1 Mark Questions

1. Penicillin functions as antibiotic mainly by inhibiting the ability of some bacteria to
   (a) form spores
   (b) replicate DNA
   (c) synthesize normal cell wall
   (d) produce functional ribosome

2. Glyoxylate cycle is used for generating
   (a) cyclic adenosine monophosphate
   (b) precursors for synthesis of aromatic amino acids
   (c) 4-carbon intermediates when cells grow on acetate
   (d) 4-carbon intermediates during growth on hexose

3. Agar-agar is produced by
   (a) *Gelidium, Gracilaria* and *Gigartina*
   (b) *Laminaria, Lessonia* and *Eisenia*
   (c) *Gelidium, Batrachospermum* and *Polysiphonia*
   (d) *Polysiphonia, Batrachospermum* and *Sargassum*

4. Which of the following pair of tissues has cell walls thickened with lignin?
   (a) Collenchyma and cork
   (b) Collenchyma and sclerenchyma
   (c) Sclerenchyma and cork
   (d) Sclerenchyma and xylem

5. Identify the mismatched compound.
   (a) Pectin (b) Gum (c) Cutin (d) Agar

6. The second law of thermodynamics is represented by
   (a) energy pyramid (b) number pyramid
   (c) food pyramid (d) biomass pyramid

2 Marks Questions

7. In Krebs' cycle, which of the following enzyme reaction release CO_2?
   A. Malate dehydrogenase
   B. Succinate dehydrogenase
   C. Isocitrate dehydrogenase
   D. α-ketoglutarate dehydrogenase
   (a) A and B (b) B and C
   (c) A and C (d) C and D

8. Which of the following statements are features of fasciculated root?
   A. An interesting tuberous root found in Asparagus.
   B. The adventitious roots occur in clusters and all are swollen.
   C. It is fusiform with abrupt tapering towards the lower end.
   D. The roots grow from the base of the plumules.
   (a) A and B (b) B and C
   (c) A and C (d) C and D

9. Consider a cross between plants heterozygous for two different genes (AaBb × AaBb), each assorting independently.
   What fraction of progeny will show the recessive phenotype for at least one gene?
   (a) $\frac{1}{16}$ (b) $\frac{9}{16}$
   (c) $\frac{7}{16}$ (d) $\frac{3}{16}$

10. Global warming is due to excessive emission of
    A. carbon dioxide B. oxides of nitrogen
    C. oxides of sulphur D. hydrogen sulphide
    (a) A and B (b) B and C
    (c) A and C (d) B and D

11. A disease free tomato plant was planted in soil contaminated with *Agrobacterium tumefaciens* harbouring T_i plasmid that lacks VirA gene. Provided all other conditions are optimum for the bacterial infection, identify the appropriate consequence.
    A. Octapine synthesis by the bacterium will enhance
    B. Acetylsyringone receptor will not be synthesized
    C. The bacteria will fail to transfer the T-DNA to the plant.
    D. A fragmented T-DNA will be transferred to the tomato plant.
    (a) A and D (b) B and D
    (c) A and C (d) B and C

12. Identify the correct statements for plantibodies.
A. Plantibodies are antibodies generated by bacteria.
B. Plantibodies are pre made antibodies that are produced in transgenic plants.
C. Plantibodies can not uncoat the calcium ion binding sites on the coat protein of the virus.
D. Plantibodies are toxins produced by plants.
(a) A and C (b) C and D
(c) B and C (d) B and D

13. Following is a DNA fragment isolated from the beginning of a gene. Identify the correct *m*RNA sequence with proper polarity.
DNA sequence:—CCC TAC GCC TTT CAG GTT—
—GGG ATG CGG AAA GTC CAA—
(a) 3′ AUG CGG AAA GUU CAA 5′
(b) 5′ AUG CGG AAA GUC CAA 3′
(c) 5′ UAC GCC UUU GUC CAA 3′
(d) 3′ UAC GCC UUU GAG GAA 5′

14. *Achyranthus aspera* and *Delphinium staphisagria* belong to the following families
(a) Amarantheceae and Rutaceae
(b) Amarantheceae and Ranunculaceae
(c) Amarantheceae and Tiliaceae
(d) Tiliaceae and Ranunculaceae

15. Active transport of ions across the membrane of a root hair cell can be assumed to be taking place if
A. the cell produces more glutathione
B. the cell has mitochondria
C. the uptake of ions stop when cyanide is added
D. the uptake of ions is against the concentration gradient
(a) A and C (b) C and D
(c) B and C (d) B and D

Q. No. 16 to 22 are Matching Exercises
In each question, each item A, B, C and D in Group I matches one of the items in Group II. Choose the correct match from the alternatives (a), (b), (c) and (d).

16.

Group I (Plant Disease)	Group II (Causal Organism)
A. Nigrospora disease of rice	1. *Ustilago nuda*
B. Loose smut of wheat	2. *Cercospora concors*
C. Ring spot of sugarcane	3. *Septoria tritici*
D. Leaf blotch of wheat	4. *Pyricularia oryzae*
	5. *Laptosphaeria sacchari*
	6. *Nigrospora oryzae*

Codes

	A	B	C	D
(a)	6	1	3	2
(c)	6	1	5	3

	A	B	C	D
(b)	6	1	4	3
(d)	6	4	3	2

17.

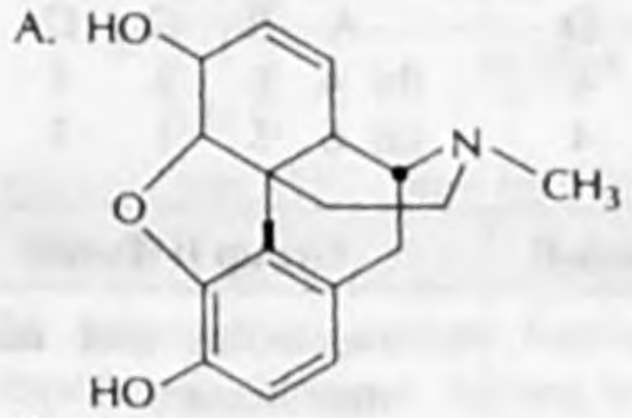
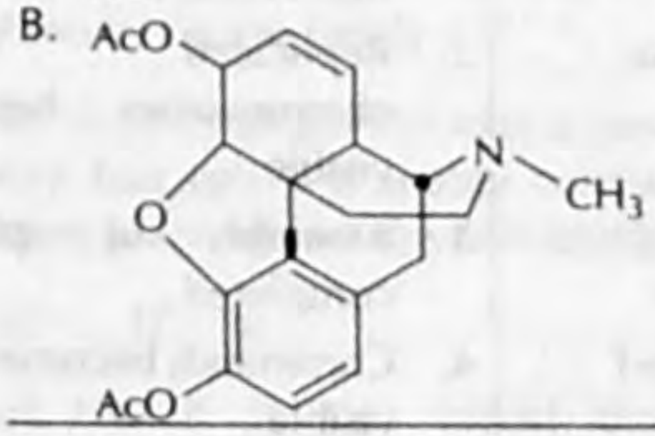
Group I (Fungal Toxin)	Group II (Causal Disease)
A. Tabtoxin	1. Canker
B. Phaseolotoxin	2. Leaf blight
C. Tentotoxin	3. Chlorosis
D. Hv toxin	4. Halo blight
	5. Wild fire
	6. Wheat rust

Codes

	A	B	C	D
(a)	1	2	3	6
(c)	2	4	6	3

	A	B	C	D
(b)	5	4	3	2
(d)	4	5	6	1

18.

Group I (Structure)	Group II (Alkaloids)
A. 	1. Morphine
B. 	2. Vincristine
	3. Heroin
	4. Cocaine

Codes

	A	B
(a)	1	2
(c)	3	1

	A	B
(b)	4	3
(d)	1	3

19.

Group I	Group II
A. Filamentous fungi	1. Malachite green
B. Gram staining of bacteria	2. Silver staining
C. Agarose gel	3. Lactophenol-cotton blue
D. Amino acid	4. Crystal voilet-safranin
	5. Ethkydium bromide
	6. Ninhydrin reagent

Codes

	A	B	C	D
(a)	2	4	5	1
(c)	6	1	3	2

	A	B	C	D
(b)	3	6	2	5
(d)	3	4	5	6

20.

Group I	Group II
A. Polysymbiosis	1. Algal component of lichen
B. Helotism	2. Fungal component of a lichen
C. Mycobiont	3. Pendant forms
D. Crustose lichen	4. A combination of algae, fungi and nitrogen fixing bacteria in a lichen thallus
	5. Lichen which form a crust closely addressed to the substrate
	6. A partnership between two organisms in which the association is decided at the expense of one

Codes

	A	B	C	D
(a)	1	2	3	4
(b)	4	6	2	5
(c)	2	6	3	4
(d)	6	5	1	3

21.

Group I (Meiosis-I)	Group II (Event)
A. Zygonema	1. Nucleolus and nuclear membrane
B. Diplonema	2. Replicated chromosomes become visible
C. Dikinesis	3. Assembly of spindle completed
D. Metaphase-I	4. Chromatids become fully visible
	5. Homologous chromosomes pair, crossing over occurs
	6. Homologous chromosomes pair

Codes

	A	B	C	D
(a)	6	2	4	5
(b)	1	2	5	4
(c)	5	2	1	6
(d)	6	4	1	3

22.

Group I (Stress-induced Biomolecule)	Group II (Stress)
A. Phytochelatin	1. Heat shock
B. Scytonemin	2. Phosphate limitati
C. Proline	3. Carbon limitation
D. Chaperonin	4. Metal stress
	5. UV radiation
	6. Osmotic stress

Codes

	A	B	C	D
(a)	2	5	6	1
(b)	3	4	6	2
(c)	4	5	6	1
(d)	1	6	4	3

Common Data for Questions 23 and 24

Nuclotide composition of four molecules is gi below.

Molecule	%A	%G	%T	%U	%C
P	33	17	33	0	17
Q	33	33	17	0	17
R	26	24	0	26	24
S	30	20	0	20	30

23. From the above table, identify the single-stranded RN molecule.

(a) P (b) Q
(c) R (d) S

24. From the above data, find out the double-strande nucleic acid molecule with the lowest T_M.

(a) P (b) Q
(c) R (d) S