

DPP - Daily Practice Problems

Chapter-wise Sheets

Date :

Start Time :

End Time :

BIOLOGY

CB15

SYLLABUS : Plant Growth and Development

Max. Marks : 180

Marking Scheme : + 4 for correct & (–1) for incorrect

Time : 60 min.

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

- Which one is a long day plant?
(a) Tobacco (b) *Glycine max*
(c) *Mirabilis jalapa* (d) Spinach
- The hormone which controls cell division and cell differentiation is
(a) ABA (b) auxin
(c) gibberellin (d) cytokinin
- Which one of the following is a long day plant?
(a) Bajra (b) Soyabean
(c) Tobacco (d) Wheat
- A chemical believed to be involved in flowering is
(a) gibberellin (b) kinetin
(c) florigen (d) IBA
- Which one of the following acids is a derivative of carotenoids ?
(a) Indole-3-acetic acid (b) Gibberellic acid
(c) Absciscic acid (d) Indole butyric acid
- Differentiation of shoot is controlled by
(a) high gibberellin : cytokinin ratio
(b) high auxin : cytokinin ratio
(c) high cytokinin : auxin ratio
(d) high gibberellin : auxin ratio
- Which one of the following generally acts as an antagonist to gibberellins?
(a) Zeatin (b) Ethylene
(c) ABA (d) IAA
- To avoid excessive water loss during severe drought stress, the closure of stomata is signalled by the production of
(a) IAA (b) NAA
(c) ABA (d) IBA

RESPONSE
GRID

- | | | | | |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1. (a)(b)(c)(d) | 2. (a)(b)(c)(d) | 3. (a)(b)(c)(d) | 4. (a)(b)(c)(d) | 5. (a)(b)(c)(d) |
| 6. (a)(b)(c)(d) | 7. (a)(b)(c)(d) | 8. (a)(b)(c)(d) | | |

Space for Rough Work

9. In short day plants, flowering is induced by
 - (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.
10. Apical dominance in plants is caused by
 - (a) high concentration of auxins in the terminal bud.
 - (b) high concentration of gibberellins in the apical bud.
 - (c) high concentration of auxins in the lateral bud.
 - (d) absence of auxins and gibberellins in apical bud.
11. Primary precursor of IAA is
 - (a) phenylalanine
 - (b) tyrosine
 - (c) tryptophan
 - (d) leucine
12. In a plant growing under dark condition, the leaves turn light coloured, internodes become much elongated and it is termed as
 - (a) vernalization
 - (b) etiolation
 - (c) phyllotaxy
 - (d) chlorosis
13. Parthenocarpic fruit can be produced by the application of which of the following auxin?
 - (a) IBA (Indole butyric acid)
 - (b) IAA (Indole acetic acid)
 - (c) 2, 4-D (2,4 dichlorophenoxy acetic acid)
 - (d) All of the above.
14. The conditions necessary for vernalization are
 - (a) high temperature and water
 - (b) low temperature and oxygen
 - (c) water and carbon dioxide
 - (d) oxygen and water.
15. Which of the following hormones does not naturally occur in plants?
 - (a) 2,4-D (2, 4-dichlorophenoxy acetic acid)
 - (b) IAA
 - (c) ABA
 - (d) GA
16. Which of the following types of phytohormones resemble the nucleic acids in some structural aspects ?
 - (a) Auxin
 - (b) Cytokinin
 - (c) Gibberellin
 - (d) ABA
17. Which one of the following statement regarding auxin is/ are correct?
 - (a) IAA and IBA are natural but NAA, 2, 4-D and 2, 4, 5-T are synthetic auxins.
 - (b) IAA and NAA are natural but IBA, 2, 4, 5-T and 2, 4-D are synthetic auxins.
 - (c) NAA and 2, 4, 5-T are natural but IAA, IBA and 2, 4-D are synthetic auxins.
 - (d) IAA, NAA, IBA, 2, 4-D and 2, 4, 5-T are synthetic auxins.
18. Which one among the following chemicals is used for causing defoliation of forest trees?
 - (a) Phosphon-D
 - (b) Malic hydrazide
 - (c) 2, 4-dichlorophenoxy acetic acid
 - (d) Amo-1618
19. Which of the following hormone prevents ripening of fruit?
 - (a) Gibberellin
 - (b) Ethylene
 - (c) Cytokinin
 - (d) ABA
20. Gibberellin was first extracted from
 - (a) *Gibberella fujikuroi*
 - (b) *Gelidium*
 - (c) *Gracelaria*
 - (d) *Aspergillus*
21. A plant completing its life cycle before the onset of dry condition is said to be
 - (a) short day plant
 - (b) long day plant
 - (c) drought escaping
 - (d) All of these
22. Phytohormones are
 - (a) chemicals regulating flowering.
 - (b) chemicals regulating secondary growth.
 - (c) hormones regulating growth from seed to adulthood.
 - (d) regulators synthesized by plants and influencing physiological processes.

**RESPONSE
GRID**

9. (a)(b)(c)(d)	10. (a)(b)(c)(d)	11. (a)(b)(c)(d)	12. (a)(b)(c)(d)	13. (a)(b)(c)(d)
14. (a)(b)(c)(d)	15. (a)(b)(c)(d)	16. (a)(b)(c)(d)	17. (a)(b)(c)(d)	18. (a)(b)(c)(d)
19. (a)(b)(c)(d)	20. (a)(b)(c)(d)	21. (a)(b)(c)(d)	22. (a)(b)(c)(d)	

Space for Rough Work

23. Which one of the following is a natural growth inhibitor?
 (a) NAA (b) ABA
 (c) IAA (d) GA
24. Select the incorrect statement among the following.
 (a) Increase in growth per unit time is growth rate.
 (b) A sigmoid growth curve is a characteristic of most living organisms in their natural environment.
 (c) Rate of growth is constant during geometrical growth.
 (d) Exponential phase is also called as log phase.
25. Cabbage is a biennial plant which produces flowers in second year of growth. In an attempt to make it flower in a single year, four potted plants (I, II, III and IV) of cabbage were subjected to different temperatures for several days as given in the table.

Potted plant	Temperature
I	5°C
II	20°C
III	30°C
IV	25°C

Which potted plant will show flowering?

- (a) I (b) II
 (c) III (d) IV
26. Etiolated seedlings are produced by germinating seeds and keeping them in total darkness. Under which of the following conditions will plants kept in the dark-begin to synthesize chlorophyll ?
 (a) After being given a pulse of blue light
 (b) After being given a pulse of red light
 (c) After being given a pulse of red light followed by a pulse of far-red light
 (d) After being given a pulse of far-red light followed by a pulse of red light
27. Which of the following may function to break dormancy in seeds ?

- (a) Penetration of the seed coat
 (b) Leaching of inhibitory compounds by water
 (c) Exposure to fire
 (d) All of the above
28. You have installed an outdoor gas burning grill on your back patio next to your favorite camellia bush. After the first few chilly nights of using your grill you notice that your camellia, which does not normally lose its leaves, is beginning to do so. Which of the following is the best explanation for what is happening ?
 (a) The bush is getting too warm next to your grill.
 (b) Ethylene is a by-product of the gas you are burning and is causing senescence in your plant.
 (c) Abscissic acid is a by-product of the gas you are burning and is causing senescence in your plant.
 (d) The plant is a biennial and is bolting.
29. Cytokinins are known to :
 (a) Inhibit cytoplasmic movement
 (b) Help in retention of chlorophyll
 (c) Influence water movement
 (d) Promote abscission layer formation.
30. Which of the following schemes best represents how environmental cues are transduced to changes in a plant ?
 (a) Receptors receive environmental cues, a signal transduction pathway is initiated, there is an alteration in the particular genes that are transcribed and translated and a cellular response is generated.
 (b) Receptors are triggered, hormones are released, signal transduction pathways are initiated, there is an alteration in expression of genes and a cellular response is generated.
 (c) Neither a nor b
 (d) Both a and b
31. When a plant is not reproducing most of the cytokinins are produced in its :
 (a) Lateral buds (b) Shoot apex
 (c) Roots (d) Leaves

RESPONSE
GRID

23. (a)(b)(c)(d) 24. (a)(b)(c)(d) 25. (a)(b)(c)(d) 26. (a)(b)(c)(d) 27. (a)(b)(c)(d)
 28. (a)(b)(c)(d) 29. (a)(b)(c)(d) 30. (a)(b)(c)(d) 31. (a)(b)(c)(d)

Space for Rough Work

32. Which of the following light receptors is responsible for absorbing blue and ultraviolet light ?
 (a) Phytochrome P_r (b) Photochrome P_{fr}
 (c) Cryptochrome (c) Phototropin
33. Phototropic and geotropic movements in plants have been traced to be linked with:
 (a) Enzymes (b) Starch
 (c) Gibberellins (d) Auxins
34. The natural plant hormones were first isolated from :
 (a) Corn germs and human urine
 (b) Cotton fruits, spinach leaves and rice plants
 (c) Human urine and rice seedlings
 (d) Spinach leaves and fungus Gibberella
35. Auxin regulates cell growth by which of the following mechanisms ?
 (a) Altering the elasticity of cell walls
 (b) Altering the plasticity of cell walls
 (c) Synthesizing new cell walls
 (d) Breaking down cell walls in growing cells
36. Which of the following were not observed in studies done on certain dwarf strains of plants ?
 (a) Applications of extracts of normal strains promoted growth of dwarf strains.
 (b) Dwarf strains grew normally if additional fertilizer was applied
 (c) Application of gibberellin A1 promoted growth of dwarf strains
 (d) Gibberellin caused little additional growth of normal strains.
37. The closure of lid of pitcher in pitcher plant is :
 (a) A paratonic movement
 (b) A tropic movement
 (c) A turgor movement
 (d) An autonomous movement
38. Which of the following instrument can be used to record plant growth by seconds?
 (a) Arc auxanometer (b) Arc indicator
 (c) Space marker disc (d) Crescograph
39. *Avena* coleoptile test to find out the quantity of growth promoting hormones was discovered by –
 (a) F.W. Went (b) L.J. Oudus
 (c) K.V. Thimann (d) F. Skoog
40. "Foolish seedling" disease of rice led to the discovery of
 (a) ABA (b) 2,4-D
 (c) IAA (d) GA
41. Which of the growth substance act as a stimulant during nodule formation in Leguminous plant ?
 (a) Ethylene (b) ABA
 (c) IAA (d) Morphactin
42. Indole-3 acetic acid called as auxin was first isolated from
 (a) Human urine (b) Corn germ oil
 (c) *Fusarium* (d) *Rhizopus*
43. Pruning of plants promotes branching, because the axillary buds get sensitized to –
 (a) Ethylene (b) Gibberellin
 (c) Cytokinin (d) IAA
44. Pineapple can be made to flower in off season by :
 (a) Ethylene
 (b) Zeatin
 (c) Napthalene Acetic Acid (NAA)
 (d) Temperature
45. Choose the wrongly matched pair from the following
 (a) Auxins – "to grow"
 (b) Gibberellins – "*Gibberella fujikuroi*"
 (c) Cytokinins – Herring sperm DNA
 (d) Absciscic acid – Flowering hormone

**RESPONSE
GRID**

32. (a) (b) (c) (d)	33. (a) (b) (c) (d)	34. (a) (b) (c) (d)	35. (a) (b) (c) (d)	36. (a) (b) (c) (d)
37. (a) (b) (c) (d)	38. (a) (b) (c) (d)	39. (a) (b) (c) (d)	40. (a) (b) (c) (d)	41. (a) (b) (c) (d)
42. (a) (b) (c) (d)	43. (a) (b) (c) (d)	44. (a) (b) (c) (d)	45. (a) (b) (c) (d)	

Space for Rough Work

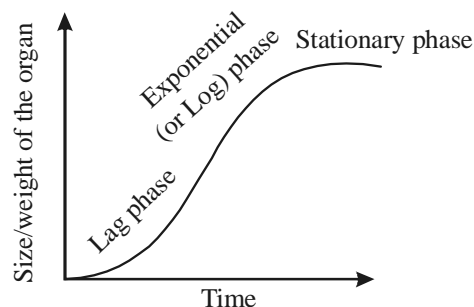
DAILY PRACTICE PROBLEM DPP CHAPTERWISE 15 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP/CB15

1. (d) Long day plants undergo flowering after receiving light above a critical day length. *e.g.* spinach, sugarbeet. Short day plants flower only when they receive light below a critical day length, *e.g.* *Glycine max*, tobacco.
2. (d) The hormone, which controls cell division and cell differentiation, is cytokinin. Both the auxin and gibberellins cause elongation of cell and plants.
3. (d) Long-day plants usually flower in the spring or early summer; they flower only if the light periods are longer than a critical length, which is usually 9-16 hours. For example, wheat plants flower only when light periods exceed fourteen hours.
4. (c)
5. (c) Absciscic acid (ABA), also known as abscisin II and dormin, is a plant hormone. It functions as many plant developmental processes, including bud dormancy. Absciscic acid is a derivative of carotenoids. It was called "abscisin II" originally because it was thought to play a major role in abscission of fruits. At about the same time another group was calling it "dormin" because they thought it had a major role in bud dormancy. The name absciscic acid (ABA) was coined by a compromise between the two groups.
6. (c) Differentiation of root is controlled by high auxin concentration. in tissue culture auxin concentration is made high to promote rooting.
7. (c) 8. (c) 9. (b) 10. (a) 11. (c)
12. (b)
13. (d) Parthenocarpy refers the development of fruits without fertilization. Such fruits are seedless but otherwise normal in appearance, *e.g.* banana, pineapple etc. The auxins (IAA, IBA, 2, 4-D) are applied in low concentration in a lanolin paste to the stigma of flower to induce parthenocarpy.
14. (c) 15. (a)
16. (b) Cytokinin are usually amino purine so they resemble nucleic acids in structural aspects.
17. (a) Natural auxin are naturally occurring auxin plant hormones which are called phytohormones. *Eg.* IAA and IBB. These are synthesized in shoot apices, leaf primordial and developing seeds from tryptophan. Some of the important synthetic auxins are 2, 4-D; 2, 4, 5-T (2, 4, 5- trichlorophenoxy acetic acid).
18. (c) 2, 4-Dichlorophenoxy acetic acid is used for causing defoliation of forest trees.
2, 4-D or 2, 4 dichlorophenoxy acetic acid is an auxin hormone. It stimulates the growth activities of the cells of the root due to which roots get destroyed and thus plants finally destroys. 2, 4-D is used as a defoliant for broad leaved dicots.
19. (d) 20. (a) 21. (c) 22. (d) 23. (b)
24. (c) Geometric growth is quite common in unicellular organisms when growth is nutrient rich medium. Here, every cell divides. The daughter cells grow and divide, the grand daughter cells repeat the process and so on. Number of cells in initially small so that initial growth is slow. Later on, there is rapid growth at exponential rate (log or exponential growth).
Sigmoid Growth Curve : Geometric growth cannot be sustained for long. Limited nutrient availability slows down the growth. It leads to stationary phase. Plotting the growth against time gives a typical sigmoid or S-curve. The exponential growth can be expressed as $W_1 = W_0 e^{rt}$

where $W_1 =$ final size (weight, height, number etc.)
 $W_0 =$ initial size at the beginning of the period
 $r =$ growth rate
 $t =$ time of growth
 $e =$ base of natural logarithms



25. (a) Low temperature required for vernalization is usually 0—5°C. In nature, the plants requiring vernalization are commonly biennials (*e.g.*, cabbage, sugarbeet, carrot), which complete their life cycle in two years. They germinate and grow vegetatively in the first year and produce flowers in the second year of growth. These plants fulfill their cold requirement during winters. However, such biennial plants can be made to flower in one growing season by providing low temperature treatment (*i.e.*, 0—5°C temperature) to young plants or moistened seeds.
26. (c) The pulse of red light converts P_r to P_{fr} . Subsequent pulses of far-red light stimulate changes that lead to chlorophyll synthesis.
27. (d) Mechanical abrasion, leaching of inhibitors by water, and exposure to fire may all trigger germination, but actual germination cannot begin until the seed imbibes water.
28. (b) Ethylene gas promotes senescence and is one of the by products of burning your gas grill. You should move your grill or your camellia bush.
29. (b) Less of chlorophyll and degeneration of proteins are the two important symptoms of senescence. Cytokinins delay these processes and, thus the senescence is also delayed. This effect of cytokinin is known as Richmond-Lang effect.
30. (d) Receptors receive environmental cues and trigger hormone release or a signal transduction pathway that involves hormones. The signal alters gene expression by altering genes which are transcribed and translated. Cellular response depends on expression of those genes.
31. (b) The ratios of cytokinins to auxins control cell differentiation in plant tissue culture. When both are present in relatively equal quantities, cells divide but do not differentiate. If there is more of cytokinin than auxin, shoot buds develop from a callus. If there is relatively more auxin than cytokinins, roots develop. Thus proportion of these two hormones control organ formation in callus tissues. Absciscic acid (ABA) is a naturally occurring growth inhibitor.
32. (c) Cryptochromes respond to blue and ultraviolet light.
33. (d) The curvature induced in plant organs in response to the unidirectional light is called phototropism.
34. (a) The first naturally occurring auxin was isolated by Kogl and Haagen-Smit (1931) from human urine. It was identified as

auxin-a (auxentriolic acid). Later, in 1934 Kogl, Haagen-Smit and Erxleben obtained another auxin called auxin-b (auxenolonic acid) from corn germ oil (extracted from germinating corn seeds).

- 35. (b) Altering the plasticity allows for permanent changes in cell wall shape. The cell wall must increase in size in order for cell growth to occur.
- 36. (b) Dwarf strains were genetically unable to produce gibberellin, so additional fertilizers would have no effect.
- 37. (a) Paratonic movements are induced by external stimuli.
- 38. (d) 39. (a) 40. (d) 41. (c) 42. (a)
- 43. (c) Pruning of plants promotes branching, because the axillary buds get sensitized to cytokinin.
- 44. (c) 45. (d)