in regulating many processes that are linked to day length (photoperiod), such as seed germination and initiation of flowering. It consists of a light detecting portion, called a chromophore, linked to a small protein and exists in two inter-convertible forms with different physical properties.

Question26

The Avena curvature is used for bioassay of
(NEET I 2016)

Options:

A. I AA

B. ethylene

C. ABA

D. GA_3

Answer: A

Solution:

Solution:
(a) : Avena curvature test is a test based on the experiments of Went (1928) which can measure auxin upto $300 mg$/ litre.

Indole 3 -Acetic Acid (IAA) is a universal natural auxin and Avena curvature test may serve as an accurate bioassay for this plant hormone.

Question27

Auxin can be bioassayed by (2015)

Options:

A. potometer

B. lettuce hypocotyl elongation

C. Avena coleoptile curvature

D. hydroponics.

Answer: C

Solution:

Solution:
(c) : Auxin bioassay is a quantitative test as it measures concentration of auxin to produce the effect and the amount of the effect. Avena Curvature is based upon experiments of Went (1928). 10° curvature is produced by auxin concentration of $150 \mathrm{mg}$/ litre at $25^{\circ} \mathrm{C}$ and 90% relative humidity. The test can measure auxin upto $300 \mathrm{mg}$/ litre. Auxin from a shoot tip or any other plant organ is allowed to diffuse in a standard size agar block (generally $2 \times 2 \times 1$ mm). Auxin can also be dissolved directly in agar. $15-30$ mm long oat coleoptile grown in dark is held vertically over water. 1 mm tip of coleoptile is removed without injuring the primary leaf. After 3 hours a second decapitation is carried out for a distance of4 mm Primary leaf is now pulled loose and agar block supported against it at the tip of decapitated coleoptile. After 90-110 minutes, the coleoptile is found to have bent. The curvature is measured. It can also be photographed and the curvature known from shadow graph.

Question28

What causes a green plant exposed to the light, on only one side, to bend towards the source of light as it grows? (2015 Cancelled)

Options:

A. Light stimulates plant cells on the lighted side to grow faster.

B. Auxin accumulates on the shaded side, stimulating greater cell elongation there.

C. Green plants need light to perform photosynthesis.

D. Green plants seek light because they are phototropic

Answer: B

Solution:

(b) : Auxins induce cell elongation. In a differentially illuminated plant, they accumulate in the shaded part, causing elongation of the cells in the shaded part. This unequal elongation on two sides causes the plant to curve or bend towards the light source i.e., phototropic curvature

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Question29

Typical growth curve in plants is (2015 Cancelled)

Options:

A. stair-steps shaped

B. parabolic

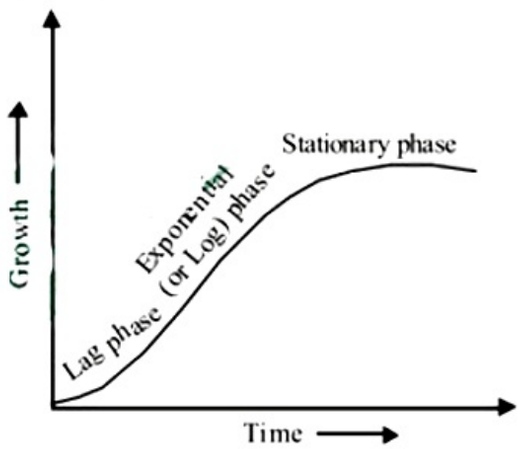
C. sigmoid

D. linear

Answer: C

Solution:

Solution:
(c) : Geometric growth cannot be sustained for long in natural condition. limited nutrient availability slows down the growth. It leads to a stationary phase or even a decline. Plotting the growth against time, gives a typical sigmoid or S-curve. Sigmoid curve of growth is typical of most organisms in their natural environment including plants. An idealised sigmoid growth curve is drawn below:



Question30

Dr. F. Went noted that if coleoptile tips were removed and placed on agar for one hour, the agar would produce a bending when placed on one side of freshly-cut coleoptile stumps. Of what significance is this experiment? (2014)

Options:

A. It made possible the isolation and exact identification of auxin.

B. It is the basis for quantitative determination of small amounts of growth-promoting substances.

C. It supports the hypothesis that IAA is auxin.

D. It demonstrated polar movement of auxins

Answer: D

Solution:

Solution:
There are various bioassays to determine the concentration of auxin hormone in the plant. The Avena coleoptile test is a bioassay firstly done by F. W. Went. It is for IAA (indole-3-acetic acid).
It measures the angle of the curvature of a decapitated coleoptile after placing an agar block containing auxin on one side.
It is seen that when coleoptile tips are placed on agar, agar produced bending when placed on one side of freshly cut coleoptile stumps. This is due to the polar movement of auxin in the stem.

Question31

A few normal seedlings of tomato were kept in a dark room. After a few days they were found to have become white-coloured like albinos. Which of the following terms will you use to describe them?
(2014)

Options:

A. Mutated

B. Embolised

C. Etiolated

D. Defoliated

Answer: C

Solution:

Solution:
(c) : Etiolation is the abnormal form of growth observed when plants grow in darkness or severely reduced light. Such plant characteristically have branched leaves and shoots, excessively long shoots and reduced leaves and root systems.

Question32

Which one of the following growth regulators is known as 'stress hormone'?
(2014)

Options:

A. Abscisic acid

B. Ethylene

C. GA_3

D. Indole acetic acid

Answer: A

Solution:

Solution:
(a) : Abscisic acid prepares plants to cope with stress conditions like drought etc. by inducing stomatal closure and other reactions. Hence it is named stress hormone.

Question33

During seed germination its stored food is mobilized by (NEET 2013)

Options:

A. ABA

B. gibberellin

C. ethylene

D. cytokinin.

Answer: B

Solution:

Solution:
(b) : Gibberellins are plant growth substances chemically related to terpenes and occurring naturally in plants and fungi. They promote elongation of stems, e.g., bolting in cabbage plants, and the mobilization of food reserves in germinating seeds and are influential in inducing flowering and fruit development.

Question34

The pineapple which under natural condition is difficult to blossom has been made to produce fruits throughout the year by application of (KN NEET 2013)

Options:

A. N AA, 2, 4 − D

B. Phenyl acetic acid

C. Cytokinin

D. I AA, I BA

Answer: A

Solution:

Solution:
(a) Plants which are difficult to flower can be made to do so by spraying them with 2, 4, –D (2, 4 – dichlorophenoxy acetic acid) and NAA (napthalene acetic acid) which are synthetic auxins, e.g., litchi, pineapple.

Question35

Through their effects on plant growth regulators, what do the temperature and light control in the plants?
(Mains 2012)

Options:

A. Apical dominance

B. Flowering

C. Closure of stomata

D. Fruit elongation

Answer: B

Solution:

Solution:
(b) : Light and temperature may affect flowering in plants in various ways. The effect of photoperiods or daily duration of light hours (and dark periods) on flowering is called photoperiodism. For example, in short day plants flowering occurs when day length is below critical period, e.g., dahlia, rice etc. In long day plants, flowering occurs when day length is above critical period, e.g., spinach, lettuce etc. In short-long day plants, short photoperiod is required for floral initiation and long photoperiod is required for blossoming and vice-versa for long-short day plants.

Question36

Which one of the following generally acts as an antagonist to gibberellins?
(Mains 2012)

Options:

A. Zeatin

B. Ethylene

C. ABA

D. I AA

Answer: C

Solution:

(c) : Abscisic acid or ABA is an antagonist to gibberellins. This is discussed in the table given below:

Abscisic acid	Gibberellic acid
It inhibits growth.	It promotes growth.
It promotes the dormancy of seeds, of buds and tubers.	It overcomes the natural dormancy seeds, tubers etc.
It inhibits the synthesis of RNA and proteins.	It promotes the of RNA and synthesis proteins.
Causes abscission of flowers and fruits.	Promotes development of fruits.
Promotes leaf senescence.	Prevents leaf senescence.
Promotes stomatal closure.	Promotes stomatal opening.
Prevents amylase activity	Promotes amylase activity during seed germination.

Question37

Vernalization stimulates flowering in (Mains 2012)

Options:

A. zamikand

B. turmeric

C. carrot

D. ginger.

Answer: C

Solution:

(c) : Carrot is a biennial plant that requires stimulus of low temperature for flowering. It remains vegetative during the warm season and bears flowers and fruits only during winter.
It can be made to flower in one growing season by providing low temperature treatment to young plants or seedlings which is referred to as vernalization. Hence, yernalization stimulates flowering in carrot.

Question38

Phototropic curvature is the result of uneven distribution of (2010)

Options:

A. gibberellin

B. phytochrome

C. cytokinins

D. auxin.

Answer: D

Solution:

Solution:
(d) : Phototropic curvature is the result of uneven distribution of auxin. Charles Darwin and his son Francis Darwin observed that the coleoptiles of canary grass responded to unilateral illumination by growing towards the light source (phototropism). After a series of experiments, it was concluded that the tip of coleoptile contain auxin that caused the bending of the entire coleoptile in relation to the direction of light.

Question39

Photoperiodism was first characterised in (2010)

Options:

A. tobacco

B. potato

C. tomato

D. cotton

Answer: A

Solution:

(a) : Photoperiodism is the response to duration and timings of light and dark period. It was first studied by W.W. Garner and H.A. Allard (1920) in tobacco. They observed that Maryland Mammoth variety of tobacco could be made to flower in Summer by reducing the light hours with artificial darkening.

Question40

Coiling of garden pea tendrils around any support is an example of (2010)

Options:

A. thigmotaxis

B. thigmonasty

C. thigmotropism

D. thermotaxis

Answer: C

Solution:

Solution:
(c) : The growth movement in response to touch, or contact of a foreign body, in plants is called thigmotropism or thigmotropic movement. The stems and tendrils of the climbers are positively thigmotropic in their response. The coiling of garden pea tendrils around any support is an example of thigmotropism. Thigmonastic (haptonastic) movements are induced by some external stimuli. For example tentacles of Drosera leaf curve and the lamina lobes of Dionaea fold on coming in contact with an insect.

Question41

One of the commonly used plant growth hormone in tea plantations is (2010)

Options:

A. ethylene

B. abscisic acid

C. zeatin

D. indole- 3 -acetic acid

Answer: D

Solution:

(d) : Indole-3-acetic acid (also called auxin) is a phytohormone which is generally produced by the growing apices of the

stems and roots, from where they migrate to the regions of their action. It is observed that the growing apical bud inhibits the growth of the lateral (axillary) bud. (apical dominance). Since apical meristem is the site of auxin synthesis, it is the physiological effect of the auxin which results in the phenomenon of apical dominance. When shoot tips is removed it usually results in the growth of lateral buds.
This phenomenon is widely applied in tea plantations and hedge-making because as in tea plantation and industries, the apical bud is plucked for tea processing which results in more lateral buds thus enhancing plantation and further industrial purposes.

Question42

Root development is promoted by (Mains 2010)

Options:

A. abscisic acid

B. auxin

C. gibberellin

D. ethylene

Answer: D

Solution:

Solution:
(d) : Ethylene promotes root growth and root hair formation. In low concentration ethylene is used for initiation of roots and also of lateral roots.

Question43

One of the synthetic auxin is (2009)

Options:

A. IAA

B. GA

C. IBA

D. NAA

Answer: D

Solution:

NAA is a synthetic plant hormone in the auxin family and is an ingredient in many commercial plant rooting horticultural products; it is a rooting agent and used for the vegetative propagation of plants from stem and leaf cutting. It is also used for plant tissue culture. The hormone NAA does not occur naturally, and, like all auxins, is toxic to plants at high concentrations. NAA is widely used in agricultural purposes. It is considered to be only slightly toxic but when at higher concentrations it can be toxic to animals.

Question44

Which one of the following acids is a derivative of carotenoids? (2009)

Options:

A. Indole-3-acetic acid

B. Gibberellic acid

C. Abscisic acid

D. Indole butyric acid

Answer: C

Solution:

(c) : Biosynthesis of abscisic acid (ABA) in most plants occur indirectly by degradation of certain carotenoids present in chloroplasts or other plastids. The biosynthetic pathway follow mevalonic acid pathway for their synthesis. The sites of synthesis are fruits, tissues, leaves, roots and seeds.

Question45

Importance of day length in flowering of plants was first shown in (2008)

Options:

A. cotton

B. Petunia

C. Lemna

D. tobacco

Answer: D

Solution:

(d) : The effect of photoperiods or daily duration of light hours (and dark periods) on the growth and development of

plants, especially flowering, is called photoperiodism. Photoperiodism was first studied by Garner and Allard (1920). They observed that "Maryland Mammoth' variety of tobacco could be made to flower in summer by reducing the light hours with artificial darkening. It could be made to remain vegetative in winter by providing extra light.

Question46

Senescence as an active developmental cellular process in the growth and functioning of a flowering plant, is indicated in (2008)

Options:

A. annual plants

B. floral parts

C. vessels and tracheid differentiation

D. leaf abscission

Answer: C

Solution:

Solution:
(c) : Senescence is the process of ageing which is caused by cellular breakdown, increased metabolic failure, increased entropy etc. It occurs in the period between reproductive maturity and death. Cell division followed by cell enlargement and differentiation, precede the actual separation. Senescence of cell in distal region lead to lignification of cell wall. Tylose formation in tracheary element and callose deposition in sieve elements which occur in advance of abscission (i.e. senescence) finally, lead to actual separation. Thus, vessels and tracheid (trachery elements) differentiation indicatessenescence.

Question47

The wavelength of light absorbed by P_r form of phytochrome is (2007)

Options:

A. 680 nm

B. 720 nm

C. 620 nm

D. 640 nm

Answer: A

Solution:

(a) : Phytochrome is the photoreceptor pigment that controls flowering. It has two forms as P_r and P_{fr} P_r is bluish phytochrome and it absorbs light at 660 to 680nm of wavelength. P_{fr} is (far red) yellowish green and absorbs light at 730nm of wavelength.

Question48

Which one of the following pairs, is not correctly matched? (2007)

Options:

A. Gibberellic acid - Leaf fall

B. Cytokinin - Cell division

C. IAA - Cell wall elongation

D. Abscissic acid - Stomatal closure

Answer: A

Solution:

Solution:
(a) : Gibberellic acid is a simple weakly acidic plant growth hormone which promotes cell elongation of both leaves and stems in general and internodal length of genetically dwarf plants in particular. It is in general a growth promoting hormone and does not inhibit growth. So leaf abscission is not associated with gibberellic acid but with abscisic acid.

Question49

Opening of floral buds into flowers, is a type of (2007)

Options:

A. autonomic movement of variation

B. paratonic movement of growth

C. autonomic movement of growth

D. autonomic movement of locomotion.

Answer: C

Solution:

Solution:
(c) : Movement may be of two types, movement of locomotion and movement of curvature. Movement of curvature is

movement of individual parts in relation to other parts. Curvature movement may be growth movements and turgor movements. Growth movements are caused by differential growth in different part of an organ. Opening of floral buds into flowers is such a type of growth movement. Mostly floral bud opening shows thermonastic movement i.e., opening and closing are controlled by temperature. Sometimes movements are controlled by presence or absence of light, e.g., Oxalis.

Question50

An enzyme that can stimulate germination of barley seeds is (2006)

Options:

A. invertase

B. α -amylase

C. lipase

D. protease

Answer: B

Solution:

Solution:
(b) : The process by which the dormant embryo of seed resumes active growth and forms a seedling is known as germination.
The initial step in germination process is the uptake of water and rehydration of the seed tissues by the process of imbibition. The first visible sign of germination is the emergence of the radicle from the seed. But this event is preceded by a series of biochemical reactions.
Imbibition of water causes the embryo within seed to produce α - and α -amylases. These enzymes hydrolyze the starch stored in endosperm into glucose which is necessary for use both as a respiratory substrate and as a source of carbon skeletons of the molecules needed for growth.

Question51

Farmers in a particular region were concerned that pre-mature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield? (2006)

Options:

A. Application of iron and magnesium to promote synthesis of chlorophyll

B. Frequent irrigation of the crop

C. Treatment of the plants with cytokinins along with a small dose of nitrogenous fertilizer

D. Removal of all yellow leaves and spraying the remaining green leaves with 2,4,5-

trichlorophenoxy acetic acid

Answer: C

Solution:

Solution:
(c) : Nitrogen is the fourth most abundant element. Chief source of nitrogen for plants is nitrates of Ca and K . It is important for plants as it is a component of nucleic acids, proteins chlorophyll and cytochromes. Deficiency of nitrogen causes poor root development, lower respiration rate, chlorosis of older leaves etc. Cytokinins are also very important for plant development. They are associated with the control of apical dominance, fruit development, root growth, cambial activity. So a nitrogenous fertilizer like NPK and cytokinins are most beneficial to the plant.

Question52

How does pruning help in making the hedge dense? (2006)

Options:

A. It releases wound hormones.

B. It induces the differentiation of new shoots from the rootstock.

C. It frees axillary buds from apical dominance.

D. The apical shoot grows faster after pruning

Answer: C

Solution:

Solution:
(c) : Prunning is the process of cutting shoot tips to promote lateral growth of branches. Removal of shoot tips involves removal of apical buds. In the shoot tips auxins are produced. Auxins are growth promoting phytohormones. They cause apical dominance by promoting the growth of apical buds and suppressing the growth of axillary buds. So when the auxins produced in the shoot tips are removed by decapitation it results in lateral growth and plants thus show bushy appearance. This is because of a relatively high concentration of auxin in the apical bud than in the lateral buds.

Question53

Treatment of seeds at low temperature under moist conditions to break its dormancy is called (2006)

Options:

A. stratification

B. scarification

C. vernalization

D. chelation

Answer: A

Solution:

Solution:
Stratification involves the treatment of seed at low temperature ($5 - 10^{\circ}C$) under sufficiently moist conditions to break its dormancy and to induce germination.
Scarification involves any damage or breakage of seed coat by physical methods (e.g., Use of scalpel, wooden hammer etc.) or chemical methods (use of mild acids) to break seed dormoney. Vernalization and Chelation is the chill treatment of plant in its early stages of life history to stimulate or induce early flowering.
Stratification involves the treatment of seed at low temperature ($5 - 10^{\circ}C$) under sufficiently moist conditions to break its dormancy and to induce germination. Scarification involves any damage or breakage of seed coat by physical methods (e.g., Use of scalpel, wooden hammer etc.) or chemical methods (use of mild acids) to break seed dormoney. Vernalization and Chelation is the chill treatment of plant in its early stages of life history to stimulate or induce early flowering.

Question54

The ability of the Venus Flytrap to capture insects is due to (2005)

Options:

A. specialized "muscle-like" cells

B. chemical stimulation by the prey

C. a passive process requiring no special ability on the part of the plant

D. rapid turgor pressure changes.

Answer: D

Solution:

Solution:
(d) : Thigmonastic movements are exhibited by some insectivorous plants such as Dionaea, venus fly trap, Drosera etc. These plants have tentacles, which are sensitive to the stimulus of touch. In the case of the venus flytrap turgor pressure changes occur in which hydrogen ions are rapidly pumped into the walls of cells on the outside of each leaf in response to the action potentials from the trigger hairs. The protons apparently loosen the cell walls so rapidly that the tissue actually becomes flaccid so that cells quickly absorb water, causing the outside of each leaf to expand and the trap to snap shut.

Question55

Cell elongation in internodal regions of the green plants takes place due to (2004)

Options:

A. indole acetic acid

B. cytokinins

C. gibberellins

D. ethylene.

Answer: C

Solution:

Solution:
(c) : Gibberellins play a role in the elongation of internodes in 'rosette' plants. Before reproductive stage there is too much elongation of internodes but there is less leaf formation. An elongated internode without leaves in called a "bolt" like structure and the process is called "bolting" flowering takes place after bolting.
Gibberellins induce cell division and cell elongation, when bolting takes place.

Question56

One set of the plant was grown at 12 hours day and 12 hours night period cycles and it flowered while in the other set night phase was interrupted by flash of light and it did not produce flower. Under which one of the following categories will you place this plant?
(2004)

Options:

A. Long day

B. Darkness neutral

C. Day neutral

D. Short day

Answer: D

Solution:

Solution:
(d) : Plants require a day length or light period for flowering, this light period is called as photoperiod. It was first studied by Garner and Allard (1920)
Short day plants (SDP's) flower in photoperiods less than critical day length, e.g., Nicotiana tabacum, Glycine max (Soybean), Xanthium strumarium. Further these plants require long uninterrupted dark period and hence are called long night plants.
Long day plants (LDP's) flower in photoperiod more than critical day length, e.g., Hyocyamus niger (Henbane), radish, Beta, spinach, Plantago, etc.Day neutral plants flower in any photoperiod, e.g. tomato, maize, cucumber, etc.

Question57

Coconut milk factor is
(2003)

Options:

A. an auxin

B. a gibberellin

C. abscisic acid

D. cytokinin.

Answer: D

Solution:

Solution:
(d) : Many experiments were done to sustain the proliferation of normal stem tissues in culture. The growth of culture was most dramatic when the liquid endosperm of coconut, also known as coconut milk, was added to the culture medium. This finding indicated that coconut milk contains a substance or substances that stimulate mature cells to enter and remain in the cell division cycle.
Eventually coconut milk was shown to contain the cytokinin zeatin, but this finding was not obtained until several years after the discovery of the cytokinins. The first cytokinin to be discovered was the synthetic analog kinetin.

Question58

Nicotiana sylvestris flowers only during long days and N.tabacum flowers only during short days. If raised in the laboratory under different photoperiods, they can be induced to flower at the same time and can be cross-fertilized to produce self-fertile offspring. What is the best reason for considering N.sylvestris and N.tabacum to be separate species?
(2003)

Options:

A. They cannot interbreed in nature

B. They are reproductively distinct

C. They are physiologically distinct

D. They are morphologically distinct

Answer: A

Solution:

(a) : According to biological species concept a species is a natural inbreeding or panmictic species or group of natural populations which have essentially similar morphological traits, they are genetically distinct and reproductively isolated from others. since under laboratory conditions N . tabacum and N . sylvestris can produce self-fertile offspring so they are not reproductively isolated. They are considered as separate species because since their flowering periods are different so cross pollination is not possible between them naturally. This makes them different species.

Question59

Plants deficient of element zinc, show its effect on the biosynthesis of plant growth hormone
(2003)

Options:

A. auxin

B. cytokinin

C. ethylene

D. abscisic acid.

Answer: A

Solution:

Solution:
(a) : Zinc is available to the plants for absorption in the divalent form. It occurs in the form of minerals as hornblende, magnetite, biotite etc., from where it is released by weathering. It is involved in the synthesis of Indole-acetic acid in plants. It is an activator in the enzyme tryptophan synthetase. Tryptophan is the precursor of Indole-acetic acid.

Question60

Differentiation of shoot is controlled by
(2003)

Options:

A. high auxin : cytokinin ratio

B. high cytokinin : auxin ratio

C. high gibberellin : auxin ration

D. high gibberellin : cytokinin ratio.

Answer: B

Solution:

(b) : The major physiological function of cytokinin is to enhance cell division. In tissue culture the undifferentiated mass of

cells formed in the culture tubes is called callus.
The callus may remain in the undifferentiated condition or differentiation may take place in this. If it is differentiated, then root and shoot may be formed. Skoog and miller had reported that cytokinins induce shoot formation and auxins induce root formation (figure).

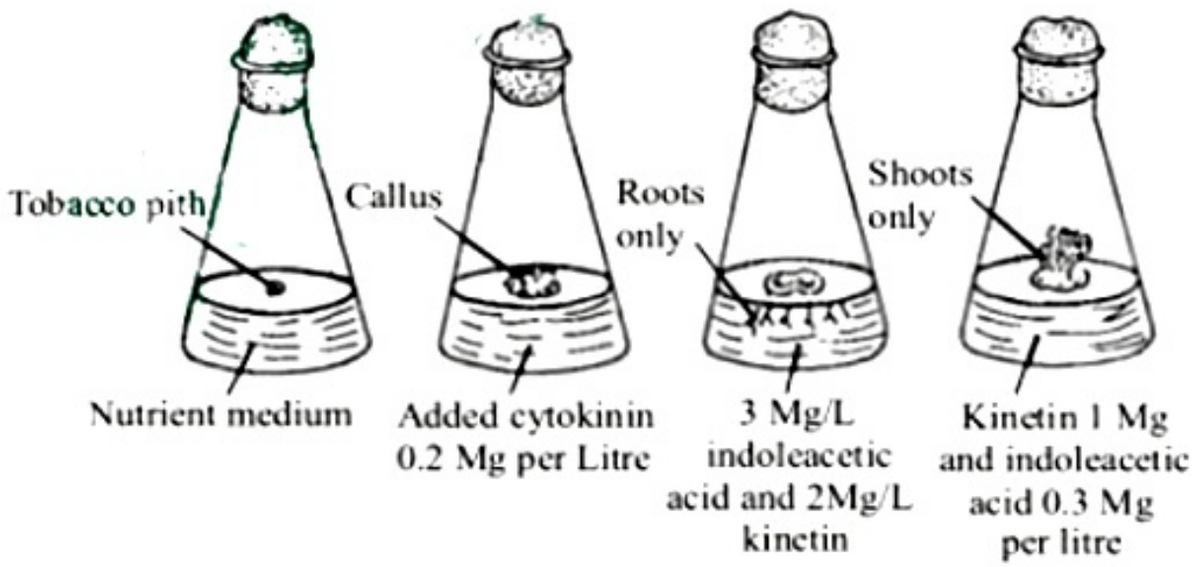


Fig. : The experiment to demonstrate the effect of auxins and cytokinins on the growth and the differentiation of tissues in culture.

Later however it was proved experimentally that -
(i) High cytokinins/auxin ratio - Differentiation of shoot.
(ii) Low cytokinins/auxin ratio-Differentiation of root.
(iii) Intermediate cytokinins/auxin ratio Differentiation of both root and shoot.
(iv) Intermediate cytokinins/low auxin - Callus formation.

Question61

Seed dormancy is due to the (2002)

Options:

A. ethylene

B. abscisic acid

C. IAA

D. starch

Answer: B

Solution:

Solution:
(b) : Viable seeds of some plants are unable to germinate even after getting all the necessary conditions. This inability of

viable seeds to germinate even under favorable conditions, is called dormancy of seeds. This is considered to be due to some barriers or blocks inside the seeds.
Some common causes of seed dormancy are :
(i) Mechanically hard seed coat, which does not allow proper growth of embryo inside it, e.g., Brassica campestris.
(ii) Presence of impermeable (impervious) seed coat to H_2O, e.g. many seeds of legumes.
(iii) Presence of impermeable seed coat to oxygen, e.g. Xanthium (cocklebur).
(iv) Presence of germination inhibitors like ABA (abscisic acid) and phenolics, etc., in seed coat or fruit pulp, e.g., in tomato, inhibitor is present in fruit pulp. Seed coats may contain relatively high concentrations of growth inhibitors that can suppress germination of the embryo. Abscisic acid (ABA) is a common germination inhibitor present in the seed coats. Repeated washing and heavy rainfall removes such substances from the seed coat.

Question62

Dwarfness can be controlled by treating the plant with (2002,1992)

Options:

A. cytokinin

B. gibberellic acid

C. auxin

D. antigibberellin.

Answer: B

Solution:

Solution:
(b) : Giberellins helps in the reversal of dwarfism in many genetically dwarf plants. External supply of Gibberellic acid causes rapid elongation of growth. E.g., rosette plant of sugar beet when treated with GA undergoes marked longitudinal growth of axis.

Question63

Which plant is LDP? (2001)

Options:

A. Tobacco

B. Glycine max

C. Mirabilis jalapa

D. Spinach

Answer: D

Solution:

(d) : Plants require a day length or light period for flowering, this light period is called as photoperiod. It was first studied by Garner and Allard (1920) Short day plants (SDP's) flower in photoperiods less than critical day length, e.g., Nicotiana tabacum, Glycine max (Soybean), Xanthium strumarium. Further these plants require long uninterrupted dark period and hence are called long night plants. Long day plants (LDP's) flower in photoperiod more than critical day length, e.g., Hyocyamus niger (Henbane), radish, Beta, spinach, Plantago, etc. Day neutral plants flower in any photoperiod, e.g tomato, maize, cucumber, etc.

Question64

Which of the following prevents the fall of fruits? (2001)

Options:

A. GA_3

B. N AA

C. Ethylene

D. Zeatin

Answer: B

Solution:

Solution:
(b) : Naphthalene acetic acid (NAA) is a synthetic or exogenous auxin. It prevent the formation of abscission layer, which is a layer of dead cells in the petiole and pedicel that causes fall of leaf or fruit. NAA prevents formation of this layer and so it prevents fall of leaf or fruit.

Question65

Hormone responsible for senescence is (2001)

Options:

A. ABA

B. auxin

C. GA

D. cytokinin

Answer: A

Solution:

Solution:
(a) : Abscisic acid is a growth inhibiting phytohormone. It induces senescence in leaves by promoting the degradation of chlorophyll and proteins. Auxin is a growth promoting phytohomone that results in cell division, cell enlargement and apical dominance. Cytokinin is a growth promoting phytohormone that causes cell division, morphogenesis and seedling growth. Gibberellins are growth promoting phytohormone that results in overcoming seed dormancy and bolting.

Question66

Which hormone breaks dormancy of potato tuber? (2001)

Options:

A. Gibberellin

B. IAA

C. ABA

D. Zeatin

Answer: A

Solution:

Solution:
(a): Gibberellin is the hormone that breaks seed/ bud dormancy. The tubers of potato reproduce vegetatively to give rise to new plants. So the dormancy of these tubers can be overcome by applying gibberellins.

Question67

If the apical bud has been removed then we observe (2000)

Options:

A. more lateral branches

B. more axillary buds

C. plant growth stops

D. flowering stops.

Answer: A

Solution:

(a) : Apical dominance is the phenomenon by which presence of apical bud does not allow the nearby lateral buds to grow. When apical bud is removed, the lateral buds sprout.

Question68

By which action a seed coat becomes permeable to water (2000)

Options:

A. scarification

B. stratification

C. vernalization

D. all of the above

Answer: A

Solution:

Solution:
(a) : Scarification means the application of those methods by which the hard seed coat is ruptured or softened so that it becomes permeable to water, gases and the embryo can expand. There are two methods of scarification as mechanical scarification and chemical scarification. This helps in overcoming seed dormancy.

Question69

Which hormone is responsible for fruit ripening? (2000)

Options:

A. Ethylene

B. Auxin

C. Ethyl chloride

D. Cytokinin

Answer: A

Solution:

(a) : Ethylene is largely a growth inhibiting phytohormone but is also involved in some growth promotion activities. It has been established that ethylene is a fruit ripening hormone. Ethylene stimulates all the biochemical changes which take place at the time of fruit ripening.

Question70

ABA is involved in (1999)

Options:

A. shoot elongation

B. increased cell division

C. dormancy of seeds

D. root elongation.

Answer: C

Solution:

Solution:
(c) : Abscisic acid (ABA) is a growth inhibiting phytohormone. Abscisic acid is found in vascular plants, some mosses, some fungi and some green algae. If ABA is applied exogenously, seed germination is inhibited. It has been suggested that ABA inhibits the synthesis of some enzymes, for germination. These enzymes are synthesised under the direction of nucleic acids. A view has been expressed that the translation of a particular messenger RNA is inhibited by ABA and the result is that protein synthesis is blocked.

Question71

The closing and opening of the leaves of Mimosa pudica is due to (1999)

Options:

A. seismonastic movement

B. chemonastic movement

C. thermonastic movement

D. hydrotropic movement.

Answer: A

Solution:

Solution:
(a) : Nastic movements occur in response to a stimulus. It is independent of its direction. They are shown by bifacial organs (leaves, sepals, petals) and are in response to diffused external stimulus.

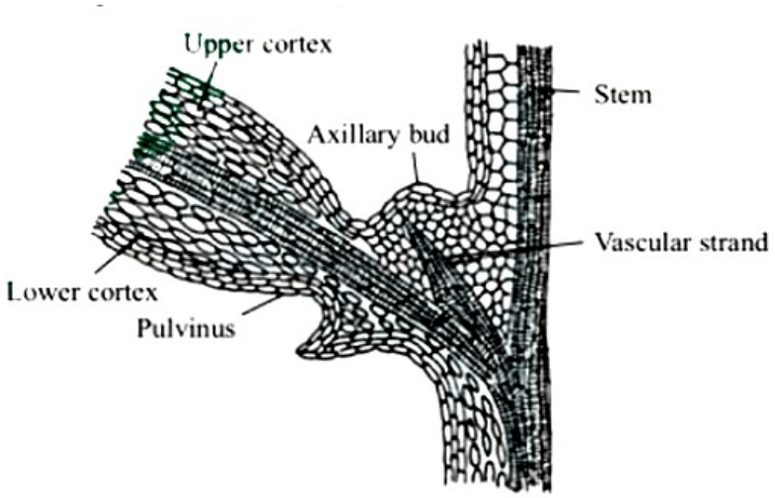


Fig. : Seismonastic movement

Seismonastic movements are due to shock or touch stimulus. Such movements are shown by Mimosa pudica. The leaf of Mimosa is compound having four pinna and each pinna is having many pinnules. If a terminal pinnule is touched, the whole leaf droops down. This is due to fact that at the bases of pinnules, pinna and whole leaf, swollen structure called pulvinus is present and drooping is due to loss of turgidity of lower portion of pulvinus.

Question72

A plant hormone used for inducing morphogenesis in plant tissue culture is
(1998)

Options:

A. cytokinins

B. ethylene

C. abscisic acid

D. gibberellins

Answer: A

Solution:

Solution:
(a) : Cytokinins are growth promoting phytohomones. Cytokinin plays an important part in organ formation (morphogenesis) with auxin. Different auxin/cytokinin ratio decides the development of root shoot ratio. The major physiological function of cytokinins is to enhance cell division. If cytokinin to auxin ratio is low, then root formation takes place but if the ratio of cytokinin to auxin is high, then, there is formation of meristematic cells in the callus.

Question73

The response of different organisms to the environmental rhythms of light and darkness is called
(1998)

Options:

A. vernalization

B. photoperiodism

C. phototaxis

D. phototropism.

Answer: B

Solution:

Solution:
(b) : Photoperiodism is the response of plants to relative length of light and darkness. Phototaxis is plant movement where the stimulus is light. Phototropism is tropism in which stimulus is light. Vernalization is application of cold treatment to plants to effect flowering.

Question74

Which combination of gases is suitable for fruit ripening? (1998)

Options:

A. 80% CH_4 and 20% CO_2

B. 80% CO_2 and 20% O_2

C. 80% C_2H_4 and 20% CO_2

D. 80% CO_2 and 20% CH_2

Answer: C

Solution:

Solution:
(c) : In most of the plants, there is a sharp rise in respiration rate near the end of the development of fruit, which sets in progress those changes, which are involved in ripening of fruit. The ripening on demand can be induced in these fruits by exposing them to normal air containing about 1 ppm of ethylene. Suitable combination of gases in atmosphere for fruit ripening is 80% ethylene (C_2H_4) and 20% CO_2

Question75

Phytochrome becomes active in (1998)

Options:

A. red light

B. green light

C. blue light

D. none of these.

Answer: A

Solution:

Solution:
(d) : Phytochrome is a bright blue or bluish green pigment which was first of all isolated from plasma membrane of alga Mougeotias. It is a photoreceptive pigment. Phytochrome has a light absorbing or light detecting portion (the chromophore) attached to small protein of about 1,24,000 daltons. Phytochrome occurs in 2 forms, i . e., P_R and P_{FR} (i.e., red light and far red light absorbing forms) and these 2 forms are interconvertible.

$$P_R \underset{\text{Far red light}}{\overset{\text{Red light}}{\rightleftharpoons}} P_{FR}$$

It is involved in the perception of photoperiodic stimuli controlling flowering and other morphogenetic phenomenon in plants.

Question76

Which one among the following chemicals is used for causing defoliation of forest trees? (1998)

Options:

A. Malic hydrazide

B. $2,4-D$

C. Amo -1618

D. Phosphon D

Answer: B

Solution:

Solution:
(b) : 2,4 -D is a famous herbicide or weedicide which especially kills broad leaved weeds. It kills weeds perhaps by over stimulated root growth. Other auxins like 2,4,5 -T have also been used as defoliants during early sixties.

Question77

A pigment which absorbs red and far-red light is (1997)

Options:

A. cytochrome

B. xanthophyll

C. phytochrome

D. carotene

Answer: C

Solution:

Solution:
(c) : Phytochrome is a bright blue or bluish green pigment which was first of all isolated from plasma membrane of alga Mougeotias. It is a photoreceptive pigment. Phytochrome has a light absorbing or light detecting portion (the chromophore) attached to small protein of about 1,24,000 daltons. Phytochrome occurs in 2 forms, i . e., P_R and P_{FR} (i.e., red light and far red light absorbing forms) and these 2 forms are interconvertible.

$$P_R \underset{\text{Far red light}}{\overset{\text{Red light}}{\rightleftharpoons}} P_{FR}$$

It is involved in the perception of photoperiodic stimuli controlling flowering and other morphogenetic phenomenon in plants.

Question78

What will be the effect on phytochrome in a plant subjected to continuous red light? (1997)

Options:

A. Phytochrome synthesis will increase

B. Level of phytochrome will decrease

C. Phytochrome will be destroyed

D. First (b) then (a)

Answer: D

Solution:

(d) : When continous red light is given the level of P_R decreases as most of it is converted to P_{FR} form. When the concentration of $P_{a \text{ reaches below a critical}}$ value, it starts synthesis of more phytochromes in the P_R form so that there is an equilibrium between synthesis and destruction of P_R form.

Question79

If a tree flowers thrice in a year (Oct., Jan. and July) in Northern India, it is said to be
(1997)

Options:

A. photo and thermo-insensitive

B. photo and thermo-sensitive

C. photosensitive but thermo-insensitive

D. thermosensitive but photo-insensitive

Answer: A

Solution:

Solution:
(a) : Flower formation is a transitional phase in the life eycle of plant. During flowering, vegetative shoot apex is converted into reproductive shoot apex. The physiological mechanism for flowering is controlled by 2 factors : photoperiod or light period, i.e., photoperiodism and low temperature, i.e., vernalization.

Question80

Gibberellic acid induces flowering
(1997)

Options:

A. in short day plants under long day conditions

B. in day-neutral plants under dark conditions

C. in some gymnospermic plants only

D. in long day plants under short day conditions.

Answer: D

Solution:

(d) :Gibberellins are growth promoting phytohormones. Some of plants species flower only if the light period exceeds a

critical length, and others flower only if this period is shorter than some critical length. Gibberellins can substitute for the long-day requirement in some species, showing an interaction with light.

Question81

The twining of tendrils around a support is a good example of (1995)

Options:

A. phototropism

B. chemotropism

C. nastic movements

D. thigmotropism.

Answer: D

Solution:

Solution:
(d) : Thigmotropism involves nastic movements resulting from touch. It occurs in tendrils which coil around support and help the plant in climbing. Phototropism is a paratonic movement in response to unidirectional light stimulus. Chemotropism is a directional paratonic movement that occurs in response to a chemical stimulus.

Question82

The closure of lid of pitcher in pitcher plant, is due to (1995)

Options:

A. paratonic movement

B. autonomous movement

C. turgor movement

D. tropic movement

Answer: A

Solution:

Solution:
(a) : Plants have the capacity of changing their position, in response to external or internal stimuli which are known as plant movements. The movements which occur due to internal stimuli are called autonomic movements and those that occur due to external stimuli are called paratonic movements.
Nepenthes (pitcher plant) is an insectivorous plant. In this the leaf lamina is modified to form a pitcher and leaf apex

forms a coloured lid. When the insect enter the pitcher it is an external stimuli, so the closure of the lid is paratonic movement.

Question83

The movement of auxin is largely (1994)

Options:

A. centripetal

B. basipetal

C. acropetal

D. both (a) and (c)

Answer: B

Solution:

Solution:
(b) : Auxin is a growth promoting phytohormone. It moves mainly from the apical to the basal end (basipetally). This type of unidirectional transport is termed polar transport. Auxin is the only plant growth hormone known to be transported polarly. Recently it has been recognized that a significant amount of auxin transport also occur acropetally (from basal end to the apical end) in the root.

Question84

If the growing plant is decapitated, then (1994)

Options:

A. its growth stops

B. leaves become yellow and fall down

C. axillary buds are inactivated

D. axillary buds are activated

Answer: D

Solution:

(d) : Decapitating a growing plant means removing shoot apex of the plant. Auxin, a growth promoting phytohormone present in apex inhibits the growth of axillary buds so that only the apex continues to grow. When the apex containing auxin is removed or decapitation is done, then axillary buds show their growth, this is because the apical dominance is

removed. This practice of removal of apical dominance is applied in tea gardens, hedges, rose gardens etc.

Question85

Removal of apical bud results in (1993)

Options:

A. formation of new apical bud

B. elongation of main stem

C. death of plant

D. formation of lateral branching

Answer: D

Solution:

Solution:
(d) : Decapitating a growing plant means removing shoot apex of the plant. Auxin, a growth promoting phytohormone present in apex inhibits the growth of axillary buds so that only the apex continues to grow. When the apex containing auxin is removed or decapitation is done, then axillary buds show their growth, this is because the apical dominance is removed. This practice of removal of apical dominance is applied in tea gardens, hedges, rose gardens etc.

Question86

The regulator which retards ageing/senescence of plant parts is (1993)

Options:

A. cytokinin

B. auxin

C. gibberellin

D. abscisic acid

Answer: A

Solution:

Solution:
(a) : Richmond and Lang, 1967 observed that degradation of protein and chlorophyll was delayed in the detached leaves, if there was cytokinin in the medium. The senescence in the detached leaves was controlled by cytokinin first by keeping the stomata open thus allowing more CO_2 to enter. This suppresses the action of ethylene which promotes senescence.

Question87

The hormone produced during adverse environmental conditions is (1993)

Options:

A. benzyl aminopurine

B. bichlorophenoxy acetic acid

C. ethylene

D. abscisic acid.

Answer: D

Solution:

Solution:
(d) : Abscisic acid is a hormone which is produced during adverse environmental condition. It also causes the closure of stomata under conditions of water stress as also under high concentration of CO_2 in the guard cells. ABA plays an important role in plants during water stress and drought conditions.The concentration of ABA increases in the leaves of plants facing such stresses, hence it is called as a stress hormone.

Question88

Klinostat is employed in the study of (1993)

Options:

A. osmosis

B. growth movements

C. photosynthesis

D. respiration

Answer: B

Solution:

Solution:
(b) : Klinostat is used to study growth movements. Klinostat comprises a disc with pot which are rotated by an axial rod with the help of a motor. Auxin get uniformly distributed on all sides and, hence the stem grows horizontally forward.

Question89

Which is produced during water stress that brings stomatal closure? (1993)

Options:

A. Ethylene

B. Abscisic acid

C. Ferulic acid

D. Coumarin

Answer: B

Solution:

Solution:
(b) : Abscisic acid is produced during water stress that brings stomatal closure. Abscisic acid is a stress hormone and it is produced during water scarcity, when the transpiration rate exceeds absorption, the plant faces water stress condition. As a result, incipient wilting occurs. Under water stress condition ABA increases which induces stomatal closure.

Question90

Flowering dependent on cold treatment is (1992)

Options:

A. cryotherapy

B. cryogenics

C. cryoscopy

D. vernalisation

Answer: D

Solution:

Solution:
(d) : In several plants, particularly bienniales and perennials, light does not seem to be the only factor controlling the process of flowering. Temperature, particularly the low temperature treatment induce flowering. Vernalization means ability of low temperature to convert winter cereal into spring cereal as a result of satisfaction of their low temperature requirement.

Question91

Bananas can be prevented from over-ripening by (1992)

Options:

A. maintaining them at room temperature

B. refrigeration

C. dipping in ascorbic acid solution

D. storing in a freezer

Answer: C

Solution:

Solution:
(c) : In artificial ripening of banana, uncontrolled application of ethylene gas may cause over ripening of banana. It can be prevented from over-ripening by dipping in ascorbic acid solution.

Question92

Apical dominance is caused by (1992)

Options:

A. abscisic acid in lateral bud

B. cytokinin in leaf tip

C. gibberellin in lateral buds

D. auxin in shoot tip

Answer: D

Solution:

Solution:
(d) : According to Thimann and co-workers, auxin is responsible for the dominance of apical bud. The apical dominance is due to interaction between auxin and cytokinin. If the auxin concentration is higher than cytokinin, the apical bud will dominate the growth.

Question93

In short day plants, flowering is induced by (1992)

Options:

A. photoperiod less than 12 hours

B. photoperiod below a critical length and uninterrupted long night

C. long night

D. short photoperiod and interrupted long night

Answer: B

Solution:

Solution:
(b) : No flowering takes place if the dark period is less than the critical day length. The flowering is inhibited if weak intensity of light is given during the dark period. If the dark period is interrupted mid way by even a single flash of light, no flowering takes place. If this flash is given in the beginning or near the end of the dark phase, they produce flowers.

Question94

Cytokinins
(1992)

Options:

A. promote abscission

B. influence water movement

C. help retain chlorophyll

D. inhibit protoplasmic streaming

Answer: C

Solution:

Solution:
(c) : Richmond and Lang, 1967 observed that degradation of protein and chlorophyll was delayed in the detached leaves, if there was cytokinin in the medium. The senescence in the detached leaves was controlled by cytokinin first by keeping the stomata open thus allowing more CO_2 to enter. This suppresses the action of ethylene which promotes senescence.

Question95

Which is employed for artificial ripening of banana fruits?
(1992)

Options:

A. Auxin

B. Coumarin

C. Ethylene

D. Cytokinin

Answer: C

Solution:

Solution:
(c) : Ethylene is a hormone which is used for ripening of fruit. In case of unripe banana, it can be made to ripe before proper time if they are kept in ethylene atmosphere. Uncontrolled application of this gas may spoil the fruits. Ethylene is produced in mature but unripe fruits and then it initiates a chain of reactions that finally lead to ripening.

Question96

Abscisic acid causes
(1991)

Options:

A. stomatal closure

B. stem elongation

C. leaf expansion

D. root elongation

Answer: A

Solution:

Solution:
(a) : Absisic acid is a hormone produced during adverse environmental condition. It also causes the closure of stomata under conditions of water stress as also under high concentration of CO_2 in the guard cells. Abscisic acid inhibits the K^+ uptake by guard cells and promotes the leakage of malic acid. It results in reduction of osmotically active solutes so that the guard cells become flaccid and stomata get closed.

Question97

The hormone responsible for apical dominance is
(1991)

Options:

A. IAA

B. GA

C. ABA

D. Florigen

Answer: A

Solution:

Solution:
(a) : In vascular plants especially the taller ones, if the apical bud is intact and growing of the lateral bud remains suppressed, removal of apical bud causes fast growth of lateral buds. This influence of apical bud in suppressing the growth of lateral buds is termed as apical dominance.
Indole-3-acetic acid (IAA) is a natural auxin which is responsible for apical dominance.
GA is Giberrellic acid causes rapid elongation growth. ABA (abscisic acid) is a powerful growth inhibitor. Florigen is a chemical involved in flowering.

Question98

A chemical believed to be involved in flowering is (1991)

Options:

A. gibberellin

B. kinetin

C. florigen

D. IBA

Answer: C

Solution:

Solution:
(c) : Chailakhyan in 1937 gave the view that flower hormone namely florigen is synthesized in the leaves under favourable photoperiodic conditions. This hormone is transmitted to the growing point where the flowering occurs.

Question99

Twining of tendrils is due to (1991)

Options:

A. thigmotropism

B. seismonasty

C. heliotropism

D. diageotropism

Answer: A

Solution:

Solution:
(a) : Thigmotropism involves nastic movements resulting from touch. It occurs in tendrils which coil around support and help the plant in climbing. Phototropism is a paratonic movement in response to unidirectional light stimulus. Chemotropism is a directional paratonic movement that occurs in response to a chemical stimulus.

Question100

Hormone primarily connected with cell division is (1991,1988)

Options:

A. IAA

B. N AA

C. cytokinin/zeatin

D. gibberellic acid

Answer: C

Solution:

Solution:
(c) : Cytokinin has a very specific effect on cell division (cytokinesis), hence the name cytokinin. They contain kinetin and related compound generally called as kinins chemically, cytokinins are degradation product of adenine, ATP, NAD and NADP. Cytokinins are essential for cytokinesis though chromosome doubling can occur in their absence. Cytokinins bring about division even in permanent cells.

Question101

Highest auxin concentration occurs (1990)

Options:

A. in growing tips

B. in leaves

C. at base of plant organs

D. in xylem and phloem

Answer: A

Solution:

Solution:
(a) : Auxins are well known to promote elongation of stem and coleoptile. However when exogenous auxin is given to intact plants this is not observed because the required amount of auxin is already present in plants. When the apex of shoot is removed, then the exogenous application of auxin promotes growth, this clearly indicates that growing apex, having meristematic cells, is the site where endogenous auxins are present in sufficient amount, once the apex is removed the source of auxin is also removed.

Question102

Phytohormones are
(1990)

Options:

A. chemical regulating flowering

B. chemical regulating secondary growth

C. hormones regulating growth from seed to adulthood

D. regulators synthesised by plants and influencing physiological processes

Answer: D

Solution:

Solution:
(d) : Growth hormones or phytohormones are defined as organic substances which are synthesized in minute quantities in one part of the plant body and transported to another part where they influence specific physiological processes. Phytohormones are chemical substances which are synthesized by plants and are naturally occurring.

Question103

Abscisic acid controls
(1990)

Options:

A. cell division

B. leaf fall and dormancy

C. shoot elongation

D. cell elongation and wall formation

Answer: B

Solution:

Solution:
(b) : Before a leaf fall, a special zone of cells is formed at the base of the pedicel or petiole. This zone is called as abscission zone. It is delimited by a protection layer on the stem side and a separation layer on the organ side. The leaf is ultimately separated and phenomenon is called abscission. ABA is also a growth inhibitor. It regulates the dormancy of seeds and buds perhaps by inhibiting the growth process. The ABA level decreases in the whole seed as their dormancy is broken.

Question104

Phototropic and geotropic movements are linked to (1990)

Options:

A. gibberellins

B. enzymes

C. auxin

D. cytokinins

Answer: C

Solution:

Solution:
(c) : Auxin regulates some of the important plant growth movements like photoropism and geotropism. Phototropism means growth of plants in response to light and geotropism means growth of plants towards gravity.

Question105

Which of the following movement is not related to auxin level? (1990)

Options:

A. Bending of shoot towards light

B. Movement of root towards soil

C. Nyctinastic leaf movements

D. Movement of sunflower head tracking the sun

Answer: C

Solution:

Solution:
(c) : Nyctinastic leaf movement is not related to auxin level. It is a movement of leaves of many species from nearly horizontal leaves during the day and nearly vertical at night. This movement are controlled by biological clock, while the bending of shoot towards light, movement of root towards soil and movement of sunflower head tracking the sun are the conditions related to auxins.

Question106

Which of the following hormones can replace vernalisation? (1989)

Options:

A. Auxin

B. Cytokinin

C. Gibberellins

D. Ethylene

Answer: C

Solution:

Solution:
(c) : Gibberellin is a hormone that replaces vernalisation. Vernalization is a period of cold treatment for plants, usually perennials or trees. Some plants won't bloom without it. In vernalization plants are exposed to low temperature in order to stimulate flowering or to enhance seed production. The biennials form their vegetative body in the first year. Then they pass through a winter season and then produce flowers and fruits in the second year. By exogenous application of gibberellins many biennials can be induced to behave as annuals and they no more require the natural chilling treatment for their flowering.

Question107

Leaf fall can be prevented with the help of (1989)

Options:

A. abscisic acid

B. auxins

C. florigen

D. cytokinins

Answer: D

Solution:

Solution:
(d) : Cytokinins delay senescence of leaves and other organs by mobilisation of nutrients. Abscissic acid promotes abscission of flowers and fruits. Its excessive presence stops protein and RNA synthesis in the leaves and hence stimulates their senescence.

Question108

Mowing grass lawn facilitates better maintenance because (1989)

Options:

A. wounding stimulates regeneration

B. removal of apical dominance and stimulation of intercalary meristem

C. removal of apical dominance

D. removal of apical dominance and promotion of lateral meristem

Answer: B

Solution:

Solution:
(b) : Mowing gras lawn facilitates better maintenance because of removal of apical dominance and stimulation of intercalary meristem.

Question109

Which one increases in the absence of light? (1989)

Options:

A. Uptake of minerals

B. Uptake of water

C. Elongation of internodes

D. Ascent of sap

Answer: C

Solution:

Solution:
(c) : Stem elongation takes place in the absence of light due to etiolation. But uptake of minerals, uptake of water and ascent of sap all this process are related to photosynthesis which takes place only in the presence of light.

Question110

Cut or excised leaves remain green for long if induced to root or dipped in
(1988)

Options:

A. gibberellins

B. cytokinins

C. auxins

D. ethylene

Answer: B

Solution:

Solution:
(b) : Cytokinin are plant growth hormones which are basic in nature. Cytokinins induce formation of new leaves chloroplasts in leaves, which in turn keeps the leaves green for a longer duration of time. Cytokinins applied to marketed vegetables can keep them fresh for several days, Shelf life of cut shoots and flowers is prolonged by employing the hormones.

Question111

Gibberellins promote
(1988)

Options:

A. seed germination

B. seed dormancy

C. leaf fall

D. root elongation

Answer: A

Solution:

(a) : Gibberellins promote seed germination. Gibberellins are weakly acidic growth hormones having ring structure and which cause cell elongation of intact plants in general and increased internodal length of genetically dwarfed plants. Giberellins are synthesized in the apical shoot buds, root tips and developing seeds.
During seed germination, especially of cereals gibberrellin stimulates the production of some messenger RNAs and then hydrolytic enzymes like amylases, lipases, proteases. The enzymes solubilize the reserve food of the seed.

Question112

Phytochrome is involved in (1988)

Options:

A. phototropism

B. photorespiration

C. photoperiodism

D. geotropism

Answer: C

Solution:

Solution:
(c) : Phytochrome is a photoreceptor molecule which mediates several developmental and morphogenetic responses of plants to light. This is called photoperiodism. Borthwick, Hendicks and Parker in 1952 , discovered phytochrome, which is a pigment that received light and existed in two inter convertible forms: active form and inactive form.

Question113

Movement of leaves of sensitive plant, Mimosa pudica are due to (1988)

Options:

A. thermonasty

B. seismonasty

C. hydrotropism

D. chemonasty

Answer: B

Solution:

(b) : Nastic movements occur in response to a stimulus. It is independent of its direction. They are shown by bifacial organs (leaves, sepals, petals) and are in response to diffused external stimulus.

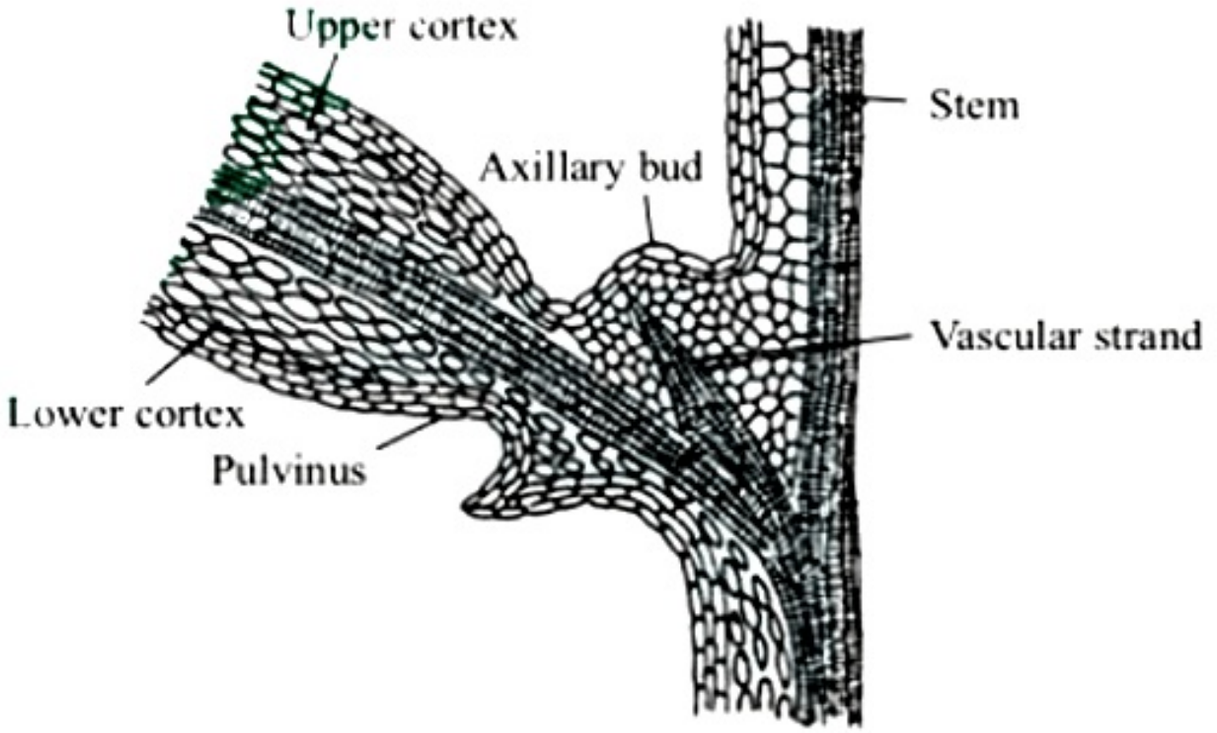


Fig. : Seismonastic movement

Seismonastic movements are due to shock or touch stimulus. Such movements are shown by Mimosa pudica. The leaf of Mimosa is compound having four pinna and each pinna is having many pinnules. If a terminal pinnule is touched, the whole leaf droops down. This is due to fact that at the bases of pinnules, pinna and whole leaf, swollen structure called pulvinus is present and drooping is due to loss of turgidity of lower portion of pulvinus.
