

- **Growth** : Irreversible increase in size and weight in organisms is called Growth.
Growth is outcome of metabolism.
- **Anabolism** : All Synthetic biochemical processes which take place in living organisms is combinly called anabolism
- **Catabolism** : All degrading biochemical processes which take place in livning organisms is combinly called catabolism.
- **Note** : Resultant of Growth increasing in weight

Anabolism	>	Catabolism	$\Rightarrow$	Growth
Catabolism	>	Anabolism	$\Rightarrow$	Ageing/ Senescence
Anabolism	=	Catabolism	=	Stationary Growth

- (1) When anabolic processes occur more than catabolic processes, what possibility occur in living ?
(A) Development (B) Growth (C) Differentiation (D) Senescence
- (2) When catabolic processes occur more than anabolic processes, so what possibility occur in living ?
(A) Growth (B) Division (C) Differentiation (D) Senescence
- (3) Growth is limited upto which tissues in the plant ?
(A) Meristematic tissues (B) Simple tissues (C) Complex tissues (D) Secondary tissues

Answers : (1-B), (2-D), (3-A)

Types of Growth :

→ Primary Growth :

- It is due to activities of apical meristematic tissues which located at the apex or vegetative organs. so length of vegetative organs increase. This growth is known as primary growth.
- Due to activation of apical meristem Primary growth can take place.
- Root apex and shoot apex are responsible for primary growth.

Note : Intercalary meristem present in nodes of monocots, is the primary tissue.

→ Secondry growth :

- The formation of secondary tissues after the elongation occurs in length of root, stem, due to these tissues increase in grith, so it is called secondary growth.
- Due to activation of lateral meristem secondary growth take place and developed as a cambium
- Cork cambium is resposible for the secondary growth of bark of tree.

- (4) It is responsible for the primary growth in plant :
(A) Apical meristem (B) Intercalary meristem
(C) Lateral meristem (D) A and B both
- (5) It is responsible for the secondary growth in plant.
(A) Apical meristom (B) Intercalary meristem
(C) Lateral meristem (D) All above

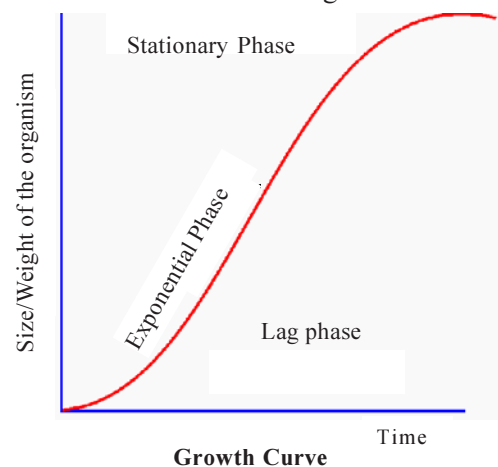
- (6) Which tissue is present in nodal region of monocot plant ?
 (A) Apical meristem (B) Intercalary meristem
 (C) Lateral meristem (D) All above
- (7) It is responsible for secondary growth which located at
 (A) Shoot apex (B) Root apex
 (C) Internode (D) In form of cork cambium below the bark of tree.

Answers : (4-D), (5-C), (6-B), (7-D)

Growth rate: The increased growth per unit time is termed as growth rate

S - Shaped Growth curve:

- Initially, the rate of growth in plant is slow. Then it increases very rapidly. In course of time, it again slows down.
- Suppose we draw a graph of growth rate raised on the increase in number of cells against time taken. such a graph will be a typical s-shaped graph. (CS = Sigmoid curve).
- After an initial period of slow growth rate,
 An exponential period of growth follows and finally a stable state of growth occurs.
- **Note :** such a graph of growth is obtained for growth of an organism and that of a population also parameters other than an increase in the number of cells can also be used in measurement of growth



- (8) S-Shaped growth curve and grand period of growth is changed by which factor ?
 (A) Suddenly change in intensity of light
 (B) Change occur in temperature
 (C) increase - decrease in relation to light and temperature
 (D) No effects of given factors on it.
- (9) It is correct order of stages of s-shaped growth curve ?
 (A) Initial growth stage, stationary growth stage, Exponential growth stage.
 (B) Stationary growth stage, Initial growth stage, Exponential growth stage.
 (C) Initial growth stage, Exponential growth stage, stationary growth stage.
 (D) Exponential growth stage, stationary growth stage, initial growth stage.
- (10) What is the parameter for sigmaid curve graph ?
 (A) Glowth of population (B) Numberof cell (C) Size of organism (D) All above

Answers : (8-D), (9-C), (10-D)

Phases of Growth :

- **Phase of cell division (Formation of Meristematic) :** The meristematic cells located in shoot apex and rootapex divide repeatedly and continuously and add new cells.

- The meristematic cells possess dense protoplasm, a large nucleus and thin cell wall made up of cellulose
- Faster rate of metabolism occurs in them.
- **Phase of cell enlargement (Elongation)** : In this phase, the new cells formed through cell divisions increase in size.
- The volume of cells increases. The growth in cell wall is mainly responsible for such enlargement. The size of vacuole in the cell also increases.
- **Phases of cell differentiation (Maturation)** : The cells assume forms based on their functions. Their size and form become permanent
- They become associated with the constitution of various tissues
- The phase of becoming differentiated is called differentiation phase.

Grand period of growth: The entire period covering the period from cell division to cell differentiation is called grand period of growth.

- (11) What is characteristics of cells which is situated in divisional region ?
 (A) Dense cytoplasm (B) Large nucleus (C) Rapid metabolic rate (D) All above
- (12) In which stage of growth size of vacuole increases ?
 (A) In stage of cell differentiation (B) In stage of cell division
 (C) In stage of cell expansion (D) None of the above
- (13) It is characteristic of cell which is situated in cell differentiation stage ?
 (A) Growth of cell wall (B) Cells assume forms based on their functions
 (C) Cells possess dense protoplasm (D) Cells possess large nucleus
- (14) In which stage of growth cells obtain various tissue structure ?
 (A) In stage of cell division (B) In stage of cell enlargement
 (C) In stage of cell differentiation (D) All above

Answers : (11-D), (12-C), (13-B), (14-C)

Factors affecting Growth :

Water : It is essential for turgidity of cells undergoing growth. Water is also required as a medium for various biochemical processes

Oxygen: Oxygen is inevitable for respiration

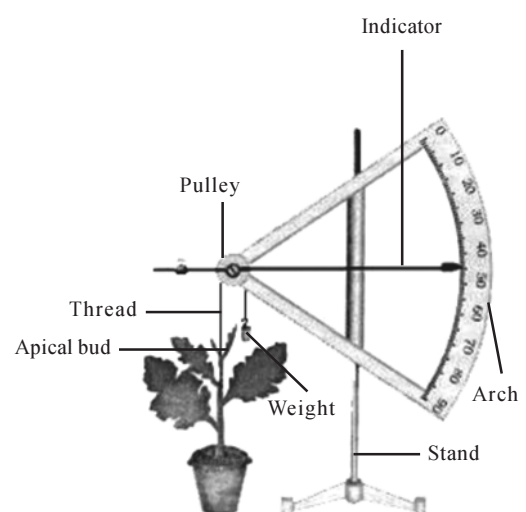
Temperature : proper temperature is required for germination. Normally the optimum range is between 28° C and 30° C.

Light : Light is required for photosynthesis. Food is prepared in this way.

Nutrients : Availability of proper amount of nutrients is required for plant growth. The materials and energy required for synthesis of Protoplasm are obtained from the nutrients. Deficiency of various nutrients and various kinds of stresses hinder the process of growth.

Measurement of Growth: Measurement by scale or tape, number of branches, number of leaves, measured by dry weight, measured by arial expansions.

- **Specific Growth-measurement Method :**
- **Method of ArC - Auxanometer :**
- One end of a thread is tied to the apical bud area of the plant. The thread is then passed over a pulley which is attached to the apparatus and suspended by a weight attached to the other end of the thread



- The position of the indicator on the arch is noted.
 - As growth occurs, the weighed end of the thread is lowered.
 - As this happens, the indicator also moves along the arch.
 - The distance is measured at proper time-intervals and growth is calculated.
- (15) What is an optimum temperature of germination ?
- (A) 30°C to 35°C (B) 28°C to 30°C
(C) 25°C to 30°C (D) 20°C to 25°C
- (16) Which of the following supplies material and energy for synthesis of cytoplasm ?
- (A) Light (B) Oxygen (C) Nutrients (D) Water
- (17) It is not correct option for Arc-Growth measurement.
- (A) One end of thread tied with apical bud.
(B) Second end of thread passes on the indicator.
(C) Second end of thread hanging weights
(D) When growth occurs weight end moves downward.

Answers : (15-B), (16-C), (17-B)

Development: Development is a term that includes all changes that an organism goes through during its life cycle from germination of seed to senescence.

- Growth, differentiation and development are very closely related events in the life of a plant.
- Development in plants is under the control of two factors
- (i) Internal Factors (ii) External cellular factors

(i) Internal cellular Factors (Genetical control) or Intercellular plant growth regulators

(ii) External cellular factors"- Light, temperature, water, oxygen, nutrients etc.

- (18) In plant genetic regulation of growth is which type of regulation ?
- (A) Intercellular (B) Intracellular (C) External factor (D) A and B both.
- (19) Regulation by growth regulators is known as
- (A) Intercellular (B) Intracellular (C) External factor (D) None of above.
- (20) It is affected to development of growth by means of external factor. ?
- (A) Nutrients (B) Gene (C) Growth regulatory (D) All above

Answers : (18-B), (19-A), (20-A)

Plant - Growth Regulators :

- They are conducted to some specific regions and influence growth occurring there or influence some activities from specific place such influence may be either stimulatory or inhibitory such chemicals are called plant growth regulators
- **Properties :**
- They are specific types of organic chemicals which produce from specific regions.
- Origin and activation loci of such chemicals differ.
- Effects are stimulatory or inhibitory
- Their amount decreases after the functions are over.

Note : PGRs are divided in five groups. Auxin, Gibberellin, cytokinin, Ethylene and Absciscic acid

- **Growth promotor group:** Auxin, Gibberrelin, cytokinin
 - **Growth inhibitors group:** Ethylene, Absciscic acid.
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- (21) PGRs is
 (A) Small molecules of diverse chemical composition.
 (B) Simple molecules of diverse chemical composition.
 (C) Special Organic Chemicals
 (D) All of the above
- (22) It is not a characteristic of PGRs.
 (A) They are formed in specific regions.
 (B) Origination and funcations differ.
 (C) They are stimulatory or inhibitory.
 (D) They are complex molecules of derivatives of chemical substances.
- (23) It is a group of growth regulators.
 (A) ABA, Ethylene, Cytokinin (B) Auxin, Gibberrelin, Cytokinin
 (C) ABA, Ethylene, (D) Ethylene, Cytokinin, Gibberrelins.
- (24) It is group of growth inhibitors.
 (A) ABA, Ethylene, Cytokinin (B) Auxin, Gibberrelin, Cytokinin
 (C) ABA, Ethylene, (D) Ethylene, Cytokinin, Gibberrlins.

Answers : (21-D), (22-D), (23-B), (24-C)

Auxins: It was first isolated from human urine.

Naturel Auxins: IAA (Indole - Acetic Acid), IBA (Indole- Butyric acid)

Synthetic Auxins: 2-4-D (2-4 Dichloro phenoxy acetic acid)

NAA (Napthalene Acetic Acid)

Effects of Auxins: Dominancy of adventitious roots and apical bud.

- Induce the formation of seedless fruit
 - Stimulate the process of floweling
 - Stimulate the respiration process
 - Stops premature fall of leaves and fruits
 - Regulates phototropic movement of plant organs.
 - Acts as weed-controllers and weed - eradicators
 - Are useful in stimulating cell division in tissue-culture also.
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- (25) It is natural auxins.
 (A) IAA, NAA (B) IAA, IBA (C) IBA, 2-4-D (D) 2-4-D, NAA
- (26) It is synthetic auxins.
 (A) IAA, NAA (B) IAA, IBA (C) IBA, 2-4-D (D) 2-4-D, NAA
- (27) Which is the use of synthetic auxin ?
 (A) Regulation of cell enlargement (B) Weed - regulators
 (C) Decrease the dominancy of axillary bud (D) Maintain chrophyll in leaves.
- (28) It is used for stimulation for cell divison in tissue culture.
 (A) 2-4-D (B) ABA (C) GA (D) IBA

- (29) Which auxin is commonly used in callus and suspension culture both ?
 (A) NAA (B) IBA (C) 2-4-D (D) ABA
- (30) Which growth regulator is used commonly for tea crop ?
 (A) Ethylene (B) Gibberelin (C) Cytokinin (D) Indol-3-Acetic acid.

Answers : (25-B), (26-D), (27-B), (28-A), (29-C), (30-D)

Gibberrelins : This hormone was discovered during the investigation of disease in paddy for which gibberella fungus is responsible (Discovered In Japan)

- The disease was named 'bakane' which means 'foolish plant'

Characters of infected plant : Abnormally long, yellow, thin and normally sterile.

- This happens due to the disease induced by secretion of gibberella fungus. Their secretion is called gibberelin.

Plant's Gibberelin : From the Fungi and other higher plants more than hundred (100) different kinds of gibberelin have been discovered which are known as GA₁, GA₂, GA₃....etc.

- All kinds of gibberelins are acidic in nature.
- Their synthesis is higher in darkness.

Effects of Gibberelins:

- Remove the expression of genetic dwarfism
- Induce elongation of stem. The internodes develop longer
- They also increase leaf area.
- Mobilization of storage compounds during germination that stimulates activation of embryo.
- Responsible for removal of dormancy of buds and seeds.
- They stimulate synthesis of various enzymes which activate the embryo.
- Induce flowering in some plants.

- (31) Which of the following is responsible for cell Enlargement in inter nodes ?
 (A) Gibberelin (B) Ethylenc (C) Cytokinin (D) IAA.
- (32) When gibberrellic acid gives stimulation for flowering ?
 (A) In situation of long day in angisperms
 (B) In situation of short day in long day plants
 (C) In situation of long day in short day plants
 (D) During night in dayneutral plant.
- (33) It is discoverd from foolish plant of paddy.
 (A) Indole-3-acetic acid (B) Ethylene (C) Gibberrelin (D) Kinetin.
- (34) Which hormone is essential for change the genetic expression ?
 (A) Cytokinin (B) Auxin (C) Gibberrelin (D) Ethylene
- (35) It is an effect of gibberrelins.
 (A) Induce germination by conduction of storage compound.
 (B) Maintainance of chlorophyll in leaves.
 (C) Induce respiration process.
 (D) Produce adventitious root.

Answers : (31-A), (32-B), (33-C), (34-C), (35-A)

Cytokinins Discovery :

- It was first discovered as kinetin (a modified form of adenine- purine) from the sperm of herring fish.
- A substance called zeatin, having effects similar to that of cytokinin was obtained from maize grain as well as from coconut milk.

Effect of cytokinin :

- Stimulate the processes of cell division cell enlargement and cell differentiation.
- Reduce apical dominance.
- Retain chlorophyll in leaves.
- Translocate nutrients and organic substances.

Note: Kinetin hormone gives remarkable effect of cell division.

- (36) It is gained from water of coconut ?
(A) Kinetin (B) Zeatin (C) Auxin (D) Gibberrelin.
- (37) Which hormone treatment is necessary to keep picked flowers and cut vegetables for long time ?
(A) Gibberrelin (B) Auxin (C) Ethylene (D) Cytokinin.
- (38) From which kinetin is first discovered ?
(A) From human urine (B) From herring fish
(C) From fruit of cotton (D) From plant of paddy
- (39) What is Kinetin ?
(A) Active form of guanine Nitrogen base (B) Derivative form of cytosine Nitrogen base
(C) Derivative form of adenine Nitrogen base (D) Active form of thimine Nitrogen base

Answers : (36-B), (37-D), (38-B), (39-C)

Abscisic Acid (ABA) : Discovery: It was first discovered as a substance inducing fall of cotton fruits.

Effects of Absciscic Acid: Preventing plant metabolism.

- Stimulate abscission process
- Inducing buds dormancy
- Under the condition of water stress, it stimulates the process of closing of stomata.
- It inhibits seed germination and the development of isolated embryo
- Resistance to stress conditions

Note : Absciscic acid act as a vegetative growth inhibitor hormone.

- (40) If ABA is more given to plant,
(A) Increase the area of leaves (B) Increase in length of stem
(C) Closing of stomata (D) Increase in length of root.
- (41) It stimulate the closure of stomata of leaf in water stress condition.
(A) ABA (B) IAA (C) GA (D) Ethylene.
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(42) It is known as water stress increased hormone.

(A) IAA

(B) 2-4-D

(C) ABA

(D) GA

Answers : (40-C), (41-A), (42-C)

Ethylene (Volatile hormone):

- It is a simple gaseous plant growth regulator, It is volatile in nature.
- Its concentration remains high in tissues undergoing senescence and in the ripening fruits.

Effects Ethylene:

- It inhibits the length wise growth in root, stems and leaves.
- It induces senescence in plants
- It induces leaf fall and fall of flowers.
- It stimulate the process of ripening of fruits.
- It induces drooping of leaves and flowers.

(43) In which amount / ratio of ethylene is higher ?

(A) In green banana

(B) In green apple

(C) In ripen mango

(D) In healthy patato.

(44) Plant growth regalator which gives triple response ?

(A) IAA

(B) ABA

(C) C₂H₄

(D) GA₃

(45) In pea plant which growth regulator is responsible for stunted growth ?

(A) Gubberrellic acid

(B) Auxin

(C) cytokinin

(D) Ethylene

Answers : (43-C), (44-C), (45-D)

Seed Dormancy:

- Seed dormancy is defined as a state in which seeds are prevented from germinating even under favorable environmental condilions. For this various internal factors are responsible.
- During the period of dormancy, the growth of seed is arrested. Some seeds remain dormant for days, while others remain dormant over month or even years.

Types of Seed dormancy : There are mainly four types :

(1) Exogenous dormancy

(2) Endogenous dormancy

(3) Combinational dormancy

(4) Secondary dormancy

(1) Exogenous Dormancy:

- It is caused by conditions outside the embryo and is often classified into three subgroups.

(a) **Physical Dormancy:** Which occurs when seeds are impermeable to water or to the exchange of gases.

(b) **Mechanical Dormancy:** Mechanical dormancy occurs when seedcoats or other coverings are too hard to allow the emtryo to expand during germination.

(c) **Chemical Dormancy:** Includes growth regulators that are present in the coverings around the embryo.

(2) Endogenous Dormancy: Endogenous dormancy is caused by conditions within the embryo itself and it is also often divided into the following subgroups.

(a) **Physiological Dormancy:** Physiological dormancy presents embryo growth and seed germination until chemical changes occur.

(b) **Morpholgical Dormancy:** It Occurs when the embryos are not differentiated into different tissues at the time of fruit ripening it means embryo is undeveloped or undifferentiated

- (c) **Combined Dormancy:** Seeds have both morphological physiological and dormancy (morpho physiological dormancy)
- (3) **Combinational Dormancy:** This is both exogenous (Physical) and endogenous (Physiological) conditions in some seeds
- (4) **Secondary Dormancy:** The conditions that are not favorable for seed germination like high temperatures causes secondary dormancy
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- (46) With the internal situation of embryo which type of dormancy occur ?
 (A) Physical dormancy (B) Chemical dormancy
 (C) Endogenous dormancy (D) Combinational Dormancy
- (47) Which dormancy prevent the germination and embryo growth until the chemical changes ?
 (A) Physiological dormancy (B) Mechanical dormancy
 (C) Chemical dormancy (D) Exogenous dormancy
- (48) Which is responsible for the exogenous dormancy ?
 (A) Presence of growth inhibitors surrounding coat of embryo.
 (B) At time of fruit ripening. In various tissue differentiation does not take place
 (C) Seed is impermeable for water or gaseous exchange.
 (D) Internal situation of embryo is favourable.
- (49) Mixed dormancy means
 (A) Physiological, chemical (B) Chemical, combinational
 (C) Physical, physiological (D) Physiological, Exogenous (physical)

Answers : (46-C), (47-A), (48-B), (49-D)

Various causes for seed dormancy:

- undeveloped embryo
- Seed coats impermeable to water
- Mechanically hard and strong seed coats which do not permit germination
- Physiologically immature embryo
- Presence of some germination inhibiting chemicals amongst them the main one is ABA

Note: GA is absent in dormant seeds. At this time ABA remains active, inhibits the transcription of genes. As a result proper enzymes are not synthesized.

Removal of seed dormancy:

- (1) Natural Method : When concentration of GA increases more than ABA, effects of ABA removed and embryo becomes active which results into removal of dormancy.
 - (2) Seed can be scraped lightly with sandpaper. Thus, their seed coats become permeable to water and germination is induced.
- A similar result can be achieved by using chemicals
 - Soaked seeds in an O₂ containing environment, can be provided with higher or lower temperature for a definite period. Dormancy is removed in this way.

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- (50) It removes the effect of ABA.
 (A) GA (B) IAA (C) CKN (D) 2 - 4 - D
- (51) It is absent in dormant seed.
 (A) C₂H₄ (B) ABA (C) GA (D) IAA

- (52) What is the main role of ABA in dormant seed ?
 (A) It inhibits translation (B) It obstruct transcription
 (C) It continues translation (D) It continues transcription.
- (53) It is phenomenon which removes the effect of ABA.
 (A) Continues process of trascription (B) Formation of specific enzyms occur
 (C) Embryo can be activated (D) All of the above

Answers: (50-A), (51-C), (52-B), (53-D)

Seed Germination: The entire process from the sowing of the seed in the soil up to the emergence of a young sapling from it is called seed germination.

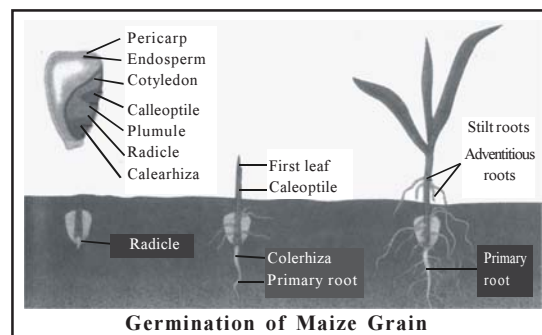
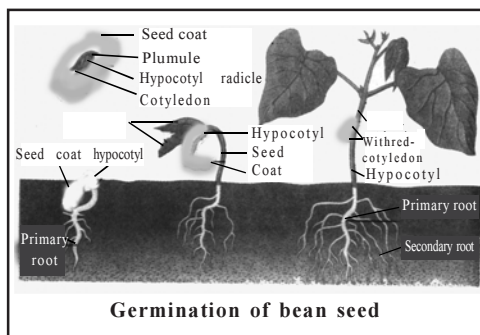
Precondition: Available water, sufficient O_2 and favourable temperature are preconditions for seed germination

Sprouting: The seed, first of all, imbibes water. As the seed coats become loose, rapid absorption of water occurs through the micropyle. Embryo becomes active. Digestion of food, either stored in endosperm or with the help of proper enzymes. The developing embryo is nourished in this way. First of all, the radicle of the embryo develops into a primary root which comes out from the micropyle. This is known as sprouting.

Stucture of rootsystems: This indicates initiation or germination of the primary root developed and forms a root system.

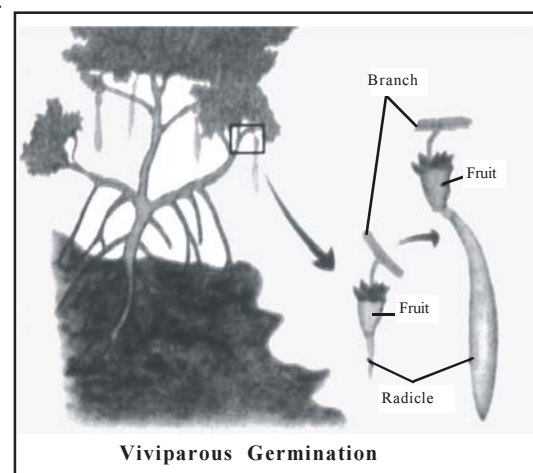
Development of shootsystem: In the mean time, development of plumule also begins, shoot that is stem and leaves, is formed through development of plumule.

- Growth related processes like cell division, cell enlargement and cell differntiation take place in the formation of root system and shoot systems during germination.
- During the entire process a high respiratory rate is maintained.
- Some hormones are secreted and some enzymes become active.



Viviparous Germination: Mangrooves are a special type of vegetation live in the bassein (creek) region around sea shore. They exihibit a different kind of germination.

- The seed germinates while it is still in the fruit attaches to the parent plant.
- Later as the weight of sapling increases it drops vertically straight into the mud and becomes anchored. lateral roots. develop and proper establishment is achieved. Such a germination is called - viviparous Germination. eg. Rhizophora and Avicennia are the examples.



- (54) What is pre condition for seed germination ?
 (A) Availability of water (B) Sufficient O₂
 (C) Favourable temperature (D) All of the above
- (55) By which process seed absorb water ?
 (A) Osmosis (B) Imbibition (C) Diffusion (D) Absorption
- (56) Sprouting means
 (A) Root formation from radicle
 (B) Formation of primary root from radicle and it comes out from the micropyle.
 (C) Formation / development of shoot system from plumule.
 (D) Dormant seed becomes active.
- (57) During the embryo development first leaf and coleoptile produce one structure is called
 (A) Primary structure (B) Coleoptile (C) Prop root (D) Plumule axis
- (58) (i) With this initiation of plant growth occurs
 (ii) After the completion of this stage essential factors for growth are available (iii) Removal of seed coat first out growth / development of shoot apex can take place.
 (A) (i) Seed coat, (ii) Seed germination (iii) First leaf
 (B) (i) Dormancy, (ii) Seed germination (iii) Seed coat
 (C) (i) Seed germination (ii) Dormancy period (iii) Seed coat
 (D) (i) Seed germination (ii) Dormancy period (iii) First leaf
- (59) In rhizophora which type of seed germination is seen ?
 (A) Epigeal seed germination (B) Hypogeal seed germination
 (C) Viviparous germination (D) Vernalization

Answers : (54-D), (55-B), (56-B), (57-B), (58-D), (59-C)

Senescence:

It is a period between complete maturation of an individual and the death of that individual and it is also known as 'aging'.

- Changes occurs during senescence:

- High rate of catabolism -There is depreciation in the organ and in the body.
- Efficiency decreases -It seems that hormones influences this process

(i) Types of Senescence :

Senescence of entire body : It affects the individual's organs as well as the entire body. All organs are involved eg. Annual plants like wheat and other cereals.

(ii) **Senescence of aerial Shoots:** In this biennial plants, the aerial shoot experiences this. External portion from above ground like flower and fruit, after formation they die and underground portion develops new shoot at next year. e.g. Banana, Ginger etc.

(iii) **Sequential senescence:** This type of senescence occurs in perennial plants, in which branches of stem become meristematic and develop and formation of new organs like flower, fruit, leaf occurs when old organs such as the branches and leaves fall down. eg. mango, eucalyptus, Cassia etc.

Abcission: The phenomenon of dropping of leaf, flower and fruit is called abscission

- The amount of auxin is high in healthy leaf
- During the senescence decreases the amount of auxin and ABA, ethylene like growth inhibitors are increases.
- Under their influence, the middle lamella which is made up of pectin and which connects the cellulose cell wall, become degraded with other accompanying degradatory activities, the abscission layer develops.
- The cells in this layer undergo degradatory process and become weak. As a result, at proper time the leaf, flower or the fruit breaks.

- (60) It is a type of senescence which takes place in annual plant.
 (A) Senescence of entire plant (B) Senescence of aerial shoot
 (C) Sequential senescence (D) All of the above
- (61) In which plant senescence of aerial shoot can be seen ?
 (A) In annual plants (B) In biennial plants
 (C) In perennial plant (D) A and B both
- (62) In healthy leaf which hormone is present in more amount ?
 (A) Cytokinin (B) Gibberellin (C) Auxin (D) Ethylene
- (63) In yellowing of leaf which hormone is in more amount ?
 (A) ABA (B) C_2H_4 (C) GA (D) A and B both

Answers : (60-A), (61-B), (62-C), (63-D)

Photoperiodism: In the development of plants process of flowering response to the stimulus of period of available light by plants is called photoperiodism.

- The period for which light is available has a remarkable influence on flowering.

- **Classification of plant on basis of sensation of light availability.**

- (i) **Long day plants:** Some plants required a longer period of light to come into flowering, such plants are called long day plants eg : **wheat, poppy, Oat, Beet** are long day plants.
- (ii) **Short Day plants:** Some plants require a shorter period of light to flower. Such plants are called short day plants. **Soybean, xanthium** etc are short day plants.
- (iii) **Day- Neutral plants:** In some other plants the period of available light does not have any influence on their flowering. Such plants are called - day neutral plants. **Tomato, cucumber and Maize** etc are any day neutral plants.

Note: For a photoperiodic response, the continuity of the period of available light and its following period of dark is inevitable. When mandatory period of dark breaks the continuity of light period in the long day plants or such a period of light breaks the continuity of dark period in the short day plants. The response of flowering to this stimulus is not observed.

- It is believed that some specific pigment (Phytochromes) as well as some specific hormone is responsible for this process.

- (64) Phytochrome pigment is related to photonastrism
 (A) Photoperiodism (B) Photorespiration
 (C) Photonastrism (D) Geotropism
- (65) In which plants phytochrome is found ?
 (A) Algae (B) Fungi (C) Flowering plants (D) A and B both
- (66) When a mandatory period of light is given in dark duration to short day plant ?
 (A) Flowering response is not seen
 (B) Spontaneous flowering take place
 (C) In that season flowering is more
 (D) It is converted from short day to long day plant.
- (67) What is responsible for response of photoperiodism ?
 (A) Leaf (B) Bud (C) Shoot apex (D) Flower
- (68) Most of the plant produce flowering in season which situation is responsible for this ?
 (A) Photonastrism (B) Photoperiodism (C) Photosynthesis (D) Photorespiration.

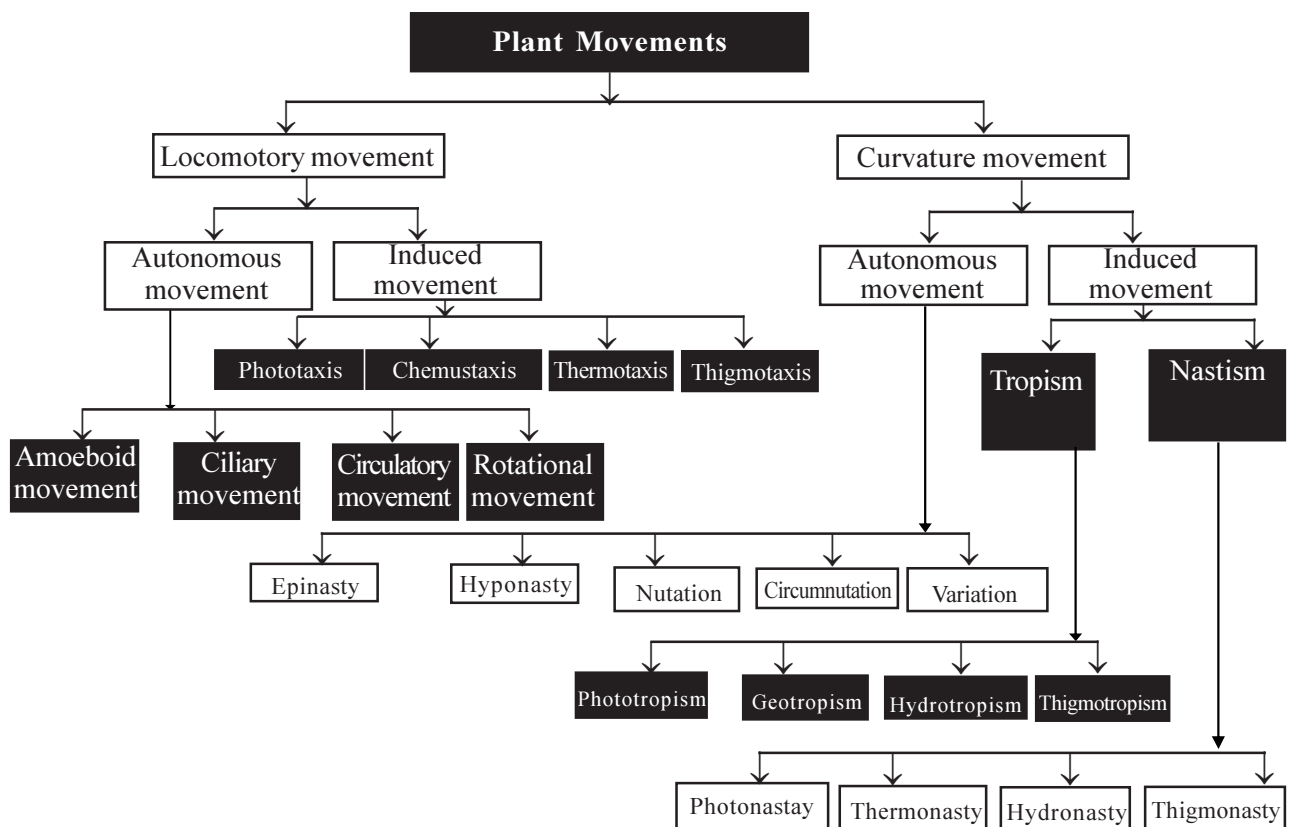
Answers : (64-A), (65-C), (66-A), (67-D), (68-B)

Vernalization:

- Better and earlier germination is induced when seeds are provided with specific low temperature for a definite period of time. Flowering is also earlier in the plants which develop from them. This artificial treatment is called Vernalization.
- Seeds of Wheat, Paddy, Millet and Cotton are provided low temperature between 1°C to 10°C and earlier end higher yield of crop is obtained.
- Plants growing under natural conditions must get low temperature for a specific period.
- Only then, they come into flowering. This natural uncertainty can be avoided by vernalization and timely yield can be obtained.

- (69) Low temperature treatment given to seed and get rapid germination that method known as
(A) Photoperiodism (B) Vernalization (C) Thermonasty (D) Phototropism.
- (70) How much temperature is given to cotton seed so it give yield in proper time ?
(A) 10°C to 15°C (B) 15°C to 20°C
(C) 1°C to 10°C (D) 25°C to 30°C
- (71) By which process the natural uncertainty for flowering is removed ?
(A) Photoperiodism (B) Photorespiration
(C) Nutation (D) Vernalization.
- (72) Which hormone is responsible for vernalization ?
(A) Auxin (B) Gibberellin
(C) Vernalin (D) ABA

Answers : (69-B), (70-C), (71-D), (72-C)



(A) Locomotory Movement:

- Such a movement can be that of the protoplasm, or an organ or the entire organism
- There are two main kinds of movements of locomotion
(1) Autonomous and (2) Induced locomotion

(1) Autonomous movement:

- No external factor is responsible for causing this type of movements.
 - (i) **Amoeboid movement** : Pseudopodia of slime mold
 - (ii) **Ciliary movement**: Chlamydomonas algae
 - (iii) **Circulatory movement**: Cytoplasm in Tradescantia anther
 - (iv) **Rotational movement**: Cytoplasm in Hydrilla leaves

(2) Induced Movement:

- The induced movements of locomotion are caused as a response to the external stimulus
- Such a locomotory movement inducing a change of place called Taxis.
 - (i) **Phototaxis** : Zoospore of Volvox.
 - (ii) **Chemotaxis** : Antherozoids of bryophytes and pteridophytes.
 - (iii) **Thermotaxis** : Diatoms
 - (iv) **Thigmotaxis** : Zoospore in Oedogonium.

(B) Curvature Movements: Higher plants show the movements of curvature which help them to orient their organ for their work efficiency. Uneven or unbalanced growth causes such a curvature. These are two main kinds of movement of curvature

(1) Autonomous Movement:

- No external factor is responsible for causing such uneven growth.
 - (i) **Epinasty**: Growth ratio of upper surface is more than upper surface in leaves -open leaf blade.
 - (ii) **Hypnasty**: Growth ratio of lower surface is more than upper surface in leaf closing of leaves.
 - (iii) **Nutation**: Zigzag movement in apical bud of stem.
 - (iv) **Circumnutation**: Spiral and helical growth of shoot in climbers and tendrillar plants.
 - (v) **Variation**: Pulsation in leaflets of Indian telegraph plant (*Desmodium gyrans*)

(2) Induced Movement:

- The induced movement of curvature are caused as a response to the external stimulus. There are two types (i) Tropism and (ii) Nastic movement
 - (i) **Tropism or Tropic movements**: If the movement of curvature in a plant organ is induced by an external and directional stimulus, it is called tropism. The curvature induced by tropism is having a directional relationship with the direction of the stimulus. Kinds of tropism are derived on the basis of the directional stimulus.

(a) Phototropism : (Bylight)

- Stem shows positive phototropism and root shows negative phototropism. Oat coleoptiles.

(b) Geotropism : (By gravitation)

- Stem shows negative geotropism and root shows positive geotropism- Radicle of maize seedling.

(c) Hydrotropism (By Water):

- Roots of higher plants.

(d) Thigmotropism: (By Touch) - Coccinia

(ii) Nastism or nastic Movements:

- This kind of movement depends on the presence and intensity of external stimulus. It is not necessary that it should affect from any definite direction. Based on the external stimulus these movements are called - Nastism

- Based on the external stimulus these movements are called

(a) Photonasty: The flowers in lotus and sunflowers open in the morning.

(b) Thermonasty: Flowers of crocus and Tulip open at higher temperature.

(c) Hydronasty: Plants show nastic movement through heavy rain and water flow.

(d) Thigmonasty: The leaves of Drosera and Mimosa close and droop when they are touched.

(73) In which amoeboid movement is found ?

- | | |
|-----------------------------|---------------------------------|
| (A) Plasmodia of slime mold | (B) Chlamydomonas algae |
| (C) Stamen of tradescantia | (D) Leaf protoplasm of Hydrilla |

(74) Which type of movement is found in cytoplasm of hydrilla leaf ?

- | | |
|--------------|---------------------|
| (A) Amoeboid | (B) Thigmotropism |
| (C) ciliary | (D) Circumnutation. |

(75) It is correct movement for zoospore of oedogonium ?

- | | | | |
|----------------|-------------------|----------------|-----------------|
| (A) Photonasty | (B) Thigmotropism | (C) Chemotaxis | (D) Thigmonasty |
|----------------|-------------------|----------------|-----------------|

(76) Where thermotaxis is found ?

- | | |
|-------------------------------|----------------|
| (A) Diatoms | (B) Slime mold |
| (C) Male gamete of bryophyte. | (D) Coccinia |

(77) Spiral and helical growth of shoot of climbers and tendrillar plants is the example for

- | | |
|--------------|--------------------|
| (A) Epinasty | (B) Hyponasty |
| (C) Nutation | (D) Circumnutation |

(78) Variation movement is shown by

- | | |
|-----------------------------|---------------------------------------|
| (A) <i>Desmodium gyrans</i> | (B) Coccinia |
| (C) Coleoptile of oat | (D) Radicle of maize seed germination |

(79) Which plant leaflet show pulsation ?

- | | |
|-----------------------------|----------------------|
| (A) <i>Desmodium gyrans</i> | (B) Tulip and crocus |
| (C) Sunflower and lotus | (D) Coccinia |

(80) Which type of tropism is found in coleoptile of oat.

- | | |
|-------------------|------------------|
| (A) Phototropism | (B) Hydrotropism |
| (C) Thigmotropism | (D) Mimosa |

- (81) Which type of tropism occurs in radicle in maize of seed germination ?
 (A) Phototropism (B) Hydrotropism (C) Thigmotropism (D) Geotropism
- (82) It shows thigmotropism.
 (A) Coleoptile of oat (B) Coleorhiza of barley
 (C) Coccinia (D) Mimosa
- (83) It shows photonasty.
 (A) Flowers of crocus and tulip
 (B) Flowers of lotus and sun flower
 (C) Drosera and mimosa
 (D) Leaves of *Desmodium gyrans*
- (84) Its flowers open at high temperature.
 (A) Sunflower (B) Lotus (C) Tulip (D) Coccinia
- (85) A phenomenon due to turgidity opening of stomata is
 (A) Photonasty (B) Hydronasty (C) Thigmonasty (D) Thermonasty
- (86) Flowers of sunflower and lotus opens at morning.
 (A) Photonasty (B) Thermonasty (C) Hydronasty (D) Phototaxis

Answers : (73-A), (74-D), (75-B), (76-A), (77-D), (78-A), (79-A), (80-A), (81-D), (82-C), (83-B), (84-C), (85-B), (86-A)

• **A - Assertion R - Reason types of questions**

Choose the correct option which given below for following questions.

- (A) A and R both are correct while R is a correct explanation of A.
 (B) A and R both are correct but R is not correct explanation of A.
 (C) A is correct but R is wrong
 (D) A is wrong but R is correct.
- (87) Assertion A : Gibberrelin is necessary for flowering in long day plants.
 Reason R : If GA treatment is given to tall plant, they can be converted into dwarf plant.
 (A) (B) (C) (D)
- (88) Assertion A : In presense of ABA seed gemination of seed can be prevented.
 Reason R : ABA is inhibitor for transcription process.
 (A) (B) (C) (D)
- (89) Assertion A : Ethylene is sprinkled on green fruits.
 Reason R : Ethylene is necessary for fruit ripening.
 (A) (B) (C) (D)
- (90) Assertion A : 2-4-D is useful for tissue culture method.
 Reason R : During gemination 2-4-D conducts the storage compounds.
 (A) (B) (C) (D)
- (91) Assertion A : Cytokinin slows down the senescence.
 Reason R : Ethylene is stimulates senescence
 (A) (B) (C) (D)
- (92) Assertion A : In S-Shaped growth curve three / stages have been found.
 Reason R : Initial growth stage is called grand period of growth.
 (A) (B) (C) (D)

- (93) Assertion A : For the response of photo periodism, its following period of dark is the period of available light and inevitable continuation of dark period is essential.
Reason R : In photoperiod of long day plant for mandatory duration of darkness, flowering response found on high rate.
(A) (B) (C) (D)
- (94) Assertion A : Vernalization is artificial process.
Reason R : Vernalization is a process in which entire plant is affected.
(A) (B) (C) (D)
- (95) Assertion A : In short day plants need less light than the specific time period for flowering.
Reason R : In dark period of short day plant, introducing of light for moment, response of flowering is not found.
(A) (B) (C) (D)
- (96) Assertion A : Cells of shoot apex and root apex continuously divide.
Reason R : At the tip of the root apex and shoot apex apical meristematic tissue is present.
(A) (B) (C) (D)
- (97) Assertion A : Wheat and other cereals are annual plant
Reason R : In them senescence found in all organs of the plant.
(A) (B) (C) (D)

Answers : (87-C), (88-A), (89-A), (90-C), (91-B), (92-C), (93-C), (94-B), (95-B), (96-A), (97-A)

• **True (T) - False (F) Types Questions**

Given statements are true or false choose the correct option.

- (98) (1) In reference of physiology growth is resultant of metabolism.
(2) Anabolic is process of degradation.
(3) Catabolic is process of synthesis.
(4) Dry weight increases as a result of growth.
(A) TFFT (B) FTTF (C) FTTF (D) TTF
- (99) (1) Rapid metabolic rate of cells is found in meristematic regions.
(2) Nucleus size of cell increase in enlargement region.
(3) In maturation region, shape and size of the cell become permanent.
(4) Meristematic cells divide rapidly which are arranged in shoot apex.
(A) FTTF (B) FFTT (C) TFFT (D) TTF
- (100) (1) Gibberellin removes genetic dwarfness.
(2) Cytokinin maintain chlorophyll of leaves.
(3) Ethylene prevents the situation of stress.
(A) TTT (B) TTF (C) FTT (D) FFT

- (101) (1) Dominancy of apical decreases bud under the effect of cytokinin.
 (2) Auxin stimulates respiration.
 (3) ABA inhibits stress situation.
 (A) FFF (B) TTF (C) TTT (D) TFT
- (102) (1) Seed absorb water by imbibition firstly.
 (2) Primary root develops from the radicle and it comes out from micropyle.
 (3) Sprouting is indication of initiation of seed germination.
 (A) TTF (B) TTT (C) FTT (D) FFF
- (103) (1) Phyto chrome pigment is responsible for the photoperiodism.
 (2) Florigen hormone is responsible for the photo periodism.
 (A) FF (B) TF (C) FT (D) TT

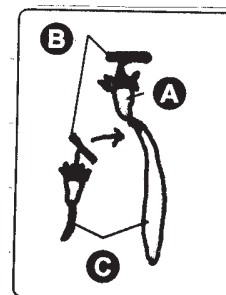
Answers : (98-A), (99-C), (100-B), (101-C), (102-B), (103-D)

- | | | | |
|-------|-------------------|--|------------------------------------|
| (104) | Column - I | Column - 2 | |
| | (I) Auxin | (p) It act as a weedicide and weed regulator. | (A) : (I - p), (II - q), (III - r) |
| | (II) Gibberlin | (q) Maintain the chlorophyll in leaves | (B) : (I - r), (II - q), (III - p) |
| | (III) Cytokinin | (r) It is more synthesized in absence of light | (C) : (I - p), (II - r), (III - q) |
| | | | (D) : (I - r), (II - p), (III - q) |
-
- | | | | |
|-------|-------------------|---|------------------------------------|
| (105) | Column - I | Column - 2 | |
| | (I) IAA | (p) Synthetic auxin act as a weedicide. | (A) : (I - r), (II - q), (III - p) |
| | (II) ABA | (q) Inhibit plant physiology. | (B) : (I - r), (II - p), (III - q) |
| | (III) NAA | (r) Stimulate process of flowering | (C) : (I - p), (II - q), (III - r) |
| | | | (D) : (I - q), (II - p), (III - r) |
-
- | | | | |
|-------|-----------------------|--|------------------------------------|
| (106) | Column - I | Column - 2 | |
| | (I) Primary growth | (p) Growth to increase work efficiency in higher plants of organs. | (A) : (I - r), (II - p), (III - q) |
| | (II) Secondary growth | (q) Activation of lateral meristem that growth. | (B): (I - r), (II - q), (III - p) |
| | (III) Annual growth | (r) Activation of apical meristem that growth. | (C) : (I - q), (II - p), (III - r) |
| | | | (D) : (I - p), (II - q), (III - r) |

- (107) **Column - I** **Column - 2**
- | | | |
|------------------------------------|---|------------------------------------|
| (I) Phase of cell enlargement | (p) Cells having a dense cytoplasm, large nucleus | (A) : (I - p), (II - q), (III - r) |
| (II) Phase of call differentiation | (q) Cells included in structure of various tissues | (B) : (I - r), (II - p), (III - q) |
| (III) Phase of cell division | (r) Increases in size of cell and increase in size of vacuole | (C) : (I - q), (II - r), (III - p) |
| | | (D) : (I - r), (II - q), (III - p) |
- (108) **Column - I** **Column - 2**
- | | | |
|----------------------------------|-----------------------------|------------------------------------|
| (I) More synthesis of Auxin | (p) In helthy leaf | (A) : (I - q), (II - p), (III - r) |
| (II) Less synthesis of Auxin | (q) In senescence leaf | (B) : (I - r), (II - p), (III - q) |
| (III) More amount of gibberrelin | (r) During seed germination | (C) : (I - q), (II - r), (III - p) |
| | | (D) : (I - p), (II - q), (III - r) |
- (109) **Column - I** **Column - 2**
- | | | |
|-------------------------|------------------------------|------------------------------------|
| (I) Short days plant | (p) Rice, soyabean, Xanthium | (A) : (I - p), (II - q), (III - r) |
| (II) Long day plant | (q) Wheat, Barley, poppy | (B) : (I - p), (II - r), (III - q) |
| (III) Day neutral plant | (r) Tomato, cucumber, maize | (C) : (I - r), (II - p), (III - q) |
| | | (D) : (I - q), (II - p), (III - r) |
- (110) **Column - I** **Column - 2**
- | | | |
|--------------------------------|---------------------------|------------------------------------|
| (I) Epigeal seed germination | (p) Avicennia, Rhizophora | (A) : (I - p), (II - q), (III - r) |
| (II) Hypogeal seed germination | (q) Bean pea | (B) : (I - r), (II - p), (III - q) |
| (III) Viviparous germination | (r) Wheat, Maize | (C) : (I - q), (II - r), (III - p) |
| | | (D) : (I - p), (II - r), (III - q) |
- (111) **Column - I** **Column - 2**
- | | | |
|--------------------|----------------------------|------------------------------------|
| (I) Thigmotaxis | (p) Drosera | (A) : (I - p), (II - q), (III - r) |
| (II) Thigmotropism | (q) Coccinia | (B) : (I - r), (II - p), (III - q) |
| (III) Thigmonasty | (r) Zoospore of oodogonium | (C) : (I - q), (II - p), (III - r) |
| | | (D) : (I - r), (II - q), (III - p) |

Answers : (104-C), (105-A), (106-B), (107-D), (108-D), (109-A), (110-C), (111-D)

- (112) Diagram shows germination of which plant group ?
- | | |
|------------------|----------------|
| (A) Mangroove | (B) Gymnosperm |
| (C) Pteridophyta | (D) Bryophyta. |
- (113) True habitat of plant which shows germination in given diagram
- | | |
|-------------------|-----------------------------|
| (A) Grassland | (B) Creek area of sea shore |
| (C) Mountain area | (D) Wetland area |



- (114) Indicate parts A,B, C in given diagram.
 (A) A = Radicle, B = Branch, C = Fruit (B) A = Fruit, B = Radicle, C = Branch,
 (C) A = Fruit, B = Branch, C = Radicle, (D) A = Branch, B = Fruit, C = Radicle.
- (115) Which is true plant group for given germination ?
 (A) Bean, pea (B) Rhizophora, Bean (C) Wheat, maize (D) Rhizophora, Avicennia

Answers : (112-A), (113-B), (114-C), (115-D)

● **Questions for PMT - NEET**

- (116) 2-4-D agent means.
 (A) Insecticide (B) Weedicide (C) Pneumatocide (D) Pesticide
- (117) 6-furfuryl aminopurine, 2-4-dichlorophenoxy acetic acid and Indole-3 acetic acid are examples of respectively.
 (A) Synthetic auxin, kinetin and natural auxin (B) Gibberrelin, natural auxin and kinetin
 (C) Kinetin, synthetic auxin and natural auxin (D) Natural auxin, Gibberrelin and kinetin.
- (118) Which process is not affected when amount of auxin decreases ?
 (A) Hypopulsatory of leaves
 (B) Entrance of root in ground
 (C) Movement of sunflower in direction of sunlight
 (D) Movement of shoot in direction of sun.
- (119) Hormone is responsible for phototropism.
 (A) Auxin (B) Gibberrelin (C) Cytokinin (D) ABA
- (120) Treatment of which hormone induce parthenogenesis ?
 (A) Ethylene (B) Auxin (C) Kinetin (D) Cytokinin
- (121) Which hormone is not found in plants ?
 (A) 2-4-D (B) GA_2 (C) Gibberrelin (D) IAA
- (122) Who discovered auxin ?
 (A) Thiamann (B) Went (C) Butlar (D) Skoog.
- (123) Mostly dormant seeds are found in Leguminous plant, because
 (A) less developed embryo (B) hard seed coat
 (C) Absence of cytokinin (D) Absence of GA_3
- (124) Rhizokalin is excess hormone, which is synthesised in
 (A) Seed coat (B) Root (C) Leaf (D) Stem
- (125) Climacteric effect means
 (A) Ripening process of fruit (B) effect of environment of growth.
 (C) Yellowing of leaves mostly in plant (D) Process of dropping of flowers of plant.
- (126) A substance which regulate the other organs growth rate and originate from shoot apex and root apex of plant, what is it ?
 (A) Enzyme (B) Hormone (C) Vitamin (D) Nutritional substance.
- (127) During the whole year for getting the fruit of pineapple which treatment is given to plant ?
 (A) NAA, 2, 4-D (B) Phynyl acetic acid (C) Cytokinin (D) IAA, IBA

- (128) Evergreen trees are covergreen during whole year what is the reason of it ?
 (A) No leaf fall is there.
 (B) Leaf fall occur at regular time interval.
 (C) During year proper amount of atmospheric moisture is available
 (D) effect of cold atmosphere.
- (129) Where is active cell division found ?
 (A) In medulla region
 (B) In cortex region
 (C) In internode region
 (D) In shoot apex and root apex.
- (130) It is a function of phytotron.
 (A) Bombardment of electron
 (B) release protons.
 (C) Plants grows in restrictive atmosphere
 (D) Mutation occur in plants.
- (131) When itiolation is found in plants ?
 (A) When plant grow in dark
 (B) When deficiency occur due to mineralnutrition
 (C) When more intensity of light
 (D) When plant grow in green light
- (132) Sowing of seed in ground at depth can not grow well because
 (A) Lack of light
 (B) lack of water
 (C) lack of oxygen
 (D) absence of nutrients.
- (133) Dendrocronology means
 (A) Secondary growth
 (B) Development of shoot
 (C) Biological Phenology
 (D) To measure age of tree.
- (134) Identity substance from given structure ?
 (A) IAA (B) ABA
 (C) GA₃ (D) CKN
- CC(=O)Oc1c[nH]c2ccccc12
- (135) Which pair is not correct ?
 (A) ABA - closistomata
 (B) GA - Leaf fall
 (C) CKN - cell division
 (D) IAA - cell wall growth.
- (136) How seedless tomato can be produce ?
 (A) Sowing seed which is vernalized
 (B) Seed is treated by phenyl mercuric acetate and then sowing
 (C) Removal of another before pollen releases
 (D) Plant is treated by auxin and gibberrelin.
- (137) Gibberrelin stimulate seed germination because
 (A) It stimulates celldivision
 (B) It produces the hydrolase enzymes of.
 (C) It produces ABA
 (D) From the hard seed coat water is also absorbed.
- (138) During seed germination amylase enzyme is produced in response to
 (A) Auxin (B) Gibberrelin (C) Kinetin (D) Ethylene
- (139) By the treatment of which hormone rosette pattern of cabbage is changed.
 (A) Gibberrelin (B) 2-4-D (C) ABA (D) IAA.
- (140) Who proposed the word cytokinin ?
 (A) Yabuta (B) Brown (C) Latham (D) Fitting.
- (141) Choose correct sentences from following.
 (1) Senescence is removed by cytokinin.
 (2) Auxin is responsible for the apical dominance.
 (3) Ethylene is neccessary for seed germination.
 (4) Gibberrelin induce immature leaf fall.
 (A) 1 and 2 are correct (B) 1 and 3 are correct
 (C) 1 and 4 are correct (D) 2 and 4 are correct

- (142) A farmer having farm and he grew paddy crop but most of the leaves of paddy become yellow that decreases the yield. Thus, for the increase of crop yield which correct advice should be given to farmer ?
- (A) Remove all yellow leaves and spread 2-4-D on green leaves.
 (B) Fe and Mg are given to plant thus synthesis of chlorophyll is increased.
 (C) Frequently irrigation given to the farm
 (D) Give treatment of N_2 fertilizer with cytokinin.
- (143) Who is proposed zeatin word ?
- (A) Skoog (B) Letham (C) Miller (D) Yabota
- (144) It is necessary for flowering in short day plant.
- (A) Gibberrelin (B) Cytokinin (C) Auxin (D) Ethylene
- (145) For the ripening of fruits what is the suitable ratio of gases.
- (A) 80% C_2H_4 and 20% CO_2 (B) 80% CO_2 and 20% CH_2
 (C) 80% CO_2 and 20% O_2 (D) 80% NO_2 and 20% CO_2
- (146) Which acid is gained from carotenoids ?
- (A) Indole butyric acid (B) Indole - acetic acid
 (C) Absciscic acid (D) Gibberrellic acid
- (147) What is morfectin ?
- (A) Synthetic growth regulator (B) Synthetic auxin
 (C) Synthetic gibberrelin. (D) Synthetic drugs.
- (148) Which hormone is opposite for gibberrelin action ?
- (A) Zeatin (B) Ethylene (C) IAA (D) ABA
- (149) Which is mismatch pair ?
- (A) Auxin : growth (B) Gibberrelin : Gibberrela fungi
 (C) Cytokinin : DNA of sperm of herring fish (D) ABA : flowering.
- (150) In plants biological clock is regulated by which ?
- (A) Phytochrome (B) Cytochrome (C) Gibberrelin (D) A and B both.
- (151) Some of plants are getting 12 hours light and 12 hours darkness so flowering can occur. Now in these plants 12 hours of dark period is discontinued by introducing when light for mendetary period that breaks flowering response. Thus these types of plants are called
- (A) Day neutral (B) Long day (C) Short day (D) Neutral darkness
- (152) Some of the seedlings of tomato plants are kept in darkness for few days so most of the seedlings show white colour this phenomenon is known as
- (A) Etiolation (B) Defoliation (C) Mutation (D) Dehydration
- (153) Soyabean gives flowering in winter season, because
- (A) It is long day plant (B) It is short day plant
 (C) It is day neutral plant (D) It is terresterial plant.
- (154) One plant gives flowering three times in a year october, January, and July, so what you tell about this situation ?
- (A) It is photo sensible but not thermo sensible
 (B) It is thermo sensible but not photo sensible
 (C) It is not sensible for light and heat both.
 (D) It is sensible for light and heat.

- (155) When plant get light from only one side, plant gets curvature movement in direction of light. Which reason is responsible for this phenomenon ?
 (A) Buds of stem is attractive towards light.
 (B) For the phototynthesis light is essential.
 (C) Auxin is present in shoot apex due to that more cell elongation occur.
 (D) More necessity of photorespiration.
- (156) In which plant, treatment is given by gibberelin so male flowers are converted into female flowers?
 (A) Papaya (B) Banana (C) Cucumber (D) Coccinia
- (157) One hormone is induced early seed germination in barley plant, second hormone responsible for flowering in pineapple. and third hormone is inhibiting leaf senescence, give the name of hormones respectively.
 (A) Auxin, Gibberelin and cytokinin (B) Gibberelin, cytokinin and Auxin.
 (C) Gibberelin, Auxin and cytokinin (D) Auxin, cytokinin and Gibberelin
- (158) How fruit ripening process induced ?
 (A) When fruit become ripen, water level should decrease in ground
 (B) Surrounding the fruits increase the ratio of N_2
 (C) Surrounding atmosphere become warmly
 (D) Artificial ethylene spread in atmosphere.
- (159) Which pair is not related
 (A) Adenine - Kinetin (B) Carotenoids - ABA
 (C) Turpin - IAA (D) Gas - Ethylene.
- (160) Which sentence is correct about phytochrome from following ?
 (A) Phytochrome is plant growth regulator.
 (B) Phytochrome is useful pigment in photosynthesis process.
 (C) Phytochrome pigment stimulate growth process light based physiological. and development.
 (D) Phytochrome is restricted protein, which control dark-reaction.
- (161) What is useful to check the viabillity capacity of seed ?
 (A) 2, 6, dichloro phenol indo phenol (B) 2,3,5, triphenyl tetra sodium chloride
 (C) DMSO (D) Safranin
- (162) In internode of stem for the cell enlargement which hormone is responsible ?
 (A) IAA (B) CKN (C) GA (D) Ethylene
- (163) Process in which floral bud is converted into flower.
 (A) Induced locomotion (B) Palatonic locomotion
 (C) Autonomous movement (D) Induced movement.
- (164) Which hormone is responsible for differntiation and organogenesis ?
 (A) Auxin (B) Gibberelin (C) Cytokinin (D) ABA
- (165) Why coconut water is useful for tissue culture method ?
 (A) Auxin (B) Ethylene (C) cytokinin (D) Gibberelins.
- (166) By which physical method, seed coat becomes permeable for the growth of embryo ?
 (A) Bending (B) Degradation (C) Vernalization (D) through scrapping
- (167) IAA is produced from derivatives of which amino acid ?
 (A) Tryptophane (B) Tyrosine (C) Phenyl alanine (D) Serine
- (168) Which hormonal treatment is given to plast to stop immature leat fall ?
 (A) IAA (B) GA_3 (C) CKN = Cytokinin (D) ABA

- (169) The process of rolling of leaves after sunset is known as
 (A) Phototropism (B) Photonasty (C) Phototaxis (D) Chemotaxis
- (170) In which plant polyembryony of nucellus is found ?
 (A) Citrus (B) Brassica (C) Malva (D) Yucca
- (171) Which sentences are correct ?
 (1) Gibberrellins is responsible for foolish plant.
 (2) ABA is growth promotor hormone.
 (3) Auxins and cytokinin are regulators of cell differentiation.
 (4) Dormancy of axillary bud in cabbage is due to auxin.
 (A) 1, 2 and 3 (B) 1 and 2 (C) 2 and 4 (D) 1 and 3
- (172) Do match columns
- | Column - 1 | | Column - 2 | |
|---------------------------|-----|-------------------|--|
| (I) C-Darwin and F-Darwin | (p) | Cytokinin | (A) : (I - s), (II - p), (III - r), (IV - t) |
| (II) Miller and Skoog | (q) | ABA | (B) : (I - p), (II - r), (III - s), (IV - q) |
| (III) Letham | (r) | Zeatin | (C) : (I - q), (II - p), (III - s), (IV - t) |
| (IV) Kurosuvu | (s) | Auxin | (D) : (I - t), (II - r), (III - p), (IV - s) |
| | (t) | GA | |
- (173) Mostly wax coating is done on apple, so that
 (A) Colour can save against light
 (B) Stop the aerobic respiration and O₂ cannot enter in fruit
 (C) Save from injury and stop the entry of ethylene
 (D) Apple is seen bright and beautiful.
- (174) In flowering plant senescence is active developmental process which indicate growth and functions it is seen in
 (A) Leaf fall (B) Xylem vessel and vessel differentiated
 (C) Annual plant (D) Floral parts
- (175) In garden tendril of pea climb with support, this process is related to
 (A) Thigmotasty (B) Thigmotaxis (C) Thermotaxis (D) Thigmotropism
- (176) Flowering depending on cold, what is called ?
 (A) Cryotherapy (B) Cryogenix (C) Cryoscopy (D) Vernalization
- (177) What is the uses of clinostat instrument ?
 (A) Osmosis measurement (B) Measure Velocity of growth
 (C) Measure the rate of Photosynthesis (D) Measure the respiration rate
- (178) What is useful for spinch vegetable to keep green for long period ?
 (A) GA₃ (B) CKN = Cytokinin (C) IAA (D) ABA
- (179) Which hormone is used in place of vernalization ?
 (A) Auxin (B) Cytokinin (C) Gibberellin (D) Ethylene

Answers : (116-B), (117-C), (118-A), (119-A), (120-B), (121-A), (122-B), (123-B), (124-C), (125-A), (126-B), (127-A), (128-B), (129-D), (130-C), (131-A), (132-C), (133-D), (134-A), (135-B), (136-D), (137-B), (138-B), (139-A), (140-C), (141-A), (142-D), (143-B), (144-A), (145-A), (146-C), (147-A), (148-D), (149-D), (150-D), (151-C), (152-A), (153-B), (154-B), (155-C), (156-B), (157-C), (158-D), (159-C), (160-C), (161-B), (162-A), (163-C), (164-D), (165-C), (166-D), (167-A), (168-C), (169-B), (170-A), (171-D), (172-A), (173-B), (174-A), (175-D), (176-D), (177-B), (178-B), (179-C)

Plant growth and development

