



BOTANY

SECTION-A

1. Match the terms in **List-I** with their description in **List-II** and choose the **correct** option.

List-I		List-II	
(A)	Dominance	(I)	Many genes govern a single character
(B)	Codominance	(II)	In a heterozygous organism only one allele expresses itself
(C)	Pleiotropy	(III)	In a heterozygous organism both alleles express themselves fully
(D)	Polygenic inheritance	(IV)	A single gene influences many characters

- (1) (A) – (II), (B) – (I), (C) – (IV), (D) – (III)
(2) (A) – (II), (B) – (III), (C) – (IV), (D) – (I)
(3) (A) – (IV), (B) – (I), (C) – (II), (D) – (III)
(4) (A) – (IV), (B) – (III), (C) – (I), (D) – (II)
2. **Statement I:** Potato and brinjal are two different genera but both belong to the species *Solanum*.
Statement II: *Mangifera* and *indica* are specific and generic epithets, respectively.
- (1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.
3. The genetic code;
- A. determines the sequences of amino acids in proteins.
B. is read by the soluble RNA.
C. is degenerate.
D. is read in mRNA in a non-contiguous fashion.
E. has no punctuations.
F. is absolutely universal.
- The **incorrect** statement(s) is/are;
- (1) A, B, C and E (2) A, B, D and E
(3) D and F (4) A and B

4. Which of the following statements is/are **false**?

- I. *Vallisneria* and *Hydrilla* are fresh water plants while sea-grass (e.g. *Zostera*) is a marine plant.
II. *Vallisneria* is epihydrophilous while *Zostera* is hypohydrophilous.
III. Pollination in water lily and *Eichhornia* (water hyacinth) takes place by insects.
IV. In majority of aquatic plants flowers emerge above the level of water and are pollinated by insects or wind.
V. In most of the water pollinated species, pollen grains are protected from wetting due to absence of mucilaginous covering.
VI. In all hydrophilous plants pollen grains are spherical.

- (1) All (2) II, IV & V
(3) V and VI (4) IV

5. Identify the **incorrect** statement:

- (1) Nearly 25 per cent of all insects are known to be phytophagous.
(2) Predators also help in maintaining species diversity in a community, by increasing the intensity of competition among competing prey species.
(3) Plants have evolved an astonishing variety of morphological and chemical defences against herbivores.
(4) Predators act as 'conduits' for energy transfer across trophic levels.

6. Identify the **correct** order of organisation of genetic material from largest to smallest;

- (1) Chromosome, genome, nucleotide, gene
(2) Chromosome, gene, genome, nucleotide
(3) Genome, chromosome, nucleotide, gene
(4) Genome, chromosome, gene, nucleotide

7. AGGTATCGCAT is a sequence from the coding strand of a gene, what will be the corresponding sequence of the transcribed mRNA?

- (1) AGGUAUCGCAU
(2) UGGTUTCGCAT
(3) ACCUAUGCGAU
(4) UCCAUAGCGUA



8. In Hatch and Slack pathway, an organic intermediate that crosses mesophyll cell and enters bundle sheath cell is;

- (1) OAA
- (2) Citric acid
- (3) Phosphoenol pyruvic acid.
- (4) Malic acid

9. **Assertion (A):** *Trichoderma polysporum* is an important fungus.

Reason (R): Cyclosporin A is obtained from this fungus which is used as an immunosuppressive agent in organ transplant patients.

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

10. A researcher while investigating the responses of phytohormones in seedlings found some common characteristics like:

- I. Horizontal growth of seedling.
- II. Swelling of axis.
- III. Apical hook formation in seedling.

Above characteristics were due to the influence of;

- (1) Absciscic acid
- (2) Auxin
- (3) Gibberellins
- (4) Ethylene

11. Choose the **incorrect** statement in context of photosynthesis, when only light of wavelength beyond 680 nm is available for excitation;

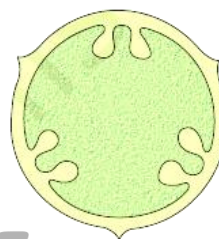
- (1) Synthesis of $\text{NADPH} + \text{H}^+$ will occur.
- (2) PS-I will only be functional.
- (3) Electrons will circulate within the photosystem.
- (4) Phosphorylation will occur.

12. Match **List-I** with **List-II** to find out the **correct** option.

List-I		List-II	
(A)	Standing crop	(I)	Rate of biomass production
(B)	Productivity	(II)	Vertical distribution of different species occupying different levels
(C)	Net primary productivity	(III)	Mass of living material at a particular time in a trophic level
(D)	Stratification	(IV)	Less than GPP due to respiratory losses

- (1) (A) – (I), (B) – (II), (C) – (III), (D) – (IV)
- (2) (A) – (IV), (B) – (III), (C) – (I), (D) – (II)
- (3) (A) – (III), (B) – (I), (C) – (IV), (D) – (II)
- (4) (A) – (III), (B) – (II), (C) – (I), (D) – (IV)

13. Which among the following statements best describes the type of placentation depicted in the picture given below?



- (1) Placenta forms a ridge along the ventral suture of the ovary.
- (2) Ovary is one-chambered but it becomes two chambered due to the formation of the false septum.
- (3) Placenta is axial and the ovules are attached to it in a multilocular ovary.
- (4) Ovules are borne on central axis and septa are absent.

14. Identify the correct examples of the class of algae that produce hydrocolloid 'caragreen'

Porphyria, *Ulothrix*, *Spirogyra*, *Dictyota*, *Sargassum* and *Gelidium*

Choose the **correct** option.

- (1) *Ulothrix* and *Dictyota*
- (2) *Spirogyra* and *Sargassum*
- (3) *Porphyria* and *Gelidium*
- (4) *Sargassum* and *Gelidium*



15. **Assertion (A):** Meiosis is the mechanism by which conservation of specific chromosome number of each species is achieved across generations in sexually reproducing organisms.

Reason (R): In meiosis, the chromosome number of the parent is conserved in the daughter cell.

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

16. **Statement I:** Western Ghats-Sri Lanka, Himalaya and Indo-Burma cover India's rich biodiversity regions.

Statement II: India, with about 45,000 species of plants and twice as many species of animals is one of 12 megadiversity countries of the world.

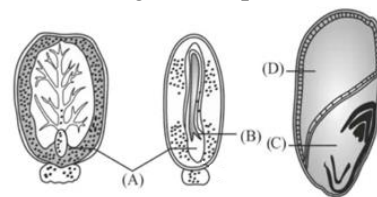
- (1) Statement I and Statement II both are correct.
- (2) Statement I is correct, but Statement II is incorrect.
- (3) Statement I is incorrect, but Statement II is correct.
- (4) Statement I and Statement II both are incorrect.

17. Match **List-I** with **List-II** to find out the correct option.

List I		List II	
(A)	Complex-I	(I)	FAD ⁺ is a coenzyme
(B)	Complex-II	(II)	FMN is a coenzyme
(C)	Complex-III	(III)	Contains copper centres
(D)	Complex-IV	(IV)	Accepts e ⁻ from UQH ₂

- (1) (A) – (I), (B) – (III), (C) – (II), (D) – (IV)
- (2) (A) – (II), (B) – (I), (C) – (IV), (D) – (III)
- (3) (A) – (III), (B) – (II), (C) – (IV), (D) – (I)
- (4) (A) – (II), (B) – (III), (C) – (I), (D) – (IV)

18. In following three diagrams identify **A**, **B**, **C** and **D** respectively and find out the **correct** match among the following set of options:



	A	B	C	D
(1)	Shoot apical meristem	Hypocotyl root axis	Scutellum	Endosperm
(2)	Hypocotyl root axis	Shoot apical meristem	Scutellum	Endosperm
(3)	Scutellum	Hypocotyl root axis	Shoot apical meristem	Endosperm
(4)	Endosperm	Scutellum	Hypocotyl root axis	Shoot apical meristem

19. Read the following statements and state them **true (T)** or **false (F)**.

- (A) Ribosomes are non-membrane bound organelles found in all cells –both eukaryotic as well as prokaryotic.
- (B) Both animal and plant cells contain a single membrane bound organelle called centrosome which helps in cell division.
- (C) Several ribosomes may attach to a single mRNA and form a chain called polyribosomes or polysome.
- (D) Elaioplasts store carbohydrates (starch), amyloplasts store oils and fats whereas the aleuroplasts store proteins.

	A	B	C	D
(1)	T	F	T	T
(2)	F	T	T	F
(3)	F	T	F	F
(4)	T	F	T	F

20. Identify the part and type of plant based on the following anatomical features:

- A. Epidermis may bear trichomes and a few stomata.
- B. The outer hypodermis consists of a few layers of collenchymatous cells.
- C. Cortical layers below hypodermis consist of rounded thin walled parenchymatous cells with conspicuous intercellular spaces.
- D. The cells of the endodermis are rich in starch grains.

- (1) Dicot stem
- (2) Monocot stem
- (3) Dicot root
- (4) Monocot root



21. Match the following **lists** and choose the **correct** option.

List I		List II	
(A)	Growth	(I)	Production of offspring
(B)	Reproduction	(II)	Composed of one or more living cells
(C)	Metabolism	(III)	Increase in mass and increase in number of individuals
(D)	Cellular organization	(IV)	Sum total of all chemical reactions occurring in a living body

- (1) (A) – (I), (B) – (II), (C) – (III), (D) – (IV)
(2) (A) – (III), (B) – (II), (C) – (I), (D) – (IV)
(3) (A) – (III), (B) – (I), (C) – (IV), (D) – (II)
(4) (A) – (II), (B) – (IV), (C) – (III), (D) – (I)

22. **Assertion (A):** Phenotypic and genotypic ratios coincide in both incomplete dominance and codominance.

Reason (R): Both incomplete dominance and codominance are deviations of mendelism.

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

23. The dihybrid phenotype of F_2 generation in Mendelian cross is;

- (1) 9 : 3 : 3 : 1
(2) 1 : 2 : 1
(3) 3 : 1
(4) 1 : 1 : 1 : 1

24. Find the **wrongly** matched pair;

- (1) Process of splicing- Dominance of RNA world
(2) Split gene arrangement – Ancient feature of the genome
(3) Presence of exons – Reminiscent of antiquity
(4) *Lac* operon - Shows negative and positive regulation

25. Which of the following statements is **correct** regarding chloroplast?

- (1) The space limited by the inner membrane is called the matrix.
(2) Chloroplast is a single membrane bound organelle.
(3) Chloroplast may be present in organs other than leaves.
(4) Chloroplast does not contain chlorophyll.

26. _____ is not an endospermic seed.

- (1) Wheat (2) Castor
(3) Maize (4) Pea

27. **Statement I:** Measurement and comparison of total growth per unit time is called the absolute growth rate.

Statement II: The growth of the given system per unit time expressed on a common basis is called the relative growth rate.

- (1) Both Statement I and Statement II are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Both Statement I and Statement II are incorrect.

28. Calvin cycle has three stages;

- A. Reduction during which carbohydrate is formed at the expense of photochemically made ATP and NADPH.
B. Regeneration during which carbon dioxide acceptor 1, 5 RuBP is formed.
C. Carboxylation during which CO_2 combines with 1, 5 RuBP.

Identify the **correct** sequence;

- (1) $C \rightarrow A \rightarrow B$ (2) $C \rightarrow B \rightarrow A$
(3) $A \rightarrow B \rightarrow C$ (4) $B \rightarrow A \rightarrow C$

29. **Assertion (A):** A stable community must be resilient or resistant to occasional disturbances.

Reason (R): Rivet popper hypothesis explains the role of biological diversity on ecosystem health.

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



30. Match the following **lists** and choose the **correct** option.

List I (Population interaction)		List II (Example)	
(A)	Commensalism	(I)	Presence of lice among hairs of human
(B)	Parasitism	(II)	Mycorrhizae
(C)	Mutualism	(III)	Barnacles growing on the back of whale
(D)	Predation	(IV)	Prickly pear cactus and <i>Cactoblastis</i>

- (1) (A) – (III), (B) – (II), (C) – (I), (D) – (IV)
 (2) (A) – (IV), (B) – (I), (C) – (II), (D) – (III)
 (3) (A) – (IV), (B) – (II), (C) – (I), (D) – (III)
 (4) (A) – (III), (B) – (I), (C) – (II), (D) – (IV)

31. Which one of the following is **incorrectly** matched?

- (1) Clot buster – *Streptococcus*
 (2) Statins – Inhibit cholesterol synthesis
 (3) Cyclosporin A – Immunosuppressive agent
 (4) Citric acid – *Clostridium butylicum*

32. **Statement I:** Humus is highly resistant to microbial action and undergoes decomposition at an extremely fast rate. Being colloidal in nature it serves as a reservoir of nutrients.

Statement II: The humus is degraded by some microbes and release of inorganic nutrients occurs by the process known as humification.

- (1) Both Statement I and Statement II are correct.
 (2) Statement I is correct but Statement II is incorrect.
 (3) Statement I is incorrect but Statement II is correct.
 (4) Both Statement I and Statement II are incorrect.

33. Identify the **correct** sequence of “Class → Mycelium → Fruiting body” observed in the kingdom-Fungi?

- (1) Phycomycetes → Septate, Coenocytic → Not present
 (2) Ascomycetes → Aseptate, Branched → Ascocarp
 (3) Basidiomycetes → Septate, Unbranched → Basidiocarp
 (4) Deuteromycetes → Septate, Branched → Not present

34. *Selaginella* and *Salvinia* are considered to represent a significant step towards evolution of seed habit because;

- (1) Gametophytes are monoecious.
 (2) Male gametes are motile.
 (3) Embryo develops in female gametophyte which is retained on parent sporophyte.
 (4) Male gametophyte is retained in the parental body forever.

35. **Statement I:** When the two photosystems work in a series, a process called cyclic photo-phosphorylation occurs.

Statement II: Cyclic photophosphorylation occurs when only light of wavelengths beyond 700 nm are available for excitation.

- (1) Both Statement I and Statement II are correct.
 (2) Statement I is correct but Statement II is incorrect.
 (3) Statement I is incorrect but Statement II is correct.
 (4) Both Statement I and Statement II are incorrect.

SECTION-B

36. Match the following **lists** and choose the **correct** option.

List I		List II	
(A)	Sclerenchymatous hypodermis	(I)	Dicotyledonous stem
(B)	Starch Sheath	(II)	Adaxial epidermal cells of monocot leaf
(C)	Bulliform cells	(III)	Abaxial epidermal cells of monocot leaf
(D)	Undifferentiated Mesophyll	(IV)	Monocot leaf
		(V)	Monocot stem

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

37. **Assertion (A):** Cellular respiration is an exergonic process.

Reason (R): The breaking of C-C bonds of complex compounds through oxidation within the cells, leads to release of considerable amount of energy.

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



38. Out of 64 codons, 61 codons code for 20 amino acids. This is due to;
- (1) Wobbling of codon.
 - (2) Overlapping of gene.
 - (3) Code being nearly universal.
 - (4) Degeneracy of genetic code.
39. If in a pond there are 50 lotus plants last year and through reproduction 10 new plants added, taking the current population to 60, the birth rate is _____ offspring per lotus per year.
- (1) 0.4
 - (2) 0.8
 - (3) 0.2
 - (4) 0.6
40. Read the following statements and identify the **correct** ones.
- I Underground stems act as organs of perennation to tide over conditions favourable for growth.
- II Axillary buds of stems may also get modified into woody, straight and pointed thorns.
- III Tendrils protect plants from browsing animals.
- IV Underground stems of some plants spread to new niches and when older parts die new plants are formed.
- (1) I and II
 - (2) II and IV
 - (3) I and III
 - (4) III and IV
41. Select the mismatched pair.
- (1) Order Primata – Gibbon, monkey, gorilla
 - (2) Order Carnivora – Tiger, cat, dog
 - (3) Order Polymoniales – Solanaceae and Liliaceae families
 - (4) Order Carnivora – Felidae and Canidae families
42. Infoldings of plasma membrane in bacteria are called
- (1) episomes.
 - (2) plasmid.
 - (3) pili.
 - (4) mesosomes.
43. Which of the following is false about ascomycetes?
- (1) Mode of nutrition saprophytic, decomposer, coprophilous (growing on dung) and parasitic.
 - (2) It includes unicellular (e.g. yeast) and multicellular forms.
 - (3) Its mycelum is coenocytic.
 - (4) Aspergillus, Claviceps and Neurospora are important members of ascomycetes.
44. The major difference between the mosses and ferns is
- (1) ferns lack alternation of generation, while mosses show the same.
 - (2) mosses are facultative aerobes, while ferns are obligate aerobes.
 - (3) vascular bundles of ferns show xylem vessels, while those of mosses lack it.
 - (4) sporophytes of ferns live much longer as compared to the sporophytes of mosses.
45. The vacuole is bound by a(a)... membrane called.... (b) In plant cells, vacuoles can occupy upto... (c)... of the volume of the cell. In Amoeba, the... (d).... vacuoles are important for excretion.
- (1) a = double, b = pellicle, c = 40%, d = food
 - (2) a = single, b = tonoplast, c = 90%, d = contractile
 - (3) a = double, b = tonoplast, c = 60%, d = gas
 - (4) a = single, b = pellicle, c = 75%, d = food
46. How many meiotic divisions are required to produce 200 seeds?
- (1) 50
 - (2) 100
 - (3) 250
 - (4) 800
47. If a plant is kept in 300 ppm CO₂ concentration, what will happen to it?
- (1) Plant will die soon.
 - (2) Plant will grow but will not die.
 - (3) Plant will show normal photosynthesis.
 - (4) Respiration will be greatly decreased.
48. The number of molecules of pyruvic acid formed from one molecule of glucose at the end of glycolysis is
- (1) 1
 - (2) 2
 - (3) 3
 - (4) 4



49. Leaf A of 20cm^2 grows 5cm^2 per hour and Leaf B of 25cm^2 grows 5cm^2 per hour. The relative growth rate of leaf A and B respectively is
- (1) 25% and 20% (2) 20% and 25%
(3) 50% and 100% (4) 25% and 50%

50. Ground tissue includes
- (1) all tissues external to endodermis
(2) epidermis and cortex
(3) all tissues internal to endodermis.
(4) all tissues except epidermis and vascular bundles.



PW Web/App - <https://smart.link/7wwosivoicgd4>

Library- <https://smart.link/sdfez8ejd80if>