

**K : BOTANY****Q. 1 – Q. 7 carry one mark each.**

Q.1 Kyoto Protocol is related to

- (A) Acid rain (B) Photochemical smog  
(C) Ozone hole (D) Global warming

Q.2 Phagotrophs are

- (A) Organisms that feed on dead organic matter  
(B) Organisms that absorb dissolved organic matter  
(C) Organisms that ingest other organisms or particulate organic matter  
(D) Organisms that manufacture food from simple inorganic substances

Q.3 Identify the **INCORRECT** statement :

- (A) 2,4-dichlorophenoxyacetic acid (2,4-D) is the most commonly used chemical analogue of indole-3-acetic acid.  
(B) In somatic embryogenesis, embryo initiation needs a high concentration of 2,4-D.  
(C) Crown-gall disease depends on the presence of Ti-plasmid in *Agrobacterium tumefaciens*.  
(D) *Agrobacterium tumefaciens* is responsible for hairy root formation in plants.

Q.4 Choose the correct relation between Angstrom ( $^{\circ}\text{A}$ ) and nanometer (nm)

- (A)  $1^{\circ}\text{A} = 10^1 \text{ nm}$  (B)  $1^{\circ}\text{A} = 10^{-1} \text{ nm}$   
(C)  $1^{\circ}\text{A} = 10^{-2} \text{ nm}$  (D)  $1^{\circ}\text{A} = 10^2 \text{ nm}$

Q.5 In hypogynous flower

- (A) Ovary occupies the highest position on the thallamus  
(B) Ovary may be partially sunken in the thallamus  
(C) Ovary is completely sunken in the thallamus  
(D) Ovary is naked

Q.6 Fill up the blanks with appropriate matches.

The main axis of the inflorescence is known as \_\_\_\_\_ and the stalk of the individual flower is called \_\_\_\_\_.

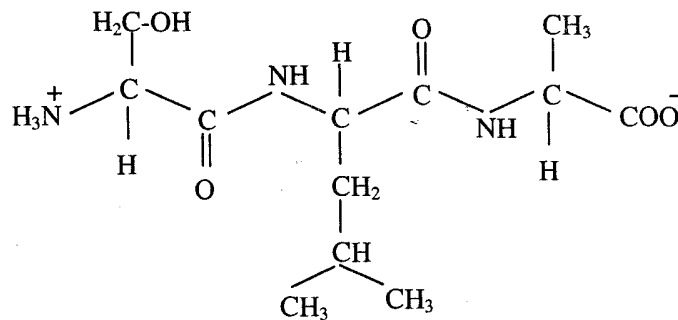
- (A) Pedicel and Panicle (B) Panicle and Pedicel  
(C) Pedicel and Peduncle (D) Peduncle and Pedicel

Q.7 Microorganisms responsible for nitrification

- (A) *Nitrosomonas* and *Nitrobacter* (B) *Nostoc* and *Anabaena*  
(C) *Rhizobium* and *Azotobacter* (D) *Clostridium* and *Pseudomonas*

**Q. 8 to Q. 21 carry two marks each.**

Q.8 Identify the amino acids in the following peptide chain :



- P. Iso-Leu-Ala  
 Q. Leu-Iso-Asn  
 R. Ser-Leu-Ala  
 S. Ser-Pro-Gln

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

Q.9 Identify the **CORRECT** statements :

- P. Vernalization is the process where flowering is promoted by heat shock.  
 Q. The four different types of floral organs are initiated as separate whorls.  
 R. The flowering stimulus is transported to the meristem via the xylem.  
 S. Abscisic acid synthesis occurs via the carotenoid biosynthetic pathway.

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

Q.10 Which of the following statements are **INCORRECT** ?

- P. The frequency of recombination is a measure of linkage between genes on the same chromosome.  
 Q. DNA polymerase I is the true DNA replicase in *E. coli*.  
 R. The conserved element closest to the transcription initiation site is called the CAAT box.  
 S. The introns in the nuclear pre-mRNAs are excised by spliceosomes.

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

Q.11 Which of the following statements are **TRUE** for transposable genetic elements ?

- P. IS elements can be inserted at many different sites in bacterial chromosomes and plasmids.  
 Q. In Tn5 the flanking IS elements are in the same orientation.  
 R. The *Ac* and *Ds* elements in maize were discovered by Barbara McClintock.  
 S. Tn10 consists of two IS elements flanking a gene for streptomycin resistance.

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

Q. 12 - Q. 20 are matching exercises. In each question, each item P, Q, R and S in Group I matches one of the items in Group II. Choose the correct match from the alternatives A, B, C and D.

Q.12 Floral formula is a method of describing a plant specimen in which the morphological characters are represented by symbols. Identify the correct matches :

Group I	Group II
P. ♂	1. Zygomorphic
Q. ⊕	2. Male flower
R. $\overline{C} \overline{A}$	3. Epipetalous
S. ⊔	4. Actinomorphic
	5. Superior ovary
	6. Inferior ovary

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

Q.13 Identify the pathways where the following reactions occur :

Group I	Group II
P. Fatty acid + GTP + Co A $\rightleftharpoons$ Acyl-CoA + GDP + Pi	1. Fatty acid synthesis
Q. $\text{NH}_3$ + Glutamate + ATP $\rightleftharpoons$ Glutamine + ADP + Pi	2. Fatty acid oxidation
R. Succinate + E - FAD $\rightleftharpoons$ Fumarate + E - FADH <sub>2</sub>	3. Oxidative phosphorylation
S. Malonyl-S-CoA + ACP-SH $\rightleftharpoons$ Malonyl-S-ACP + CoA-SH	4. Citric acid cycle
	5. Gluconeogenesis
	6. Amino acid biosynthesis

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

Group I	Group II
P. <i>Ricinus communis</i>	1. Rice bran oil
Q. <i>Jatropha curcas</i>	2. Mahua oil
R. <i>Pongamia pinnata</i>	3. Sun-flower oil
S. <i>Madhuca indica</i>	4. Castor oil
	5. Karanja oil
	6. Jatropha oil

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

- Q.15
- | Group I                 | Group II  |
|-------------------------|---|
| P. Förster mechanism    | 1. The initial product inhibit the initial reaction             |
| Q. Ping-Pong reaction   | 2. The accumulation of end product inhibit the initial reaction |
| R. Feed-back inhibition | 3. Process of exciton transfer in chromophore molecule          |
| S. DNA recombination    | 4. Double displacement reaction                                 |
|                         | 5. Michaelis–Menten enzyme kinetics                             |
|                         | 6. Holliday model   |
- (A) P-5, Q-4, R-2, S-6    (B) P-2, Q-3, R-4, S-6    (C) P-3, Q-4, R-2, S-6    (D) P-6, Q-5, R-4, S-1

- Q.16
- | Group I  | Group II          |
|--|-------------------|
| P. $\begin{array}{c} \downarrow \\ \text{AG} \bullet \text{CT} \\ \text{TC} \uparrow \text{GA} \end{array}$                          | 1. <i>EcoRI</i>   |
| Q. $\begin{array}{c} \downarrow \\ \text{GTPy} \bullet \text{PuAC} \\ \text{CAPu} \uparrow \text{PyTG} \end{array}$                  | 2. <i>AluI</i>    |
| R. $\begin{array}{c} \downarrow \\ \text{C} \text{ C} \bullet \text{GG} \\ \text{GG} \bullet \text{C} \uparrow \text{C} \end{array}$ | 3. <i>HpaII</i>   |
| S. $\begin{array}{c} \downarrow \\ \text{A} \text{AG} \bullet \text{CTT} \\ \text{TTC} \bullet \text{GAA} \end{array}$               | 4. <i>HindIII</i> |
|  | 5. <i>PstI</i>    |
|  | 6. <i>HinII</i>   |
- (A) P-1, Q-5, R-6, S-3    (B) P-2, Q-6, R-3, S-4    (C) P-1, Q-6, R-4, S-2    (D) P-1, Q-2, R-6, S-4

- Q.17
- | Group I             | Group II                                   |
|---------------------|--|
| P. Linnaeus         | 1. <i>Flora Indica</i>                     |
| Q. William Roxburgh | 2. <i>Genera Plantarum</i>                 |
| R. Bentham-Hooker   | 3. Artificial-sexual system                |
| S. Engler           | 4. Sero diagnostic system                  |
|                     | 5. Phylogenetic system                     |
|                     | 6. <i>The Families of Flowering Plants</i> |
- (A) P-2, Q-4, R-3, S-5    (B) P-1, Q-6, R-5, S-2    (C) P-3, Q-1, R-5, S-6    (D) P-3, Q-1, R-2, S-5

