

BOTANY : : 2009

1. A teacher was explaining about a constant physical contact involving almost equal physiological interdependence in two different thalloid forms. He was trying to explain one of the following :

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|-----------------------------------|-------------------------------------|
| (1) Mycorrhizal association | (2) Establishment of heterothallism |
| (3) Operation of heterothallism . | (4) Advent of Lichen formation |

2. In *Duranta* the nature 'of vasculated defensive, structures represent the modification of :

- | | |
|---|--|
| (1) Axillary bud as in <i>Bougainvillea</i> | (2) Terminal bud as in <i>Carissa</i> |
| (3) Stipules as in <i>Acacia</i> | (4) Apical bud as in <i>Artabotrys</i> |

3. Study the following lists :

List-I

- (A) Entire leaf modified into a spine
- (B) Leaf except stipules modified into a tendril
- (C) Stipules modified into a tendril
- (D) First leaf of axillary bud modified into a spine

List-II

- (I) Clematis
- (II) Citrus
- (III) Euphorbia
- (IV) Lathyrus
- (V) Smilax

The correct match is

- | | A | B | C | D |
|-----|-----|-----|----|-----|
| (1) | III | IV | V | II |
| (2) | III | I | IV | II |
| (3) | II | III | I | V |
| (4) | V | II | I | III |

4. Study the following table:

- | | |
|--|---|
| (I) Modified aerial stem | Unisexual flowers develop acropetally |
| (II) Rows achlamydeous length | Pedicels of all the flowers are of same |
| (III) Cohesion of bracts forming a cup | Centrifugal opening of flowers |
| (IV) Flower formation on | Presence of rachilla one side in a spiral |

Chalazal entry of pollen

Presence of false whorl

Male flowers many

Terminal part of the peduncle is manner flowerless

Select the correct pair of answers in which the former represents the set of characters present in Poinsettia and the latter in the pair represents the set of characters present in Casuarina.

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|-------------|-----------|-------------|------------|
| (1) II, III | (2) I, II | (3) IV, III | (4) III, I |
|-------------|-----------|-------------|------------|

5. A student observed 34 inflorescences in *Bougainvillea* and 42 inflorescences in *Poinsettia*. Find out the number of flowers in *Bougainvillea* and the number of female flowers in *Poinsettia* respectively :

- | | | | |
|-------------|------------|--------------|-------------|
| (1) 34, 126 | (2) 68, 00 | (3) 204, 164 | (4) 102, 42 |
|-------------|------------|--------------|-------------|

6. *Assertion (A)* : In syconus type of fruit, the achenes formed are fewer than the total number of flowers in the inflorescence from which it is formed.

Reason (R) : Upper and middle flowers cannot develop into fruits.

The correct answer is :

- (1) Both A and R are true and R is the correct explanation of A
- (2) Both A and R are true, but R is not the correct explanation of A
- (3) A is true, but R is false
- (4) A is false, but R is true

7. There are 10 flowers in one individual plant of *Crotalaria*. In each microsporangium of every stamen of all the flowers, there are 30 microspore mother cells. How many pollen grains are formed from that plant?
 (1) 4,000 (3) 24,000 (2) 10,000 (4) 48,000
8. A perennial shrub has compound leaves and solitary zygomorphic and epigynous flowers. Each flower reveals dichlamydeous condition with many stamens and multiple fruit with exalbuminous seeds. What is the ratio of advanced and primitive characters in it?
 (1) 1 : 2 (2) 2 : 3 (3) 1 : 1 (4) 3 : 2
9. **Assertion (A)** : An ascending taxonomic sequence of *Gossypium herbaceum* indicates its placement in progressively higher groups.

Reason (R) : Ascending taxonomic hierarchy indicates that a taxon is treated as belonging to a number of taxa.

The correct answer is :

- (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true, but R is not the correct explanation of A
 (3) A is true, but R is false
 (4) A is false, but R is true
10. A plant with actinomorphic and hypogynous flowers, heterochlamydeous perianth, dorsifixed and extrorse anthers dehiscing transversely belongs to
 (1) Coronariae (2) Bicarpellatae (3) Thalamiflorae (4) Calyciflorae
11. The chemical substances found most abundantly in the middle lamella is released into the Phragmoplast by :
 (1) Endoplasmic reticulum
 (2) Golgi complex
 (3) Spindle fragments
 (4) Interzonal fibres
12. Study the following lists:

List-I

- (A) Initiation of spindle fibres
 (B) Synthesis of RNA and Protein
 (C) Action of endonuclease
 (D) Movement of chromatids towards opposite poles

List-II

- (I) Anaphase-I
 (II) Zygotene
 (III) G₁ phase
 (IV) Pachytene
 (V) Anaphase – II

The correct match is

- | | A | B | C | D |
|-----|-----|-----|----|----|
| (1) | II | III | IV | V |
| (2) | III | II | I | V |
| (3) | I | III | V | IV |
| (4) | V | III | I | II |
13. If there are 120 adenine molecules in a B-DNA double helical structure showing 20 coils, what is the number of pyrimidine nucleotides forming three hydrogen bonds in it ?
 (1) 80 (2) 100 (3) 120 (4) 140
14. From evolutionary point of view, tracheids and sieve cells are more primitive than tracheae and sieve tubes respectively. The angiosperms have:
 (1) Tracheae and sieve tubes
 (2) Tracheids, Tracheae and sieve tubes
 (3) Tracheae, sieve cells and sieve tubes
 (4) Tracheids, Tracheae and sieve cells

15. Arrange the following in the order of their location from periphery to centre in the entire dicotyledonous plant body:
 (I) Fusiform cells (II) Trichoblasts (III) Collocytes (IV) Tyloses
 (1) IV, I, II, III (2) II, III, I, IV (3) III, II, I, IV (4) I, IV, III, II
16. **Assertion (A)** : Apical and intercalary meristems contribute to the growth in length while the lateral moristems bring increase in girth in maize.
Reason (R) : Apiral and intercalary meristams always increase the height of plants.
 The correct answer is :
 (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true, but R is not the correct explanation of A
 (3) A is true, but R is false
 (4) A is false, but R is true
17. Study the following lists :
- | | |
|------------------------|-----------------|
| List-I | List-II |
| (A) Spongy aril | (I) Jussiaea |
| (B) Multiple epidermis | (II) Pistia |
| (C) Respiratory roots | (III) Nerium |
| (D) Root pockets | (IV) Sagittaria |
| | (V) Nymphaea |
- The correct match is
- | | | | | |
|-----|----|-----|-----|-----|
| | A | B | C | D |
| (1) | I | III | II | V |
| (2) | II | I | IV | III |
| (3) | IV | II | III | I |
| (4) | V | III | I | II |
18. **Assertion (A)** : True xerophytes store water in the form of mucilage which helps to withstand prolonged period of drought.
Reason (R) : Vascular and mechanical tissues are well developed in true xerophytes.
 The correct answer is :
 (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true, but R is not the correct explanation of A
 (3) A is true, but R is false
 (4) A is false, but R is true
19. In garden pea yellow colour of cotyledons is dominant over green and round shape of seed is dominant over wrinkled. When a plant with yellow and round seeds is crossed with a plant having yellow and wrinkled seeds, the progeny showed segregation for all the four characters. The probability of obtaining green round seeds in the progeny of this cross is :
 (1) 1/4 (2) 1/8 (3) 1/16 (4) 3/16
20. A homozygous sweet pea plant with blue flowers (RR) and long pollen (R_0R_o) is crossed with a homozygous plant having red flowers (rr) and round , pollen (r_or_o). The resultant F_1 hybrid is test crossed. Which of the following genotype does not appear in its progeny?
 (1) RRR_oR_o (2) $RrRr_o$ (3) $Rrr_o r_o$ (4) $rrR_o r_o$
21. Two adjacent filaments of Spirogyra affinis each 10 cells participating in reproduction. How many new Spirogyra plants are produced during sexual reproduction?
 (1) 5 (2) 10 (3) 20 (4) 40
22. Arrange the following in correct sequence with reference to sexual reproduction in Rhizopus :
 (I) Formation of germ tube.
 (II) Formation of zygothores.
 (III) Formation of warty wall layer of zygospore.
 (IV) Secretion of trisporic acid.

The correct sequence is: .

- (1) IV,III, II, I (2) IV, II, III, I (3) II, I, IV,III (4) I, III, 11, IV

23. Which of the following taxa shows zooidogamous oogamy ?

- (I) Spirogyra (II) Funaria (III) Pteris (IV) Cycas

The correct answer is :

- (1) I, II, III (2) I, III, IV (3) I, II, IV (4) II, III, IV

24. Study the following lists:

List-I

(A) Coleorhiza

(B) Apogamy

(C) Indusium

(D) Caudex

List-II

(I) Development of sporophyte directly from gametophyte without inter-vention of gametes

(II) Development of gametophyte directly from sporophyte without the involvement of reduction division

(III) An unbranched columnar stem with a crown of leaves

(IV) Protective covering of radicle

(V) Protective structure of a sorus

The correct match is :

- | | | | | |
|-----|-----|-----|----|-----|
| . | A | B | C | D |
| (1) | V | II | IV | I |
| (2) | IV | I | V | III |
| (3) | III | V | II | IV |
| (4) | II | III | I | V |

25. Study the following lists:

List-I

(A) Pasteurella pestis

(B) Treponema pallidum

(C) Mycobacterium bovis

(d) Streptomyces nodosus

List-II

(I) Angular leaf spot of cotton

(II) Amphoterican

(III) Actinomycosis of cattle

(IV) Syphilis

(V) Plague

The correct match is :

- | | | | | |
|-----|-----|-----|-----|-----|
| | A | B | C | D |
| (1) | IV | I | II | III |
| (2) | II | III | IV | V |
| (3) | V | IV | III | II |
| (4) | III | II | I | IV |

26. Identify the correct pair of events when temperate phages infect bacteria :

- (I) No prophages are formed.
(II) Bacterial cell undergoes many divisions
(III) Bacterial cell undergoes immediate lysis
(IV) Prophages are formed

The correct pair is :

- (1) I, II (2) II, III (3) III, IV (4) II, IV

27. The osmotic potential and pressure potential of three cells (A, B, C) located in different parts of an actively transpiring plant are given below:

Cell	Osmotic Potential (MPa)	Pressure
A	- 0.87	0.44
B	- 0.92	0.34
C	- 0.68	0.27

Identify these three cells as root hair, root cortical and leaf mesophyll cells respectively.

The correct answer is .

- (1) A, B, C (2) A, C, B (3) C, A, B (4) B, C, A

28. Read the following table:

- (I) DCMU - Herbicide - Inhibitor of Non-cyclic electron transport
 (II) PMA - Fungicide- Reduce transpiration
 (III) Colchicine- Alkaloid - Causes male sterility
 (IV) Soilrite - Sodium alginate. Encapsulation of somatic embryos

Identify the correct pair of answer :

- (1) I, II (2) I, III (3) II, III (4) II, IV

29. The number of stomata and epidermal cells in 1 mm² leaf area of lower epidermis of the leaves of X, Y and Z plants are given below. Arrange the plants in decreasing order of their stomatal Index :

Plant	Number of Stomata	Number of Epidermal cells
X	30	150
Y	60	240
Z	90	400

- (1) X, Y, Z (2) Y, Z, X (3) Z, Y, X (4) Y, X, Z

30. Study the following :

List-I

- (A) Photolysis of water
 (B) Diazotrophy
 (C) Cytochrome 'C' oxidase
 (D) Biosynthesis of IAA

List-II

- (I) Zinc
 (II) Copper
 (III) Manganese
 (IV) Molybdenum
 (V) Boron

The correct match is :

- | | A | B | C | D |
|-----|-----|----|-----|----|
| (1) | III | II | I | V |
| (2) | III | IV | II | I |
| (3) | V | II | III | IV |
| (4) | IV | I | III | II |

31. Assume that an actively respiring cell has 3x number of K⁺ in its cytoplasm and 2x number of K⁺ outside. After some time, x number of K⁺ entered into the cell. What is the process by which K⁺ transport has taken place?

- (1) Primary active transport (2) Secondary active transport
 (3) Diffusion (4) Passive transport

32. Four respiratory enzymes are given below. Arrange them in increasing order of the carbon number of the substrates on which they act .:

- (I) Enolase (II) Aconitase
 (III) Fumerase (IV) Alcohol dehydrogenase

The correct order is :

- (1) II, IV, III, I (2) IV, I, II, III
 (3) I, IV, III, II (4) IV, I, III, II

33. The ratio between 2-carbon and 3-carbon intermediates having -NH₂ group formed in photosynthetic oxidation cycle is :

- (1) 1: 1 (2) 2: 1 (3) 3: 2 (4) 3 : 4

34. Which of the following respiratory substrate requires the highest number of O₂ molecules for its complete oxidation : .

- (1) Tripalmitin (2) Triolein (3) Tartaric acid (4) Oleic acid

35. What is the amino acid sequence encoded by the base sequence: UCA UUU UCC GGG AGU of a mRNA segment:

- (1) Methionine→Phenylalanine→Serine→ Glycine→Serine
 (2) Glycine→Serine→Phenylalanine-Serine→ Glycine

(3) Serine→Phenylalanine→Serine-Glycine→ Serine

(4) Serine→Phenylalanine→Glycine-Serine→ Glycine

36. Identify two physiological processes induced by two different phytohormones having a common precursor which is formed due to the catalytic activity of pyruvic dehydrogenase complex:

(I) More female flowers in cucumber

(II) α -amylase production in barley grain

(III) Acceleration of fruit ripening in tomato

(IV) Delay in sprouting of potato tubers

The correct combination is :

(1) I, II

(2) I, III

(3) II, IV

(4) III, IV

37. Study the following lists :

List-I

(A) Usage of bisexual

flowers as female parents

(B) Incorporation of several desirable

characters into a single variety

(C) Exploiting hybrid

vigour for many generations

(D) Improving local

varieties of self pollinated crop

List-II

(I) Clonal selection

(II) Pure line selection

(III) Emasculation

(IV) Hybridization

{ V} Polyploidy breeding

The correct match is :

A B C D

(1) IV V III I

(2) II III IV V

(3) III IV I II

(4) I V II IV

38. Identify the palindromic sequence in the following :

(1) $\frac{\text{GAATTC}}{\text{GAATTC}}$

(2) $\frac{\text{GAATTC}}{\text{CTTUUG}}$

(3) $\frac{\text{GAATTC}}{\text{CUUAAG}}$

(4) $\frac{\text{GAATTC}}{\text{CTTAAG}}$

39. The characteristics of a molecular probe are:

(I) Very long molecule

(II) Double stranded

(III) DNA or RNA

(IV) Complementary to a part of desired gene

(1) I, II

(2) II, III

(3) III, IV

(4) IV, I

40. **Assertion (A)** : Somoclonal variations may be present in plants produced from callus.

Reason (R) : Somoclonal variations are caused due to recombination during meiosis.

The correct answer is :

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true, but R is not the correct explanation of A

(3) A is true, but R is false

(4) A is false, but R is true

ANSWERS

(1) 4	(2) 1	(3) 1	(4) 4	(5) 4
(6) 1	(7) 4	(8) 3	(9) 1	(10) 3
(11) 2	(12) 1	(13) 1	(14) 2	(15) 2
(16) 4	(17) 4	(18) 4	(19) 2	(20) 1 or 2
(21) 2	(22) 2	(23) 4	(24) 2	(25) 3
(26) 4	(27) 3	(28) 1	(29) 2	(30) 2
(31) 2	(32) 4	(33) 2	(34) 2	(35) 3
(36) 3	(37) 3	(38) 4	(39) 3	(40) 3