



BOTANY

SECTION-A

1. Which of the following components provides sticky character to the bacterial cell?
- (1) Cell wall
 - (2) Nuclear membrane
 - (3) Plasma membrane
 - (4) Glycocalyx
2. Which of the following is made up of dead cells?
- (1) Xylem parenchyma
 - (2) Collenchyma
 - (3) Phellem
 - (4) Phloem
3. Palisade parenchyma is absent in leaves of:
- (1) *Sorghum*
 - (2) Mustard
 - (3) Soybean
 - (4) Gram
4. **Assertion (A)** : The decomposition rate of lignin and chitin is slow in colder climates.
Reason (R) : The rate of decomposition is controlled by chemical and climatic factors.
- (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)** and **Reason (R)** both are false.
5. Decline in the population of indian native fishes due to introduction of *Clarias gariepinus* in river Yamuna can be categorised as;
- (1) co-extinction
 - (2) habitat fragmentation
 - (3) over-exploitation
 - (4) alien species invasion.

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

List-I		List-II	
(A)	Pistils fused together	(I)	Gametogenesis
(B)	Formation of gametes	(II)	Pistillate
(C)	Hyphae of higher Ascomycetes	(III)	Syncarpous
(D)	Unisexual female flower	(IV)	Dikaryotic

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

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

List-I (Bioactive molecules)		List-II (Source)	
(A)	Cyclosporin A	(I)	<i>Monascus</i>
(B)	Statins	(II)	<i>Clostridium</i>
(C)	Clot buster	(III)	<i>Trichoderma</i>
(D)	Butyric acid	(IV)	<i>Streptococcus</i>

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

8. **Assertion (A)** : No two species can occupy the same ecological niche in habitat.

Reason (R): A habitat can contain only one ecological niche.

- (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)** and **Reason (R)** both are false.



9. Match the component of 'lac operon' of *E.coli* given under **List-I** with their function listed in **List-II** choose the answer with correct combination of alphabet of the two columns:

List-I (Component of lac Operon)		List-II (Function of lac Operon)	
(A)	Structural gene	(I)	Binding site for repressor protein
(B)	Operator gene	(II)	Codes for repressor protein
(C)	Promoter gene	(III)	Induces lactose transport from the medium
(D)	Regulator gene	(IV)	Codes for enzyme proteins
		(V)	Binding site for RNA-polymerase

- (1) (A) – (I), (B) – (IV), (C) – (II), (D) – (III)
 (2) (A) – (IV), (B) – (II), (C) – (I), (D) – (V)
 (3) (A) – (IV), (B) – (I), (C) – (V), (D) – (II)
 (4) (A) – (II), (B) – (IV), (C) – (III), (D) – (I)
10. Two crosses in which the source of gametes are reversed are called:
- (1) Test cross
 (2) Reverse cross
 (3) Dihybrid cross
 (4) Reciprocal cross

11. Identify the **correct** match.

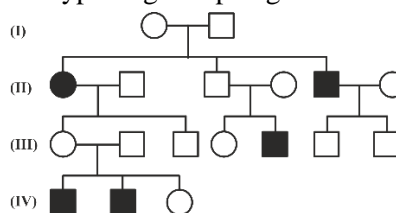
	List-I	List-II
(1)	Coleorhiza	Dicot family
(2)	Non-albuminous seed	Thick and swollen cotyledon
(3)	Residual nucellus	Maize
(4)	Residual endosperm	Pea

12. R and Y genes of Maize lie very close to each other. When RRYy and rryy genotypes are hybridized, F₂ generation will show:
- (1) Segregation in 9 : 3 : 3 : 1 ratio
 (2) Segregation in 3 : 1 ratio
 (3) Higher number of parental types
 (4) Higher number of recombination types

13. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind?

- (1) 25%
 (2) 0%
 (3) 50%
 (4) 75%

14. In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree:



- (1) X-linked dominant
 (2) Autosomal dominant
 (3) X-linked recessive
 (4) Autosomal recessive

15. Purines found both in DNA and RNA are:

- (1) Guanine and cytosine
 (2) Cytosine and thymine
 (3) Adenine and thymine
 (4) Adenine and guanine

16. Spliceosome are not found in the cells of:

- (1) Plants
 (2) Fungi
 (3) Animals
 (4) Bacteria

17. *Escherichia coli* cells with mutated z gene of the lac operon cannot grow in medium containing only lactose at the source of energy because:

- (1) Lac operon is constitutively active in these cells
 (2) They cannot synthesise functional beta-galactosidase
 (3) In the presence of glucose, *Escherichia coli* cannot utilize lactose
 (4) The bacterium cannot transport lactose from medium into cells.



18. During high light intensity, the chloroplasts align themselves

- (1) In vertical position along lateral walls
- (2) Along tangential walls
- (3) In centre and get scattered
- (4) Perpendicular to light.

19. The most common type of ovule of angiosperms:

- (1) Is orthotropous type
- (2) Is an upright ovule
- (3) Have micropyle close to hilum
- (4) Lacks embryo sac

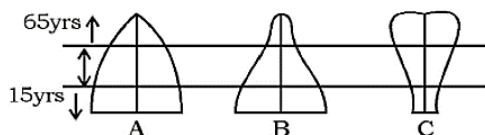
20. Which of the following structure guides the entry of pollen tube in embryo sac?

- (1) Antipodal cells
- (2) Secondary nucleus
- (3) Filiform apparatus
- (4) Chalazal cells

21. Largest cell of egg apparatus is:

- (1) synergids
- (2) Egg cell
- (3) Central cell
- (4) Antipodal

22. Given below population pyramids of three different populations A, B and C depicting the relationship between birth and death rates in each.



Which of the following is incorrect in reference of given pyramids?

- (1) Population B has slower growth rate than population A
- (2) Population C has birth rate higher than its death rate
- (3) Population A represents a rapidly growing population
- (4) Population B has highest death rate among the three population

23. The protons formed by splitting of water are released in the:

- (1) Lumen of the thylakoids
- (2) Outer side of the membrane
- (3) Both (1) & (2)
- (4) Stroma of chloroplast

24. Match **List-I** with **List-II** for housefly classification and select the correct option using the codes given below.

List-I		List-II	
(A)	Family	(I)	Diptera
(B)	Order	(II)	Arthropoda
(C)	Class	(III)	Muscidae
(D)	Phylum	(IV)	Insecta

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

25. Which among the following sentence is **incorrect** about light reaction?

- (1) It is also known as ‘photochemical’ phase.
- (2) It includes light absorption, water splitting, oxygen release, and the formation of high-energy chemical intermediates.
- (3) Reaction centre consist of single molecule of chl *a* but 2 molecules of chl *b*.
- (4) The pigments are organised into two discrete photochemical light harvesting complexes (LHC) within PS - I and PS - II.

26. In ETS the phosphorylation of ADP into ATP takes place due to the movement of hydrogen ion:

- (1) From Matrix to intermembranous space
- (2) From intermembranous space to matrix
- (3) Both (1) and (2)
- (4) None of the above

27. Select the **correct** match:

- (1) Alec Jeffreys: *Streptococcus pneumoniae*
- (2) Alfred Hershey and Martha Chase: TMV
- (3) Matthew Meselson and F. Stahl : *Pisum sativum*
- (4) Francois Jacob and Jacques Monod : Lac operon



28. In CAM plants:
- (1) Only C_3 enzymes are present in bundle sheath cells
 - (2) Only C_4 enzymes are present in bundle sheath cells
 - (3) Both C_3 and C_4 enzymes are present in leaf mesophyll cells
 - (4) Both C_3 and C_4 enzymes are present in bundle sheath cells
29. Which statement is false about photosynthesis?
- (1) The electron carriers involved in photophosphorylation are located in the thylakoid membranes
 - (2) In the photosynthetic process, PSII absorbs energy at 680 nm
 - (3) The absorption spectrum of chlorophyll shows that some colours of light are absorbed more than the others
 - (4) Compensation point of C_4 plant is higher than C_3 plants
30. What is total gain of ATP during aerobic respiration of one molecule of glucose in Eukaryotic cell?
- (1) 32 ATP
 - (2) 38 ATP
 - (3) 34 ATP
 - (4) 40 ATP
31. Which of the following organisms are known as chief producers in the oceans?
- (1) Dinoflagellates
 - (2) Diatoms
 - (3) Cyanobacteria
 - (4) Euglenoids
32. Ciliates differ from all other protozoans in:
- (1) Using flagella for locomotion
 - (2) Having a contractile vacuole for removing excess water
 - (3) Using pseudopodia for capturing prey
 - (4) Having two types of nuclei
33. Which of the following are found in extreme saline conditions?
- (1) Archaeobacteria
 - (2) Eubacteria
 - (3) Cyanobacteria
 - (4) Mycobacteria
34. Viroids differ from viruses in having:
- (1) DNA molecules with protein coat
 - (2) DNA molecules without protein coat
 - (3) RNA molecules with protein coat
 - (4) RNA molecules without protein coat
35. Which of the following statement(s) is/are **correct** about RuBisCO?
- (1) It catalyzes the fixation of CO_2 .
 - (2) It has oxygenation & carboxylation both activity.
 - (3) It is the most abundant protein on earth.
 - (4) All of the above
- [SECTION - B]**
36. Which of the following algae is likely to be found in the deepest waters?
- (1) Green
 - (2) Brown
 - (3) Red
 - (4) All are found at equal depths
37. Zygotic meiosis is characteristic of:
- (1) *Marchantia*
 - (2) *Fucus*
 - (3) *Funaria*
 - (4) *Chlamydomonas*
38. The gemmae produced by some liverworts function as:
- (1) A water gathering structure
 - (2) A light capturing structure
 - (3) A sexual structure
 - (4) An asexual structure
39. **Statement I:** *Neurospora* is extensively used in biochemical and genetical studies.
Statement II: Both *Claviceps* and *Neurospora* have conidia present endogenously on branched or unbranched conidiophores.
- (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.
40. Flowers are unisexual in:
- (1) Cucumber
 - (2) China rose
 - (3) Onion
 - (4) Pea
41. Axile placentation is present in:
- (1) Lemon
 - (2) Pea
 - (3) Argemone
 - (4) Dianthus.



42. Number of molecules of CO_2 generated in ETS when reduced coenzymes from one glucose molecule are oxidized?

- (1) Zero (2) 1
(3) 12 (4) 24

43. **Assertion (A):** Embryogenesis refers to the development of embryo from the zygote.

Reason (R): During Embryogenesis zygote undergoes cell division (mitosis) and cell differentiation.

- (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)** and **Reason (R)** both are false.

44. Match the **List-I** and **List-II**:

List-I		List-II	
A	Auxin	I	GA_3
B	Gibberellin	II	Indole Acetic acid
C	Cytokinin	III	Abscisic acid
D	Dormin	IV	Acetic acid
		V	Zeatin

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

45. The third name in trinomial nomenclature is:

- (1) Species (2) Subgenus
(3) Subspecies (4) Ecotype

46.
$$\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$$

On the basis of above formula, the growth of organism will ultimately determine by:

- (1) Only 'r' (2) Only 'K'
(3) Both 'r' and 'K' (4) Neither 'r' nor 'K'

47. If we analyse the species-area relationships among very large areas like the entire continents, then slope of line becomes much steeper in the range of:

- (1) 0.1 to 0.6 (2) 0.1 to 0.2
(3) 0.6 to 1.2 (4) 0.2 to 0.6

48. Consider following statements with respect to the C_4 pathway and select the correct ones.

- (i) Mesophyll cells possess both RuBisCo and PEPCase enzymes.
(ii) Initial CO_2 fixation occurs in mesophyll cells.
(iii) Final CO_2 fixation occurs in bundle sheath cells.

- (1) (i) and (ii) (2) (ii) and (iii)
(3) (i) and (iii) (4) (i), (ii) and (iii)

49. ZW/ZZ type of sex determination is seen in:

- (1) Platypus (2) Snails
(3) Cockroach (4) Peacock

50. The human chromosomes with the highest and least number of genes in them are respectively:

- (1) Chromosome 21 and Y
(2) Chromosome 1 and X
(3) Chromosome 1 and Y
(4) Chromosome X and

