

J : BOTANY**Q. 1 – Q. 10 carry one mark each.**

- Q.1 The stalk with which the ovule remains attached to the placenta is called
(A) Micropyle (B) Chalaza (C) Funiculus (D) Hilum
- Q.2 The diploid chromosome number of an organism is $2n = 14$. What would be the expected chromosome numbers in a nullisomic?
(A) 12 (B) 13 (C) 15 (D) 16
- Q.3 The mutagen ethidium bromide acts as a
(A) Deaminating agent (B) Alkylating agent
(C) Intercalating agent (D) Base analogue
- Q.4 During photorespiration the reactive oxygen species, H_2O_2 is produced in
(A) Glyoxysome (B) Lysosome (C) Peroxisome (D) Dictyosome
- Q.5 One of the defense mechanisms adopted by plants for detoxification of heavy metals is the synthesis of
(A) Phytochelatin (B) Calmodulin (C) Tubulin (D) Systemin
- Q.6 In which one of the following phases of cell cycle the drug colchicine exerts its effect?
(A) G1 (B) G2 (C) S (D) M
- Q.7 The transition of water molecule from liquid to glassy state during cryopreservation is termed as
(A) Vitrification (B) Hyperhydricity (C) Cryoprotectant (D) Habituation
- Q.8 The DNA content of a nucleus can be measured by
(A) ESR Spectroscopy (B) FTIR Spectroscopy
(C) Flow Cytometry (D) X-Ray Crystallography
- Q.9 Retrograde signaling involves communication of
(A) nucleus to the chloroplast
(B) endoplasmic reticulum to the nucleus
(C) nucleus to the mitochondria
(D) chloroplast to the nucleus
- Q.10 A photoautotrophic micropropagation system can be established by increasing the
(A) sucrose concentration in the culture medium
(B) CO_2 concentration in the culture medium
(C) agar concentration in the culture medium
(D) NH_4^+ concentration in the culture medium

Q. 11 - Q. 20 carry two marks each.

Q.11 Which of the following statements in photosynthesis are **CORRECT**?

- P. The absorption maxima for photosystem I (PS I) and PS II are 680 nm and 700 nm, respectively
- Q. Photosynthetic reaction centre contains 300 chlorophyll molecules and the release of one molecule of oxygen requires a minimum of 8 photons
- R. The non-photochemical quenching of excitation energy is enhanced by the presence of zeaxanthin
- S. The photochemical splitting of water occurs in PS I

- (A) P, Q (B) R, S (C) P, S (D) Q, R

Q.12 Which of the following statements are **TRUE** on DNA delivery methods during plant transformation?

- P. Single stranded nicks are made in T-DNA border repeat by the VirD1, VirD2 and VirD3 protein complex
- Q. *virA* gene products form the export apparatus on the membrane for the transfer of T-DNA
- R. Gold/Tungsten particles are used as microprojectiles in biolistic method
- S. Acceleration of DNA-coated microprojectiles is carried out with compressed CO₂

- (A) P, S (B) R, S (C) P, R (D) Q, S

Q.13 Match the following plant secondary compounds with their uses and source plants

Compounds	Uses	Plant species
P. Guggulusterol	1. Anti-hypertensive	i. <i>Lithospermum erythrorhizon</i>
Q. Shikonin	2. Anti-rheumatic	ii. <i>Catharanthus roseus</i>
R. Ajmalicine	3. Dye	iii. <i>Glycyrrhiza glabra</i>
S. Glycyrrhizin	4. Sweetner	iv. <i>Commiphora wightii</i>
	5. Anti-tumor	v. <i>Swertia chirata</i>
	6. Anti-plaque	vi. <i>Coptis japonica</i>

- | | | | |
|---------|---------|--------|---------|
| (A) | (B) | (C) | (D) |
| P-2-iv | P-3-iv | P-4-iv | P-4-iii |
| Q-3-i | Q-1-i | Q-3-i | Q-2-ii |
| R-1-ii | R-5-ii | R-1-v | R-5-i |
| S-4-iii | S-6-iii | S-2-vi | S-6-iv |

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Q.14 Match the gene of interest for various aspects of crop improvement

Gene insert

- P. *bar*
- Q. *vip3A*
- R. *β -lcy*
- S. *gsh-II*

Aspects of crop improvement

- 1. Tolerance to heavy metals
- 2. Nutritional improvement with increased vitamin A
- 3. Insect resistance
- 4. Herbicide resistance
- 5. Delayed ripening
- 6. Resistance to fungal infection

(A)	(B)	(C)	(D)
P-4	P-4	P-2	P-4
Q-3	Q-3	Q-4	Q-2
R-5	R-2	R-5	R-6
S-6	S-1	S-3	S-1

Q.15 Match the plants with their seed storage proteins

Plant

- P. Rape seed
- Q. Pea
- R. Sorghum
- S. Wheat

Protein

- 1. Kafirin
- 2. Vicillin
- 3. Gliadin
- 4. Napin
- 5. Zein
- 6. Patatin

(A)	(B)	(C)	(D)
P-4	P-2	P-4	P-3
Q-3	Q-3	Q-2	Q-2
R-5	R-6	R-1	R-4
S-2	S-1	S-3	S-5

Q.16 Match the name of the disease with the causal organism

Disease

- P. False smut of rice
- Q. Ring rot of potato
- R. Red rot of sugarcane
- S. Downy mildew of grape

Causal organism

- 1. *Plasmopara viticola*
- 2. *Colletotrichum falcatum*
- 3. *Corynebacterium sepidonicum*
- 4. *Ustilaginoidea virens*
- 5. *Erwinia amylovora*
- 6. *Synchytrium endobioticum*

(A)	(B)	(C)	(D)
P-1	P-4	P-6	P-5
Q-5	Q-3	Q-2	Q-3
R-2	R-2	R-4	R-2
S-4	S-1	S-1	S-4

Q.17 Identify the **CORRECT** statements for phylogenetic systems of classification

- P. The most popular phylogenetic systems of classification is that of George Bentham and Joseph Dalton Hooker and was published in 'Genera Plantarum'
- Q. A true phylogenetic system of classification was proposed by Adlof Engler and was published in 'Die Natürlichen Pflanzenfamilien'
- R. The phylogenetic system of classification proposed by John Hutchinson was appeared in 'The Families of Flowering Plants'
- S. The origin of dicot from primitive monocot was proposed by Arthur Cronquist in his book 'Systema Naturae'

- (A) Q, R (B) P, Q (C) R, S (D) P, S

Q.18 Which of the following statements are **TRUE** for the plastid genomes?

- P. Plastid genome is circular in nature with genome size of 120-160 kb
- Q. The plastid ribosomes are with sedimentation coefficient of 80S
- R. The gene for the small subunit of ribulose biphosphate carboxylase (RubisCO) is located in the plastid
- S. rRNAs in the plastid genome are arranged in one transcription unit

- (A) P, Q (B) Q, S (C) R, S (D) P, S

Q.19 Identify the **CORRECT** statements.

- P. Specialized parenchymatous cells with tannins and crystals of calcium oxalate are termed as sclereids
- Q. The sieve elements of angiosperms are surrounded by companion cells and are essential component of phloem loading
- R. The exudation of water by guttation occurs through trichomes
- S. The bulliform cells control the unrolling and hygroscopic movement of grass leaves

- (A) P, Q (B) P, R (C) Q, S (D) P, S

Q.20 Which of the following statements are **INCORRECT** on ecological point of view?

- P. Primary succession involving xerosere is initiated in a wet habitat
- Q. Halones commonly found in electronic equipment are one of the active force destroying the protective ozone layer in the stratosphere
- R. Sympatric speciation occurs when the new species evolves in geographic isolation from the parent species
- S. α -Diversity is the diversity of species within a habitat or community

- (A) P, Q (B) P, R (C) Q, R (D) Q, S

END OF SECTION - J