

9 Plant Physiology ICAR SEPT 2022

Topic:- GEN KNOW COMMON PHD

1) Colour of the tag used on certified seed bags is[Question ID = 16958][Question Description = 101_221_GKD_SEP22_Q01]

1. Blue [Option ID = 37829]
2. Purple [Option ID = 37830]
3. White [Option ID = 37831]
4. Golden Yellow [Option ID = 37832]

2) Following are the statements regarding the Usar soil -

- A. It is reclaimed by adding lime.
- B. This soil has pH more than seven.
- C. Paddy crop can be grown in this soil.

Choose the *correct* answer from the options given below:

[Question ID = 16959][Question Description = 102_221_GKD_SEP22_Q02]

1. A and B only [Option ID = 37833]
2. B and C only [Option ID = 37834]
3. C only [Option ID = 37835]
4. A only [Option ID = 37836]

3) When total utility of a commodity increases, marginal utility will be

[Question ID = 16960][Question Description = 103_221_GKD_SEP22_Q03]

1. Negative but increasing
[Option ID = 37837]
2. Positive but decreasing
[Option ID = 37838]
3. Constant
[Option ID = 37839]
4. Either positive or negative
[Option ID = 37840]

4) Where is the headquarter of International Fund for Agriculture Development located?

[Question ID = 16961][Question Description = 104_221_GKD_SEP22_Q04]

1. Vienna, Austria
[Option ID = 37841]
2. Rome, Italy
[Option ID = 37842]
3. New York, USA
[Option ID = 37843]
4. Berlin, Germany
[Option ID = 37844]

5) Mid-Oceanic Ridges are one of the important divisions of the ocean floor. In this respect, point out the incorrect statement regarding the 'Mid-Oceanic Ridges'. [Question ID = 16962][Question Description = 105_221_GKD_SEP22_Q05]

1. It is the largest mountain chain on the surface of the earth [Option ID = 37845]
2. It is a series of interconnected chain within the ocean. [Option ID = 37846]
3. It is characterised by a central rift system [Option ID = 37847]
4. The rift system at the crest is the zone of very low volcanic activity. [Option ID = 37848]

6) Consider the following facts about the union territory of India and point out the one which is incorrect in relation to union territory. [Question ID = 16963][Question Description = 106_221_GKD_SEP22_Q06]

1. These are the areas under the direct control of central government. [Option ID = 37849]
2. Also known as the 'centrally administered territories. [Option ID = 37850]

3. These territories constitute a conspicuous departure from the unitary feature of India. [Option ID = 37851]
4. There is no uniformity in their administrative systems. [Option ID = 37852]

7) Variety of flora and fauna are found in the different types of forest in India. In this regard, species of trees like teak, *sal shisham*, *sandalwood*, etc. are found in which of the following type of forests in India?[Question ID = 16964][Question Description = 107_221_GKD_SEP22_Q07]

1. Tropical evergreen forests [Option ID = 37853]
2. Tropical thorn forests [Option ID = 37854]
3. Tropical deciduous forests [Option ID = 37855]
4. Montane forests [Option ID = 37856]

8) The Marginal Preference Theory of consumption behaviour was proposed by

[Question ID = 16965][Question Description = 108_221_GKD_SEP22_Q08]

1. Armstrong
[Option ID = 37857]
2. J.K.Hicks
[Option ID = 37858]
3. Neumann
[Option ID = 37859]
4. Edmund Cannon
[Option ID = 37860]

9) Point out the incorrect statements regarding the service sector in India.[Question ID = 16966][Question Description = 109_221_GKD_SEP22_Q09]

1. It is the highest contributor to GDP [Option ID = 37861]
2. It requires skilled labour [Option ID = 37862]
3. It is the fastest growing sector [Option ID = 37863]
4. It is restricted to very few sectors. [Option ID = 37864]

10) Consider the statements regarding the agriculture sector in India and point out the incorrect statement.[Question ID = 16967][Question Description = 110_221_GKD_SEP22_Q10]

1. Agriculture sector is the largest employer of workforce [Option ID = 37865]
2. It has contributed to the Gross Value Added (GVA) [Option ID = 37866]
3. Growth in allied sectors is the major drivers of overall growth in the sector. [Option ID = 37867]
4. Minimum Support Price (MSP) policy is used as to promote crop uniformity. [Option ID = 37868]

11) In case of related goods, the cross elasticity of demand is[Question ID = 16968][Question Description = 111_221_GKD_SEP22_Q11]

1. Low [Option ID = 37869]
2. High [Option ID = 37870]
3. Zero [Option ID = 37871]
4. Unity [Option ID = 37872]

12) With reference to organic farming in India, consider the following statements :

- A. The National Programme for Organic Production' (NPOP) is operated under the guidelines and directions of the Union Ministry of Rural Development.
- B. The Agricultural and Processed Food Products Export Development Authority' (APEDA) functions as the Secretariat for the implementation of NPOP.
- C. Sikkim has become India's first fully organic state.

Choose the *correct* answer from the options given below:

[Question ID = 16969][Question Description = 112_221_GKD_SEP22_Q12]

1. A and B only
[Option ID = 37873]
2. B and C only
[Option ID = 37874]
3. C only
[Option ID = 37875]
4. A, B and C

[Option ID = 37876]

13) With reference to the circumstances in Indian agriculture, the concept of "Conservation Agriculture" assumes significance. Which of the following falls under the Conservation Agriculture ?

- A. Avoiding the monoculture practices.
- B. Adopting minimum tillage.
- C. Avoiding the cultivation of plantation crops.
- D. Using crop residues to cover soil surface.
- E. Adopting spatial and temporal crop sequencing/ crop rotations.

Choose the *correct* answer from the options given below:

[Question ID = 16970][Question Description = 113_221_GKD_SEP22_Q13]

- 1. A, C and D only [Option ID = 37877]
- 2. B, C, D and E only [Option ID = 37878]
- 3. B, D and E only [Option ID = 37879]
- 4. A, B, C and E only [Option ID = 37880]

14) Consumers are likely to get a variety of goods in which kind of market competition[Question ID = 16971][Question Description = 114_221_GKD_SEP22_Q14]

- 1. Monopoly [Option ID = 37881]
- 2. Duopoly [Option ID = 37882]
- 3. Oligopoly [Option ID = 37883]
- 4. Monopolistic [Option ID = 37884]

15) What is the correct chronological order of the following laws enacted for the conservation and protection of environment ?

- A. Environment (Protection) Act.
- B. Water (Prevention & Control of Pollution) Act.
- C. Air (Prevention & Control of pollution) Act.
- D. National Green Tribunal Act.

Choose the *correct* answer from the options given below:

[Question ID = 16972][Question Description = 115_221_GKD_SEP22_Q15]

- 1. B, C, A, D [Option ID = 37885]
- 2. A, B, C, D [Option ID = 37886]
- 3. C, B, A, D [Option ID = 37887]
- 4. D, C, B, A [Option ID = 37888]

16) The scientific study of soil is[Question ID = 16973][Question Description = 116_221_GKD_SEP22_Q16]

- 1. Earth Study [Option ID = 37889]
- 2. Soil Science [Option ID = 37890]
- 3. Pedology [Option ID = 37891]
- 4. Soil Chemistry [Option ID = 37892]

17) *Triticum aestivum*, the common bread wheat is -

[Question ID = 16974][Question Description = 117_221_GKD_SEP22_Q17]

- 1. Tetraploid

[Option ID = 37893]

- 2. Hexaploid

[Option ID = 37894]

- 3. Haploid

[Option ID = 37895]

- 4. Diploid

[Option ID = 37896]

18) Sectoral inflation refers to[Question ID = 16975][Question Description = 118_221_GKD_SEP22_Q18]

- 1. Running inflation [Option ID = 37897]

2. Comprehensive inflation [Option ID = 37898]
3. Sporadic inflation [Option ID = 37899]
4. Creeping inflation [Option ID = 37900]

19) Keynes Liquidity trap refers to[Question ID = 16976][Question Description = 119_221_GKD_SEP22_Q19]

1. Speculative demand for money [Option ID = 37901]
2. Transactions motive of money is inelastic [Option ID = 37902]
3. Precautionary motive of money is inelastic [Option ID = 37903]
4. Transactions motive of money is constant [Option ID = 37904]

20) A business is solvent if[Question ID = 16977][Question Description = 120_221_GKD_SEP22_Q20]

1. Total receipts exceed total expenditures [Option ID = 37905]
2. Total debt exceeds total equity [Option ID = 37906]
3. Total sales exceed total cash expense [Option ID = 37907]
4. Total assets exceed total liabilities [Option ID = 37908]

Topic:- Crop Sc 3_PHD

1) Which of the following statement is NOT true about telomerase?

[Question ID = 2851][Question Description = 101_54_CRP_SEP22_Q01]

1. Telomerase contains a ribozyme. [Option ID = 11401]
2. Telomerase activity decreases as the cell ages. [Option ID = 11402]
3. Telomere synthesis requires the 3' end of the chromosome as primer and proceeds in usual 5'→3' direction. [Option ID = 11403]
4. Telomere synthesis requires the 5' end of the chromosome as primer and proceeds in usual 3'→5' direction. [Option ID = 11404]

2) Read the following statements-

- A. Peptide bond of the protein is formed by the enzyme peptidase.
- B. The primary structure of a protein is a sequence of amino acids joined by a peptide bond.
- C. Tertiary structure of a protein is stabilized by ionic, hydrogen, and covalent bonds.
- D. The hydrophilic/hydrophobic character of amino acid residues is important to the tertiary structure of a protein.
- E. The ability of peptide bonds to form intramolecular hydrogen bonds is important to secondary structure.

Choose the *correct* answer from the options given below:

[Question ID = 2852][Question Description = 102_54_CRP_SEP22_Q02]

1. A, B and D only [Option ID = 11405]
2. B, C and D only [Option ID = 11406]
3. B, D and E only [Option ID = 11407]
4. C, D and E only [Option ID = 11408]

3) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Enzyme becomes inactive at below minimum temperature.

Reason R: The inactivity of the enzymes is due to denaturation.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2853][Question Description = 103_54_CRP_SEP22_Q03]

1. Both A and R are correct and R is the correct explanation of A. [Option ID = 11409]
2. Both A and R are correct but R is **NOT** the correct explanation of A. [Option ID = 11410]
3. A is correct but R is not correct. [Option ID = 11411]
4. A is not correct but R is correct. [Option ID = 11412]

4) Who discovered the enzyme reverse transcriptase?[Question ID = 2854][Question Description = 104_54_CRP_SEP22_Q04]

1. Temin and Kornberg [Option ID = 11413]
2. Kornberg and Baltimore [Option ID = 11414]
3. Grunberg and Ochoa [Option ID = 11415]
4. Temin and Baltimore [Option ID = 11416]

5) Which of the following mechanisms will remove uracil and incorporate the correct base?

[Question ID = 2855][Question Description = 105_54_CRP_SEP22_Q05]

1. Nucleotide excision repair [Option ID = 11417]

2. Double-strand break repair [Option ID = 11418]
3. Mismatch repair [Option ID = 11419]
4. Base excision repair [Option ID = 11420]

6) Which of the following statement is NOT correct about genetic codons?

[Question ID = 2856][Question Description = 106_54_CRP_SEP22_Q06]

1. An amino acid may be specified by more than one codon. [Option ID = 11421]
2. AUG is the most common signal for the beginning of a polypeptide in all cells. [Option ID = 11422]
3. Genetic codons are triplet of nucleotide that codes for a specific amino acid. [Option ID = 11423]
4. Genetic codons are read in successive and overlapping fashion. [Option ID = 11424]

7) What are the smallest terpenes, containing a single isoprene unit named?[Question ID = 2857][Question Description = 107_54_CRP_SEP22_Q07]

1. Hemiterpenes [Option ID = 11425]
2. Monoterpenes [Option ID = 11426]
3. Sesquiterpenes [Option ID = 11427]
4. Diterpenes [Option ID = 11428]

8) Given below are two statements-

Statement I: Compatible solutes/osmolytes are the organic compounds that are osmotically inactive in the cell and do not destabilize the membrane, when plants are under stress.

Statement II: Plant cells can tolerate high concentration of these compounds without any detrimental effect on metabolism.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2858][Question Description = 108_54_CRP_SEP22_Q08]

1. Both Statement I and Statement II are true [Option ID = 11429]
2. Both Statement I and Statement II are false [Option ID = 11430]
3. Statement I is true but Statement II is false [Option ID = 11431]
4. Statement I is false but Statement II is true [Option ID = 11432]

9) The molarity of a solution of substance express the number of moles of the substance in _____[Question ID = 2859]

[Question Description = 109_54_CRP_SEP22_Q09]

1. One cubic centimeter of solution [Option ID = 11433]
2. One cubic decimeter of solution [Option ID = 11434]
3. One cubic millimeter of solution [Option ID = 11435]
4. One milliliter of solution [Option ID = 11436]

10) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Most of the wood fungi grow well on barks/logs/woods.

Reason R : Wood fungi have the enzyme cellulase which breaks the β (1 \rightarrow 4) glycosidic bond in cellulose and get the metabolized sugar for themselves.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2860][Question Description = 110_54_CRP_SEP22_Q10]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11437]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11438]
3. A is true but R is false [Option ID = 11439]
4. A is false but R is true [Option ID = 11440]

11) Which of the following enzyme is responsible for hydrolysis of stored triacylglycerols to release fatty acids in germinating seeds?

[Question ID = 2861][Question Description = 111_54_CRP_SEP22_Q11]

1. Laccases [Option ID = 11441]
2. Lipoygenases [Option ID = 11442]
3. Co-Lipases [Option ID = 11443]
4. Lipases [Option ID = 11444]

12) Which of the following is the only vitamin containing a trace element, cobalt (Co)?

[Question ID = 2862][Question Description = 112_54_CRP_SEP22_Q12]

1. Vitamin B₂ [Option ID = 11445]
2. Vitamin B₁₂ [Option ID = 11446]
3. Vitamin B₇ [Option ID = 11447]
4. Vitamin B₆ [Option ID = 11448]

13) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Hygroscopic water is held by soil particles of colloidal complex due to adhesive force.

Reason R : Hygroscopic water is generally available water to plant roots.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2863][Question Description = 113_54_CRP_SEP22_Q13]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11449]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11450]
3. A is true but R is false [Option ID = 11451]
4. A is false but R is true [Option ID = 11452]

14) Who defined “enzymes” as simple or compound proteins acting as specific catalysts?[Question ID = 2864][Question Description = 114_54_CRP_SEP22_Q14]

1. Buchner (1897) [Option ID = 11453]
2. Kuhne (1898) [Option ID = 11454]
3. Porter (1955) [Option ID = 11455]
4. Mayrback (1952) [Option ID = 11456]

15) Given below are two statements-

Statement I: Reduced CO₂ concentration favours opening of stomata while an increase in CO₂ concentration promotes stomatal closing.

Statement II: Accumulation of abscisic acid causes closing of stomata in plants.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2865][Question Description = 115_54_CRP_SEP22_Q15]

1. Both Statement I and Statement II are true [Option ID = 11457]
2. Both Statement I and Statement II are false [Option ID = 11458]
3. Statement I is true but Statement II is false [Option ID = 11459]
4. Statement I is false but Statement II is true [Option ID = 11460]

16) Match List I with List II

List I	List II
Plant Hormone	Function
A. Auxin	I. Hyponasty of leaves
B. Gibberellin	II. Prevention of premature drop of fruits
C. Cytokinin	III. Increases chlorophyllase activity
D. Ethylene	IV. Delay of senescence

Choose the correct answer from the options given below:

[Question ID = 2866][Question Description = 116_54_CRP_SEP22_Q16]

1. A - II, B - III, C - IV, D - I [Option ID = 11461]
2. A - I, B - II, C - III, D - IV [Option ID = 11462]
3. A - II, B - I, C - IV, D - III [Option ID = 11463]
4. A - IV, B - I, C - II, D - III [Option ID = 11464]

17) Given below are two statements-

Statement I: Molybdenum deficiency in plants is characterized by wilting of terminal shoots followed by frequent death.

Statement II: Boron deficient plants produce lesser number of flowers and are sterile or lacking.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2867][Question Description = 117_54_CRP_SEP22_Q17]

1. Both Statement I and Statement II are true [Option ID = 11465]
2. Both Statement I and Statement II are false [Option ID = 11466]
3. Statement I is true but Statement II is false [Option ID = 11467]
4. Statement I is false but Statement II is true [Option ID = 11468]

18) Consider the following statements-

- A. Water, aeration and temperature are the most important factors which influence seed germination.
- B. Light plays a meagre role in seed germination.
- C. The seed viability is lost when anabolism is exceeded by catabolism.
- D. Generally, carbon dioxide reduces the percentage of germination.

Choose the *correct* answer from the options given below:

[Question ID = 2868][Question Description = 118_54_CRP_SEP22_Q18]

- 1. A, B and C only [Option ID = 11469]
- 2. A, C and D only [Option ID = 11470]
- 3. B, C and D only [Option ID = 11471]
- 4. A, B and D only [Option ID = 11472]

19) Who proposed the theory of two-phase flowering?[Question ID = 2869][Question Description = 119_54_CRP_SEP22_Q19]

- 1. Chailakhyan (1968) [Option ID = 11473]
- 2. Lobimenka and Scheglova (1938) [Option ID = 11474]
- 3. Knott (1934) [Option ID = 11475]
- 4. Bunning (1958) [Option ID = 11476]

20) Who proposed the Osmotic theory for water absorption?

[Question ID = 2870][Question Description = 120_54_CRP_SEP22_Q20]

- 1. Atkins and Priestly [Option ID = 11477]
- 2. Thimann [Option ID = 11478]
- 3. Karner [Option ID = 11479]
- 4. Levitt [Option ID = 11480]

21) Given below are two statements-

Statement I: Transpiration may occur through the cuticle, lenticels or stomata.

Statement II: Transpiration creates suction force and helps in the ascent of sap.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2871][Question Description = 121_54_CRP_SEP22_Q21]

- 1. Both Statement I and Statement II are correct [Option ID = 11481]
- 2. Both Statement I and Statement II are incorrect [Option ID = 11482]
- 3. Statement I is correct but Statement II is incorrect [Option ID = 11483]
- 4. Statement I is incorrect but Statement II is correct [Option ID = 11484]

22) Match List I with List II

List I	List II
Scientist	Proposed theory
A. Godlewski	I. Pulsation theory
B. J. C. Bose	II. Relay pump theory
C. Boehm	III. Transpiration pull theory
D. Dixon and Jolly	IV. Capillarity

Choose the correct answer from the options given below:

[Question ID = 2872][Question Description = 122_54_CRP_SEP22_Q22]

- 1. A - III, B - IV, C - I, D - II [Option ID = 11485]
- 2. A - III, B - I, C - IV, D - II [Option ID = 11486]
- 3. A - II, B - I, C - IV, D - III [Option ID = 11487]
- 4. A - II, B - IV, C - I, D - III [Option ID = 11488]

23) Given below are two statements-

Statement I: Each photon contains an amount of energy that is called a quantum.

Statement II: Quantum yield of photosynthesis is ratio of number of photochemical products to total number of quanta absorbed.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2873][Question Description = 123_54_CRP_SEP22_Q23]

1. Both Statement I and Statement II are correct [Option ID = 11489]
2. Both Statement I and Statement II are incorrect [Option ID = 11490]
3. Statement I is correct but Statement II is incorrect [Option ID = 11491]
4. Statement I is incorrect but Statement II is correct [Option ID = 11492]

24) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Tryptophan is primary precursor of IAA in plants.

Reason R: TIBA inhibits polar auxin transport and called as antiauxins.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2874][Question Description = 124_54_CRP_SEP22_Q24]

1. Both A and R are correct and R is the correct explanation of A [Option ID = 11493]
2. Both A and R are correct but R is NOT the correct explanation of A [Option ID = 11494]
3. A is correct but R is not correct [Option ID = 11495]
4. A is not correct but R is correct [Option ID = 11496]

25) Given below are two statements-

Statement I: Seeds with life span of a few weeks to 4 years are known as “Microbiotic seeds”.

Statement II: Seeds with life span varying from 15 years to 100 years or more are known as “Macrobiotic seeds”.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2875][Question Description = 125_54_CRP_SEP22_Q25]

1. Both Statement I and Statement II are correct [Option ID = 11497]
2. Both Statement I and Statement II are incorrect [Option ID = 11498]
3. Statement I is correct but Statement II is incorrect [Option ID = 11499]
4. Statement I is incorrect but Statement II is correct [Option ID = 11500]

26) Match List I with List II

List I	List II
Scientists	Associated with
A. W Arber, D Nathans, and H O Smith	I. RNA interference (RNAi)
B. A Z Fire and C C Mello	II. CRISPR Technology
C. Marc V Montagu, M D Chilton, and R Fraley	III. Recombinant DNA technology using restriction endonuclease
D. J Doudna and E Charpentier	IV. <i>Agrobacterium</i> -mediated genetic transformation

Choose the correct answer from the options given below:

[Question ID = 2876][Question Description = 126_54_CRP_SEP22_Q26]

1. A - III, B - II, C - I, D - IV [Option ID = 11501]
2. A - III, B - IV, C - I, D - II [Option ID = 11502]
3. A - III, B - I, C - IV, D - II [Option ID = 11503]
4. A - I, B - II, C - III, D - IV [Option ID = 11504]

27) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Golden Rice (GR) is rich in pro-vitamin A.

Reason R: GR is engineered with two genes (*psy* and *crtl*) of the beta-carotene biosynthesis pathway.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2877][Question Description = 127_54_CRP_SEP22_Q27]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11505]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11506]
3. A is true but R is false [Option ID = 11507]
4. A is false but R is true [Option ID = 11508]

28) Which of the following strategy was used in genetically engineered *Rainbow* papaya to control ringspot virus?[Question ID = 2878][Question Description = 128_54_CRP_SEP22_Q28]

1. Antisense RNA approach [Option ID = 11509]
2. Ribozyme [Option ID = 11510]
3. cDNA of RNA satellite [Option ID = 11511]
4. Coat protein gene [Option ID = 11512]

29) Which of the following component is enriched/fortified in CRISPR-edited tomatoes commercialized in Japan?

[Question ID = 2879][Question Description = 129_54_CRP_SEP22_Q29]

1. Enriched with omega-3-fatty acids [Option ID = 11513]
2. Fortified with Fe and Zn [Option ID = 11514]
3. Enriched in gamma-aminobutyric acid [Option ID = 11515]
4. Enriched in lycopene and anthocyanin [Option ID = 11516]

30) Which population type do NAM and MAGIC represents?

[Question ID = 2880][Question Description = 130_54_CRP_SEP22_Q30]

1. Eco-tilling population [Option ID = 11517]
2. Uni-parental population [Option ID = 11518]
3. Multi-parent population [Option ID = 11519]
4. Bi-parental population [Option ID = 11520]

31) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Biological Nitrogen Fixation (BNF) converts N_2 gas to ammonia (NH_3).

Reason R: BNF are catalyzed by a *nitrogenase* protein complex in legumes.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2881][Question Description = 131_54_CRP_SEP22_Q31]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11521]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11522]
3. A is true but R is false [Option ID = 11523]
4. A is false but R is true [Option ID = 11524]

32) Who among the following first reported generation of haploid plants from pollen grains?

[Question ID = 2882][Question Description = 132_54_CRP_SEP22_Q32]

1. Murashige and Skoog [Option ID = 11525]
2. Maheshwari and Guha [Option ID = 11526]
3. Nitch and Nitch [Option ID = 11527]
4. Reinert and Steward [Option ID = 11528]

33) Which of the following is the main effect of cytokinins in the tissue culture system?

[Question ID = 2883][Question Description = 133_54_CRP_SEP22_Q33]

1. Adventitious root formation [Option ID = 11529]
2. Induction of somatic embryos [Option ID = 11530]
3. Adventitious shoot formation [Option ID = 11531]
4. Shoot elongation [Option ID = 11532]

34) How many sister chromatids are present in the maize (*Zea mays*) plant cell that is entering the first meiotic division?

[Question ID = 2884][Question Description = 134_54_CRP_SEP22_Q34]

1. 10 [Option ID = 11533]
2. 20 [Option ID = 11534]
3. 30 [Option ID = 11535]
4. 40 [Option ID = 11536]

35) Given below are two statements

Statement I: Watson and Crick proposed semi-conservative DNA replication.

Statement II: ^{35}S is used in proving semi-conservative DNA replication.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2885][Question Description = 135_54_CRP_SEP22_Q35]

1. Both Statement I and Statement II are true [Option ID = 11537]
2. Both Statement I and Statement II are false [Option ID = 11538]
3. Statement I is true but Statement II is false [Option ID = 11539]
4. Statement I is false but Statement II is true [Option ID = 11540]

36) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Mismatch repair system is dependent on the methylation.

Reason R: MutS is a site-specific endonuclease that acts only on the hemimethylated GATC sequence.

In light of the above statements, choose the correct answer from the options given below:

[Question ID = 2886][Question Description = 136_54_CRP_SEP22_Q36]

- Both A and R are true and R is the correct explanation of A [Option ID = 11541]
- Both A and R are true but R is NOT the correct explanation of A [Option ID = 11542]
- A is true but R is false [Option ID = 11543]
- A is false but R is true [Option ID = 11544]

37) What is the histone octamer made of?

[Question ID = 2887][Question Description = 137_54_CRP_SEP22_Q37]

- 5 types of histones [Option ID = 11545]
- 8 types of histones [Option ID = 11546]
- 8 histones of 4 different types [Option ID = 11547]
- 6 histones of 3 different types [Option ID = 11548]

38) Match List I with List II

List I	List II
Enzyme	Function
A. Alkaline phosphatase	I. Removes nucleotide residues from the 3' ends of a DNA strand.
B. Polynucleotide kinase	II. Cleave DNA molecules at a specific base sequence.
C. Exonuclease III	III. Removes terminal phosphates from the 5' or 3' end (or both).
D. Type II restriction endonucleases	IV. Joins two DNA molecules or fragments.
E. DNA ligase	V. Adds a phosphate to the 5'-OH end of a polynucleotide to label it or permit ligation.

Choose the correct answer from the options given below:

[Question ID = 2888][Question Description = 138_54_CRP_SEP22_Q38]

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

[Option ID = 11549]

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

[Option ID = 11550]

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

[Option ID = 11551]

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

[Option ID = 11552]

39) Match List I with List II

List I	List II
Genes / Its products	Gene product / Function
A. <i>fixLJ</i>	I. Membrane bound cytochrome oxidase
B. <i>fixNOQP</i>	II. Oxygen responsive regulator
C. <i>nifH</i>	III. Negative regulator
D. NifA	IV. Dinitrogenase reductase
E. NifL	V. Positive regulator

Choose the correct answer from the options given below:

[Question ID = 2889][Question Description = 139_54_CRP_SEP22_Q39]

- A - V, B - III, C - II, D - I, E - IV [Option ID = 11553]
- A - IV, B - V, C - III, D - II, E - I [Option ID = 11554]
- A - II, B - I, C - IV, D - V, E - III [Option ID = 11555]
- A - II, B - V, C - IV, D - I, E - III [Option ID = 11556]

40) Common cause of gastrointestinal illness due to contaminated water and the leading cause of GI illnesses worldwide is _____.

[Question ID = 2890][Question Description = 140_54_CRP_SEP22_Q40]

- Legionella pneumophila* [Option ID = 11557]
- Toxoplasma* [Option ID = 11558]
- Norovirus [Option ID = 11559]
- Clostridium perfringens* [Option ID = 11560]

41) Match List I with List II

List I	List II
Primary/Secondary Metabolites	Commercial significance
A. Glutamic acid	I. Anticancer agent
B. Phenylalanine	II. Cholesterol lowering agent
C. Lysine	III. Antiparasitic agent
D. Lovastatin	IV. Precursor agent of aspartame
E. Avermectin	V. Flavour enhancer agent
F. Bleomycin	VI. Feed supplement agent

Choose the correct answer from the options given below:

[Question ID = 2891][Question Description = 141_54_CRP_SEP22_Q41]

1. A - IV , B - VI , C - II , D - V , E - I , F - III [Option ID = 11561]
2. A - V , B - IV , C - VI , D - II , E - III , F - I [Option ID = 11562]
3. A - III , B - VI , C - II , D - V , E - I , F - IV [Option ID = 11563]
4. A - VI , B - III , C - V , D - I , E - IV , F - II [Option ID = 11564]

42) Given below are two statements-

Statement I: As of now, 11 types of biofertilizers (bacterial and fungal) are approved under Fertilizer Control Order in India.

Statement II: Since not approved under FCO, algal biofertilizers like blue green algae are not available in the market.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2892][Question Description = 142_54_CRP_SEP22_Q42]

1. Both Statement I and Statement II are correct [Option ID = 11565]
2. Both Statement I and Statement II are incorrect [Option ID = 11566]
3. Statement I is correct but Statement II is incorrect [Option ID = 11567]
4. Statement I is incorrect but Statement II is correct [Option ID = 11568]

43) In statistics, skewness is referred to _____.

[Question ID = 2893][Question Description = 143_54_CRP_SEP22_Q43]

1. Measure of peakedness [Option ID = 11569]
2. Measure of convexity [Option ID = 11570]
3. Lack of symmetry [Option ID = 11571]
4. Measure of chance that an event occurs [Option ID = 11572]

44) Given below are two statements-

Statement I: Ion torrent sequencing method measures the release of protons (H⁺) each time a new deoxyribonucleotide is added to a growing strand of DNA and the resulting pH change by an electrode.

Statement II: In nanopore sequencing method, a DNA double helix is allowed to passthrough a protein nanopore, which causes changes in electric current that are base specific.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2894][Question Description = 144_54_CRP_SEP22_Q44]

1. Both Statement I and Statement II are true [Option ID = 11573]
2. Both Statement I and Statement II are false [Option ID = 11574]
3. Statement I is true but Statement II is false [Option ID = 11575]
4. Statement I is false but Statement II is true [Option ID = 11576]

45) The term "Vaccines" derived from Latin word *vacca*, meaning_____. [Question ID = 2895][Question Description = 145_54_CRP_SEP22_Q45]

1. Cow [Option ID = 11577]
2. Sheep [Option ID = 11578]
3. Fox [Option ID = 11579]
4. Goat [Option ID = 11580]

46) Which of the following statements are true regarding electron microscopy?

- A. Produces good magnification but inferior resolution over light microscopy.
- B. Uses electron beam with wavelength of 0.05 Å°.
- C. Microbes can be viewed in living state under transmission electron microscope.

D. Scanning electron microscope can reveal striking three dimensional picture of specimen.

Choose the *correct* answer from the options given below:

[Question ID = 2896][Question Description = 146_54_CRP_SEP22_Q46]

1. A, B and D only [Option ID = 11581]
2. A, C and D only [Option ID = 11582]
3. B and D only [Option ID = 11583]
4. A and D only [Option ID = 11584]

47) Which of the following organisms are capable of using either respiratory or fermentation processes, depending on the availability of oxygen in the cultural environment?

[Question ID = 2897][Question Description = 147_54_CRP_SEP22_Q47]

1. Obligate anaerobes [Option ID = 11585]
2. Facultative anaerobes [Option ID = 11586]
3. Obligate aerobes [Option ID = 11587]
4. Microaerophiles [Option ID = 11588]

48) Given below are two statements-

Statement I: Autotroph can derive its carbon from carbon dioxide.

Statement II: Lithotroph is an organism that uses organic molecules as sources of electron.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2898][Question Description = 148_54_CRP_SEP22_Q48]

1. Both Statement I and Statement II are true [Option ID = 11589]
2. Both Statement I and Statement II are false [Option ID = 11590]
3. Statement I is true but Statement II is false [Option ID = 11591]
4. Statement I is false but Statement II is true [Option ID = 11592]

49) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Nitrogenase enzyme complex is highly sensitive to oxygen and must be protected from oxygen inactivation for nitrogen fixation process.

Reason R : *Azotobacter* forms specialized cell structure called heterocyst to prevent oxygen inactivation of nitrogenase.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2899][Question Description = 149_54_CRP_SEP22_Q49]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11593]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11594]
3. A is true but R is false [Option ID = 11595]
4. A is false but R is true [Option ID = 11596]

50) Which of the following method is used to determine species richness in soil sample?[Question ID = 2900][Question Description = 150_54_CRP_SEP22_Q50]

1. Viable plate count [Option ID = 11597]
2. Fatty acid methyl ester profiles [Option ID = 11598]
3. Soil respiration [Option ID = 11599]
4. Soil enzymes activity [Option ID = 11600]

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1) Match List I with List II

List I	List II
Cell organelle	Function
A. Peroxisomes	I. Site of hydrolytic enzymes
B. Spherosomes	II. Site of protein synthesis
C. Glyoxysomes	III. Concerned with photorespiration
D. Ribosomes	IV. Concerned with glyoxylate metabolism

Choose the correct answer from the options given below:

[Question ID = 2951][Question Description = 101_51_PHC_SEP22_Q01]

1. A - III, B - IV, C - I, D - II [Option ID = 11801]
2. A - III, B - I, C - IV, D - II [Option ID = 11802]
3. A - II, B - I, C - IV, D - III [Option ID = 11803]
4. A - II, B - IV, C - I, D - III [Option ID = 11804]

2) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Active absorption of water occurs due to root activity and not the shoot activity.

Reason R: It may be either due to osmotic mechanism or due to non-osmotic mechanism.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2952][Question Description = 102_51_PHC_SEP22_Q02]

1. Both A and R are correct and R is the correct explanation of A [Option ID = 11805]
2. Both A and R are correct but R is NOT the correct explanation of A [Option ID = 11806]
3. A is correct but R is not correct [Option ID = 11807]
4. A is not correct but R is correct [Option ID = 11808]

3) Who coined the term water potential?

[Question ID = 2953][Question Description = 103_51_PHC_SEP22_Q03]

1. R. Brown [Option ID = 11809]
2. Slatyer and Taylor [Option ID = 11810]
3. Abbe Nollet [Option ID = 11811]
4. Renner [Option ID = 11812]

4) Given below are two statements-

Statement I: The amount of water which is retained by the soil after rains or irrigation of fields is termed as field capacity of the soil.

Statement II: Clay soil has highest water holding capacity.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2954][Question Description = 104_51_PHC_SEP22_Q04]

1. Both Statement I and Statement II are correct [Option ID = 11813]
2. Both Statement I and Statement II are incorrect [Option ID = 11814]
3. Statement I is correct but Statement II is incorrect [Option ID = 11815]
4. Statement I is incorrect but Statement II is correct [Option ID = 11816]

5) Given below are two statements-

Statement I: Michaelis constant is reflection of the affinity of enzyme for its substrate.

Statement II: The smaller the value of K_m , the more strongly the enzyme binds the substrate.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2955][Question Description = 105_51_PHC_SEP22_Q05]

1. Both Statement I and Statement II are correct [Option ID = 11817]
2. Both Statement I and Statement II are incorrect [Option ID = 11818]
3. Statement I is correct but Statement II is incorrect [Option ID = 11819]
4. Statement I is incorrect but Statement II is correct [Option ID = 11820]

6) Match List I with List II

List I	List II
Pigment	Absorption peaks in nm
A. Chlorophyll a	I. 453, 642
B. Chlorophyll b	II. 435, 662
C. Xanthophylls	III. 618
D. Phycocyanins	IV. 440, 490

Choose the correct answer from the options given below:

[Question ID = 2956][Question Description = 106_51_PHC_SEP22_Q06]

1. A - III, B - IV, C - I, D - II [Option ID = 11821]
2. A - III, B - I, C - IV, D - II [Option ID = 11822]
3. A - II, B - I, C - IV, D - III [Option ID = 11823]
4. A - II, B - IV, C - I, D - III [Option ID = 11824]

7) Given below are two statements-

Statement I: Photosystem I produces a strong reductant, capable of reducing NADP⁺, and a weak oxidant.

Statement II: Photosystem II produces a very strong oxidant, capable of oxidizing water, and a weaker reductant than the one produced by photosystem I.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2957][Question Description = 107_51_PHC_SEP22_Q07]

1. Both Statement I and Statement II are correct [Option ID = 11825]
2. Both Statement I and Statement II are incorrect [Option ID = 11826]
3. Statement I is correct but Statement II is incorrect [Option ID = 11827]
4. Statement I is incorrect but Statement II is correct [Option ID = 11828]

8) Steps of bacterial infection in root cells -

- A. Multiplication of the rhizobia, colonization of the rhizosphere, and attachment to epidermal and root hair cells.
- B. Characteristic curling of the root hairs and invasion of the bacteria to form an infection thread.
- C. Nodule initiation and development in the root cortex.
- D. Release of the bacteria from the infection thread and their differentiation as specialized nitrogen-fixing cells.

Choose the *correct* answer from the options given below:

[Question ID = 2958][Question Description = 108_51_PHC_SEP22_Q08]

1. A, B, C, D [Option ID = 11829]
2. B, C, D, A [Option ID = 11830]
3. C, D, A, B [Option ID = 11831]
4. D, A, C, B [Option ID = 11832]

9) Who gave the physiological model " $Y_p = T \times TE \times HI$ " for yield under water limited conditions?

[Question ID = 2959][Question Description = 109_51_PHC_SEP22_Q09]

1. Passioura [Option ID = 11833]
2. Hubick [Option ID = 11834]
3. Tanner and Sinclair [Option ID = 11835]
4. Wright [Option ID = 11836]

10) Match List I with List II

List I	List II
Growth parameter	Definition
A. Relative Growth Rate (RGR)	I. Product of leaf area and the time period in which leaf area is maintained
B. Leaf Area Index (LAI)	II. Rate of increase in dry matter per unit dry matter
C. Leaf Area Duration (LAD)	III. Rate of increase in dry matter per unit leaf area
D. Net Assimilation Rate (NAR)	IV. Ratio of leaf area to the ground area

Choose the correct answer from the options given below:

[Question ID = 2960][Question Description = 110_51_PHC_SEP22_Q10]

1. A - III, B - IV, C - I, D - II [Option ID = 11837]
2. A - III, B - I, C - IV, D - II [Option ID = 11838]
3. A - II, B - I, C - IV, D - III [Option ID = 11839]
4. A - II, B - IV, C - I, D - III [Option ID = 11840]

11) Given below are two statements-

Statement I: Phloem loading is transfer of photosynthates from mesophyll cells to sieve tube elements in the leaf.

Statement II: Phloem unloading is transfer of photosynthates from sieve tube elements to the receiver cells.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2961][Question Description = 111_51_PHC_SEP22_Q11]

1. Both Statement I and Statement II are correct [Option ID = 11841]
2. Both Statement I and Statement II are incorrect [Option ID = 11842]
3. Statement I is correct but Statement II is incorrect [Option ID = 11843]
4. Statement I is incorrect but Statement II is correct [Option ID = 11844]

12) Who proposed the pressure flow theory?

[Question ID = 2962][Question Description = 112_51_PHC_SEP22_Q12]

1. Thaine [Option ID = 11845]
2. Aikman and Anderson [Option ID = 11846]
3. Canny [Option ID = 11847]
4. Munch [Option ID = 11848]

13) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Proline solutes concentration increase in plant under water stress.

Reason R: Solutes accumulate during osmotic adjustment and generate a more negative leaf water potential, thereby helping to maintain water movement into the leaf and consequently, leaf turgor.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2963][Question Description = 113_51_PHC_SEP22_Q13]

1. Both A and R are correct and R is the correct explanation of A [Option ID = 11849]
2. Both A and R are correct but R is NOT the correct explanation of A [Option ID = 11850]
3. A is correct but R is not correct [Option ID = 11851]
4. A is not correct but R is correct [Option ID = 11852]

14) Given below are two statements-

Statement I: Plant exposed to stress are found to have higher levels of ABA.

Statement II: ABA induces closer of stomata.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2964][Question Description = 114_51_PHC_SEP22_Q14]

1. Both Statement I and Statement II are correct [Option ID = 11853]
2. Both Statement I and Statement II are incorrect [Option ID = 11854]
3. Statement I is correct but Statement II is incorrect [Option ID = 11855]
4. Statement I is incorrect but Statement II is correct [Option ID = 11856]

15) Given below are two statements-

Statement I: High temperature stress decreases leaf chlorophyll content.

Statement II: The degradation of chlorophyll molecules may be associated with production of reactive oxygen species under high temperature stress.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2965][Question Description = 115_51_PHC_SEP22_Q15]

1. Both Statement I and Statement II are correct [Option ID = 11857]
2. Both Statement I and Statement II are incorrect [Option ID = 11858]
3. Statement I is correct but Statement II is incorrect [Option ID = 11859]
4. Statement I is incorrect but Statement II is correct [Option ID = 11860]

16) Match List I with List II

List I	List II
Plant hormone	Characteristic
A. Auxin	I. Delay of senescence
B. Gibberellins	II. Abscission
C. Cytokinins	III. Apical bud dominance
D. ABA	IV. Breaking dormancy

Choose the correct answer from the options given below:

[Question ID = 2966][Question Description = 116_51_PHC_SEP22_Q16]

1. A - III, B - IV, C - I, D - II [Option ID = 11861]
2. A - III, B - I, C - IV, D - II [Option ID = 11862]
3. A - II, B - I, C - IV, D - III [Option ID = 11863]
4. A - II, B - IV, C - I, D - III [Option ID = 11864]

17) Which of the following is precursor for brassinolide?

[Question ID = 2967][Question Description = 117_51_PHC_SEP22_Q17]

1. Campesterol [Option ID = 11865]
2. Tryosine [Option ID = 11866]
3. Tryptophan [Option ID = 11867]
4. Zeatin [Option ID = 11868]

18) Given below are two statements-

Statement I: Zeatin is the most abundant and widely distributed natural cytokinin in higher plants.

Statement II: Cytokinin enhances conversion of etioplasts into chloroplasts when etiolated seedlings after treatment with cytokinins are exposed to light.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2968][Question Description = 118_51_PHC_SEP22_Q18]

1. Both Statement I and Statement II are correct [Option ID = 11869]
2. Both Statement I and Statement II are incorrect [Option ID = 11870]
3. Statement I is correct but Statement II is incorrect [Option ID = 11871]
4. Statement I is incorrect but Statement II is correct [Option ID = 11872]

19) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Gibberellins induce stem elongation.

Reason R: Auxin is transported basipetally.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2969][Question Description = 119_51_PHC_SEP22_Q19]

1. Both A and R are correct and R is the correct explanation of A [Option ID = 11873]
2. Both A and R are correct but R is NOT the correct explanation of A [Option ID = 11874]
3. A is correct but R is not correct [Option ID = 11875]
4. A is not correct but R is correct [Option ID = 11876]

20) Match List I with List II

List I	List II
Mineral nutrient	Deficiency symptom
A. Calcium	I. Whip tail of brassica
B. Iron	II. Tip hooking in cauliflower
C. Molybdenum	III. Grey speck in oat
D. Manganese	IV. Lime induced chlorosis

Choose the correct answer from the options given below:

[Question ID = 2970][Question Description = 120_51_PHC_SEP22_Q20]

1. A - III, B - IV, C - I, D - II [Option ID = 11877]
2. A - III, B - I, C - IV, D - II [Option ID = 11878]
3. A - II, B - I, C - IV, D - III [Option ID = 11879]
4. A - II, B - IV, C - I, D - III [Option ID = 11880]

21) Given below are two statements-

Statement I: Calcium is a component of the plant cell wall, particularly of the cementing substance Ca-pectate.

Statement II: Fe is highly immobile in the plant and not redistributed.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2971][Question Description = 121_51_PHC_SEP22_Q21]

1. Both Statement I and Statement II are correct [Option ID = 11881]
2. Both Statement I and Statement II are incorrect [Option ID = 11882]
3. Statement I is correct but Statement II is incorrect [Option ID = 11883]
4. Statement I is incorrect but Statement II is correct [Option ID = 11884]

22) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Boron plays important role in nitrogen metabolism.

Reason R: Boron is associated with the prosthetic group of the enzymes nitrate reductase and nitrogenase.

In light of the above statements, choose the *most appropriate* answer from the options given below :

[Question ID = 2972][Question Description = 122_51_PHC_SEP22_Q22]

1. Both A and R are correct and R is the correct explanation of A [Option ID = 11885]
2. Both A and R are correct but R is NOT the correct explanation of A [Option ID = 11886]
3. A is correct but R is not correct [Option ID = 11887]
4. A is not correct but R is correct [Option ID = 11888]

23) Which of the following mineral element is essential for the synthesis of tryptophan?

[Question ID = 2973][Question Description = 123_51_PHC_SEP22_Q23]

1. Boron [Option ID = 11889]
2. Zinc [Option ID = 11890]
3. Sodium [Option ID = 11891]
4. Copper [Option ID = 11892]

24) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Important property of the modified Hoagland formulation is that Nitrogen is supplied as both ammonium (NH_4^+) and nitrate (NO_3^-).

Reason R: Supplying Nitrogen in a balanced mixture of cations and anions tends to reduce the rapid rise in the pH of the medium that is commonly observed when the nitrogen is supplied solely as nitrate anion.

In light of the above statements, choose the *most appropriate* answer from the options given below:

[Question ID = 2974][Question Description = 124_51_PHC_SEP22_Q24]

1. Both A and R are correct and R is the correct explanation of A [Option ID = 11893]
2. Both A and R are correct but R is NOT the correct explanation of A [Option ID = 11894]
3. A is correct but R is not correct [Option ID = 11895]
4. A is not correct but R is correct [Option ID = 11896]

25) Who coined the term "Diffusion Pressure and Diffusion Pressure Deficit"?

[Question ID = 2975][Question Description = 125_51_PHC_SEP22_Q25]

1. Ruhland [Option ID = 11897]
2. R. Brown [Option ID = 11898]
3. Nathansohn [Option ID = 11899]
4. B. S. Meyer [Option ID = 11900]

26) Who demonstrated that N^{15} nitrogen of nitrate is readily converted to N^{15} ammonia? [Question ID = 2976][Question Description = 126_51_PHC_SEP22_Q26]

1. Brenner *et al.* (1961) [Option ID = 11901]
2. K. W. Joy (1964) [Option ID = 11902]
3. Spiegelman and Levinthal (1961) [Option ID = 11903]
4. Delwiche, Mendel and Visser (1951) [Option ID = 11904]

27) Match List I with List II

List I	List II
Radioactive Isotope	Half Life
A. ^{24}Na	I. 2.7 years
B. ^{33}P	II. 15.6 years
C. ^{45}Ca	III. 25.4 days
D. ^{55}Fe	IV. 153 days
E. ^{64}Cu	V. 12.8 hours

Choose the correct answer from the options given below:

[Question ID = 2977][Question Description = 127_51_PHC_SEP22_Q27]

1. A - II, B - III, C - IV, D - I, E - V [Option ID = 11905]
2. A - III, B - I, C - V, D - II, E - IV [Option ID = 11906]
3. A - III, B - IV, C - I, D - II, E - V [Option ID = 11907]
4. A - II, B - V, C - I, D - IV, E - III [Option ID = 11908]

28) Who proved that the movement of solutes in the phloem element is bidirectional? [Question ID = 2978][Question Description = 128_51_PHC_SEP22_Q28]

1. A. Dutchman and Z. Janssen (1961) [Option ID = 11909]
2. Biddulph and Cory (1965) [Option ID = 11910]
3. Korenberg and Dintzis (1961) [Option ID = 11911]
4. Holley and Nirenberg (1965) [Option ID = 11912]

29) Which organ forms the interface between the embryo and the starchy endosperm tissue in a single cotyledon seed?

[Question ID = 2979][Question Description = 129_51_PHC_SEP22_Q29]

1. Coleoptile [Option ID = 11913]
2. Mesocotyl [Option ID = 11914]
3. Scutellum [Option ID = 11915]
4. Aleurone layer [Option ID = 11916]

30) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : The mature seeds that fail to germinate under normal conditions exhibit primary dormancy.

Reason R : The primary dormancy is typically induced by abscisic acid (ABA) during seed maturation.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2980][Question Description = 130_51_PHC_SEP22_Q30]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11917]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11918]
3. A is true but R is false [Option ID = 11919]
4. A is false but R is true [Option ID = 11920]

31) According to the hormone balance theory, which plant hormones ratio is the primary determinant of seed dormancy?

[Question ID = 2981][Question Description = 131_51_PHC_SEP22_Q31]

1. Abscisic acid : Auxins [Option ID = 11921]
2. Abscisic acid : Cytokinins [Option ID = 11922]
3. Abscisic acid : Gibberellins [Option ID = 11923]
4. Gibberellins : Cytokinins [Option ID = 11924]

32) Which of the following is NOT an example of short day plant?[Question ID = 2982][Question Description = 132_51_PHC_SEP22_Q32]

1. *Nicotiana tabacum* [Option ID = 11925]
2. *Chenopodium rubrum* [Option ID = 11926]
3. *Phorbitis nil* [Option ID = 11927]
4. *Hyoscyamus niger* [Option ID = 11928]

33) Read the following statements-

A. Circadian rhythms and photoperiodism have the common property of responding to cycles of light and darkness.

B. The seasonal growth model explains the circadian oscillator that controls the timing of light sensitive and light-insensitive phases.

C. The inhibition of flowering in SDPs by night breaks was one of the first physiological processes shown to be under the control of phytochrome.

D. The ABC model partially explains the determination of floral organ identity, and it postulates that organ identity in each whorl is determined by a unique combination of the three organ identity gene activities.

Choose the *correct* answer from the options given below:

[Question ID = 2983][Question Description = 133_51_PHC_SEP22_Q33]

1. A, B and C only [Option ID = 11929]
2. A, C and D only [Option ID = 11930]
3. B, C and D only [Option ID = 11931]
4. A, B and D only [Option ID = 11932]

34) Given below are two statements-

Statement I: In phytochrome, the Type I phytochrome is encoded by *PHY A*, *PHY B* and *PHY C* genes while Type II phytochrome is encoded by *PHY D* and *PHY E* genes.

Statement II: The chromophore of phytochrome is synthesized in plastids while apoprotein is synthesized on nuclear genome.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2984][Question Description = 134_51_PHC_SEP22_Q34]

1. Both Statement I and Statement II are true [Option ID = 11933]
2. Both Statement I and Statement II are false [Option ID = 11934]
3. Statement I is true but Statement II is false [Option ID = 11935]
4. Statement I is false but Statement II is true [Option ID = 11936]

35) Which of the following statement is NOT correct?[Question ID = 2985][Question Description = 135_51_PHC_SEP22_Q35]

1. Water moves through the xylem by pressure-driven bulk flow. [Option ID = 11937]
2. Vessel elements tend to be longer and narrower than tracheids. [Option ID = 11938]
3. Vessel elements are found in angiosperms, a small group of gymnosperms called the Gnetales, and some ferns. [Option ID = 11939]
4. Tracheids are present in both angiosperms and gymnosperms, as well as in ferns and other groups of vascular plants. [Option ID = 11940]

36) Match List I with List II

List I	List II
Species	Length of juvenile period
A. Rose	I. 5-15 years
B. Grape	II. 5-8 years
C. Redwood	III. 20-30 days
D. Citrus	IV. 1 year
E. English oak	V. 25-30 years

Choose the correct answer from the options given below:

[Question ID = 2986][Question Description = 136_51_PHC_SEP22_Q36]

1. A - II, B - III, C - I, D - V, E - IV [Option ID = 11941]
2. A - III, B - I, C - IV, D - II, E - V [Option ID = 11942]
3. A - III, B - IV, C - I, D - II, E - V [Option ID = 11943]
4. A - II, B - IV, C - V, D - III, E - I [Option ID = 11944]

37) Given below are two statements-

Statement I: Zelitch (1963) proposed the proton-transport concept to explain the mechanism of opening and closing stomata.

Statement II: Levitt (1972) proposed that the production of glycolic acid in the guard cells is an important factor in stomatal opening.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2987][Question Description = 137_51_PHC_SEP22_Q37]

1. Both Statement I and Statement II are true [Option ID = 11945]
2. Both Statement I and Statement II are false [Option ID = 11946]
3. Statement I is true but Statement II is false [Option ID = 11947]
4. Statement I is false but Statement II is true [Option ID = 11948]

38) Which of the following fruit is categorized under non-climacteric fruit?[Question ID = 2988][Question Description = 138_51_PHC_SEP22_Q38]

1. Grapes [Option ID = 11949]
2. Apple [Option ID = 11950]
3. Pear [Option ID = 11951]
4. Guava [Option ID = 11952]

39) Which one of the following fruits is one single exception where ethylene has no effect on the rate of respiration and ripening?

[Question ID = 2989][Question Description = 139_51_PHC_SEP22_Q39]

1. Pear [Option ID = 11953]
2. Citrus [Option ID = 11954]
3. Strawberry [Option ID = 11955]
4. Grapes [Option ID = 11956]

40) Given below are two statements-

Statement I: The *NAC* and *WRKY* gene families are the most abundant transcription factors regulating leaf senescence.

Statement II: Senescing leaves dehydrate more rapidly than non-senescing leaves because ABA-induced stomatal closure no longer functions.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2990][Question Description = 140_51_PHC_SEP22_Q40]

1. Both Statement I and Statement II are true [Option ID = 11957]
2. Both Statement I and Statement II are false [Option ID = 11958]
3. Statement I is true but Statement II is false [Option ID = 11959]
4. Statement I is false but Statement II is true [Option ID = 11960]

41) Gene family involved in auxin-regulated growth and development-

- A. The AUX/IAA gene family
- B. The SAUR gene family
- C. CRE1 family
- D. The GH3 gene family

Choose the *correct* answer from the options given below:

[Question ID = 2991][Question Description = 141_51_PHC_SEP22_Q41]

1. A, B and C only [Option ID = 11961]
2. A, B and D only [Option ID = 11962]
3. B, C and D only [Option ID = 11963]
4. A, C and D only [Option ID = 11964]

42) RNA functions as-

- A. Intermediate between the gene and the protein-synthesizing machinery.
- B. An adaptor between the codons in the mRNA and amino acids.
- C. Interferes with the translation of, certain mRNAs.
- D. Enzymes catalyze essential reactions in the cell.

Choose the *correct* answer from the options given below:

[Question ID = 2992][Question Description = 142_51_PHC_SEP22_Q42]

1. A, B and D only [Option ID = 11965]
2. A, B and C only [Option ID = 11966]
3. A, C and D only [Option ID = 11967]
4. A, B, C and D [Option ID = 11968]

43) Given below are two statements-

Statement I: In antisense constructs, the orientation of the sequence to be expressed mimics the usual arrangement of the gene.

Statement II: More efficient down-regulation is achieved by the expression of hairpin RNA (hp RNA) induced RNAi.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2993][Question Description = 143_51_PHC_SEP22_Q43]

1. Both Statement I and Statement II are true [Option ID = 11969]
2. Both Statement I and Statement II are false [Option ID = 11970]
3. Statement I is true but Statement II is false [Option ID = 11971]
4. Statement I is false but Statement II is true [Option ID = 11972]

44) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : PEG-induced fusion is enhanced by enriching the PEG solution with Ca^{2+} ions.

Reason R : The Ca^{2+} may form a bridge between the negatively polarized groups of protein (or phospholipids) and PEG.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2994][Question Description = 144_51_PHC_SEP22_Q44]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11973]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11974]
3. A is true but R is false [Option ID = 11975]
4. A is false but R is true [Option ID = 11976]

45) What is the insert capacity of cosmid based vector?[Question ID = 2995][Question Description = 145_51_PHC_SEP22_Q45]

1. Up to 6 kb [Option ID = 11977]
2. Up to 40 kb [Option ID = 11978]
3. Up to 300 kb [Option ID = 11979]
4. Up to 2000 kb [Option ID = 11980]

46) Given below are two statements-

Statement I: Stress is usually defined as an external factor that exerts a disadvantageous influence on the plant.

Statement II: UV-B radiation range is 280-320 nm.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2996][Question Description = 146_51_PHC_SEP22_Q46]

1. Both Statement I and Statement II are true [Option ID = 11981]
2. Both Statement I and Statement II are false [Option ID = 11982]
3. Statement I is true but Statement II is false [Option ID = 11983]
4. Statement I is false but Statement II is true [Option ID = 11984]

47) Where the Nanaji Deshmukh Plant Phenomics Facility is located?[Question ID = 2997][Question Description = 147_51_PHC_SEP22_Q47]

1. CIFE, Mumbai [Option ID = 11985]
2. IARI, New Delhi [Option ID = 11986]
3. NAARM, Hyderabad [Option ID = 11987]
4. CCRI, Nagpur [Option ID = 11988]

48) Given below are two statements-

Statement I: Phytochrome is a conjugated protein which consists of a water insoluble protein and a chromophore.

Statement II: Synthesis of phytochrome induces seed germination.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 2998][Question Description = 148_51_PHC_SEP22_Q48]

1. Both Statement I and Statement II are true [Option ID = 11989]
2. Both Statement I and Statement II are false [Option ID = 11990]
3. Statement I is true but Statement II is false [Option ID = 11991]
4. Statement I is false but Statement II is true [Option ID = 11992]

49) What is the wavelength of visible light?[Question ID = 2999][Question Description = 149_51_PHC_SEP22_Q49]

1. 200 - 300 nm [Option ID = 11993]
2. 100 - 200 nm [Option ID = 11994]
3. 400 - 700 nm [Option ID = 11995]
4. 300 - 380 nm [Option ID = 11996]

50) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Fluorescence is the emission of a photon of light as an electron relaxes from the first singlet excited to ground state.

Reason R : An action spectrum is a graph that shows the effectiveness of light in inducing a particular process plotted as a function of wavelength.

In light of the above statements, choose the *correct* answer from the options given below:

[Question ID = 3000][Question Description = 150_51_PHC_SEP22_Q50]

1. Both A and R are true and R is the correct explanation of A [Option ID = 11997]
2. Both A and R are true but R is NOT the correct explanation of A [Option ID = 11998]
3. A is true but R is false [Option ID = 11999]
4. A is false but R is true [Option ID = 12000]

