

1 Mark Questions

- When changes in the phenotype or gene expression occur without changes in the underlying DNA sequence, the phenomenon is called
 - mutation
 - eugenics
 - epigenetics
 - epistasis
- A population growing exponentially can be described by the differential equation $\frac{dN}{dt} = rN$, where $\frac{dN}{dt}$ represents the rate at which the whole population grows, N is the size of the population, r is the intrinsic rate of increase, and t is time. According to this equation, the per capita rate of growth is
 - highest at large N
 - constant
 - lowest at large N
 - lowest at small N
- Which one of the following is not a plant hormone?
 - Abscisic acid
 - Brassinosteroid
 - Ethylene
 - Cytokine
- Arabidopsis* and rice have diploid chromosome numbers of 10 and 24, respectively. Assuming no crossing over taking place, genetic variation among F_2 individuals in a genetic cross is likely to be
 - same in both species but not zero
 - more in *Arabidopsis*
 - more in rice
 - zero in both the species
- Which of the following statements is correct?
 - Plants adapted to cold environment have higher ratio of "unsaturated to saturated" fatty acids in their membrane compared to those adapted to hot environment
 - Plants adapted to cold environment have lower ratio of "unsaturated to saturated" fatty acids in their membrane compared to those adapted to hot environment
 - Plants adapted to cold environment have same ratio of "unsaturated to saturated" fatty acids in their membrane compared to those adapted to hot environment
 - Plants do not have any unsaturated fatty acids in the membrane
- A sign is hammered into a tree trunk 2 metres above the tree's base. If the tree is 10 metres tall and elongates 1 metre each year, how high will the sign be after 10 years?
 - 12 metres
 - 7 metres
 - 4 metres
 - 2 metres
- In the arrangement of floral parts in a bud, identify the incorrect statement.
 - Valvate, where the petals or sepals do not overlap but simply touch one another by their margins
 - Scabrous, petals rough and harsh to touch
 - Epicalyx, an extra calyx found in some flowers outside the calyx
 - Imbricate, where sepals and petals overlap each other at the margin
- The possible genotypes of endosperms borne on a heterozygous (Rr) plant will be
 - RRR, RRr, Rrr, rrr
 - RRr, Rrr
 - RR, Rr, rr
 - Rr
- The amount of chemical energy available to consumers in an ecosystem is best represented by
 - gross primary production
 - net primary production
 - respiration
 - photosynthesis
- Free radical scavenging activity of a medicinally important plant extract can be quantified by
 - ABTS (2, 2'-azino-bis-(3-ethyl benzothiazoline 6-sulphonic acid))
 - Bradford method
 - Walkley and Black method
 - Kjeldahl method

2 Marks Questions

11. Identify the correct statements from the following
- Lenticels are the small pores present on the surface of the stem of branches of woody plants.
 - Glyoxysomes contain chlorophyll molecules in their thylakoid membranes.
 - The enzyme ribulose 1, 5 bisphosphate carboxylase is otherwise known as carboxydehydratase.
 - 18 ATP and 12 NADPH molecules are utilised for fixing 6 molecules of CO_2 in the dark reaction of photosynthesis.

- (a) A and B (b) A and C
(c) B and C (d) A and D

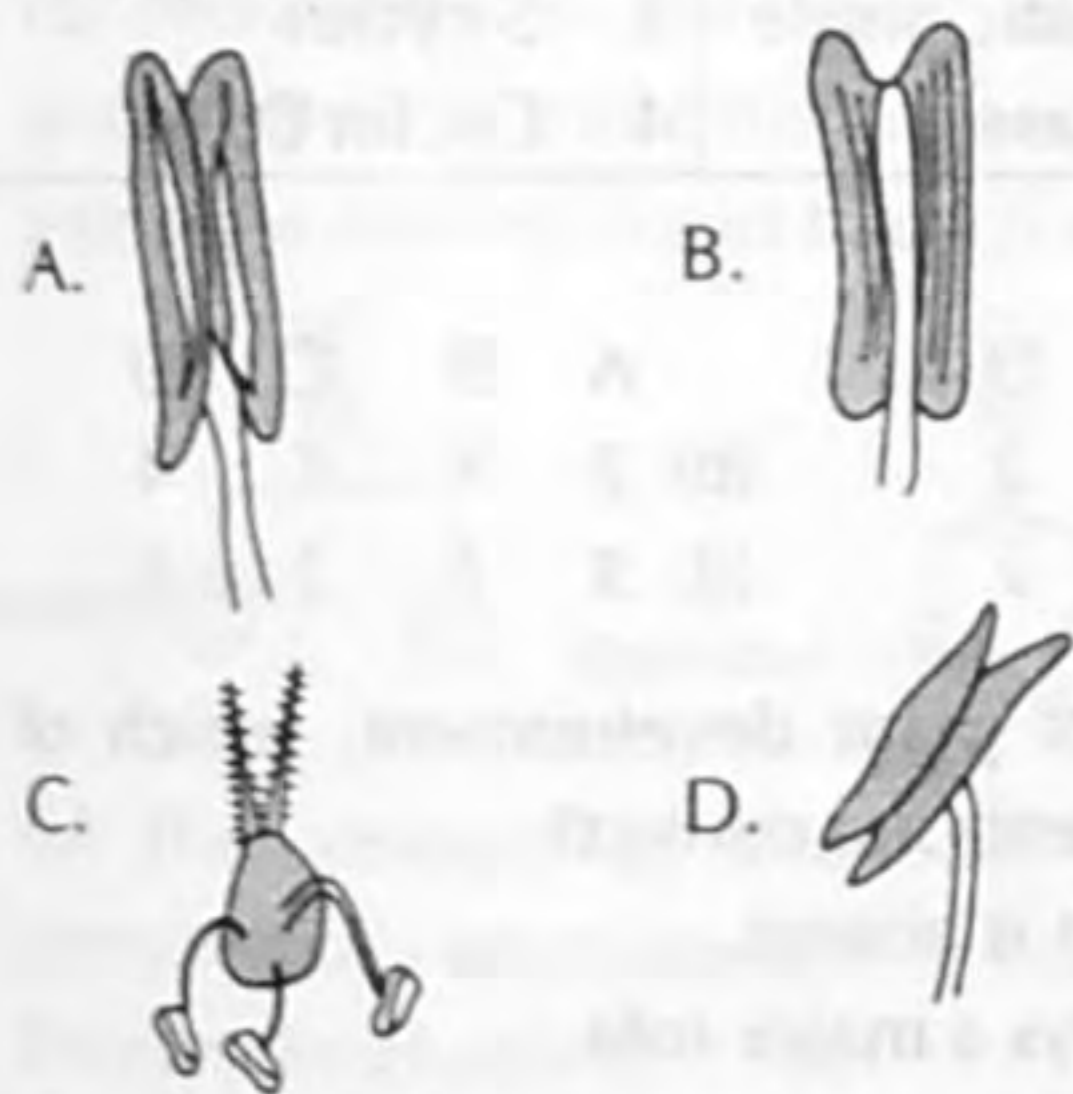
12. Match the following.

Group I	Group II	Group III
A. Sorghum	1. Gossypol	(i) Protein
B. Castor	2. Strychnine	(ii) Glycosidic conjugate
C. Mushroom	3. Dhurrin	(iii) Alkaloid
D. Cotton	4. Bungarotoxin	(iv) Polyphenol
	5. Ricin	(v) Lipid
	6. α -Amanitin	(vi) Cyclic peptide

- (a) A-3-ii, B-5-i, C-6-vi, D-1-iv
(b) A-2-iii, B-4-iv, C-1-ii, D-6-v
(c) A-2-vi, B-5-v, C-1-iv, D-6-ii
(d) A-2-i, B-3-iii, C-4-iv, D-1-v

13. Identify the correct match.

Group I (Anther)



Group II (Type of Fixation)

- Basified
- Longitudinal
- Dorsifixed
- Adenate
- Porous
- Versatile

Codes

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

14. From the structures given below, identify the compounds.

Group I (Structure)	Group II (Compound)
A.	1. Ethylene
B.	2. Indole butyric acid
C.	3. Nicotine
D. $CH_2=CH_2$	4. Indole acetic acid
	5. Gibberellic acid
	6. Menthol

Codes

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

15. Regarding the relationships between two organisms in an ecosystem, match the following.

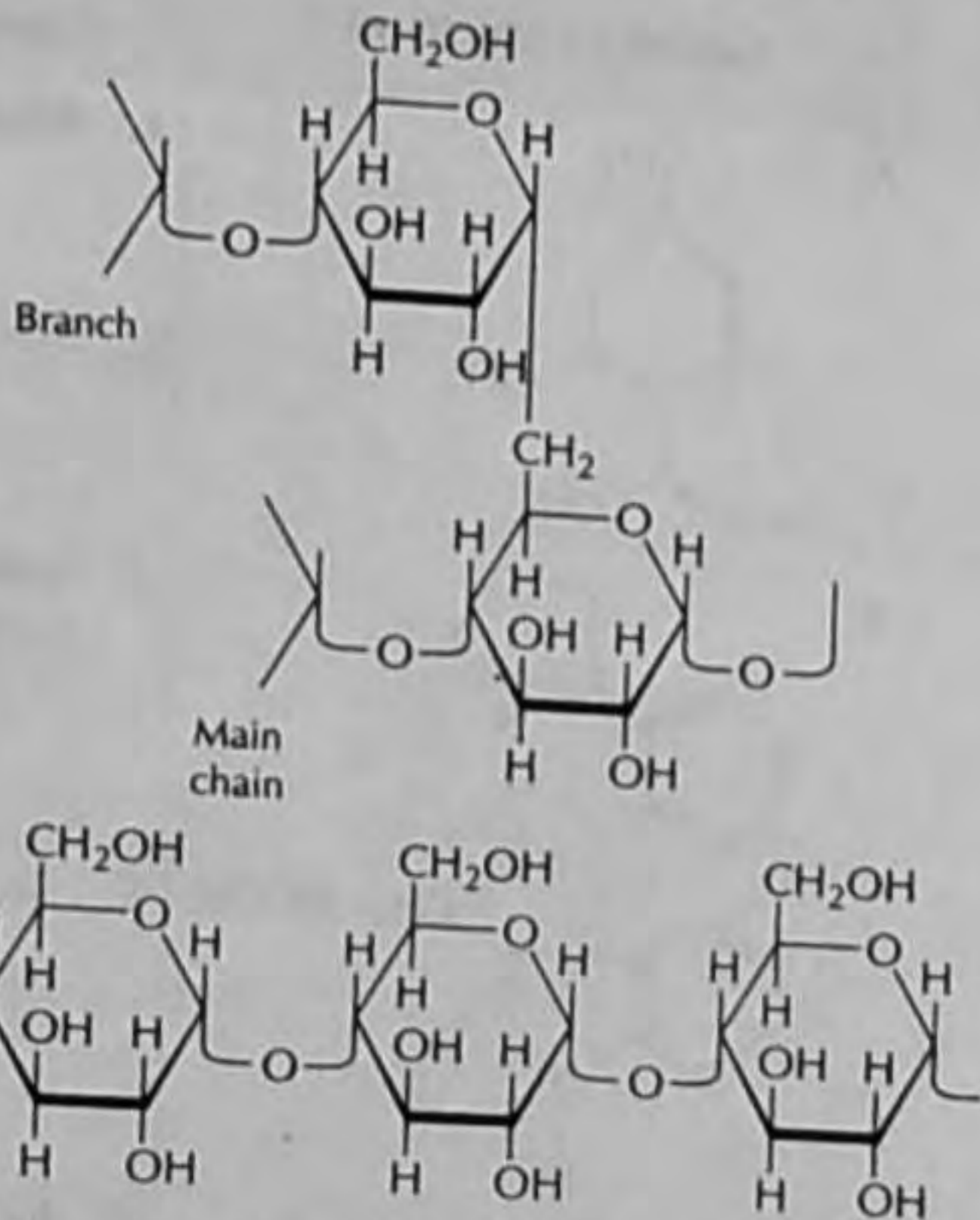
Group I (Relationship)	Group II (Definition)
A. Commensalism	1. Both organisms are benefitted
B. Mutualism	2. One impeding the success of the other
C. Parasitism	3. One organism benefits but the other is unaffected
D. Amensalism	4. One benefitted, other is harmed

Codes

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

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

16. Name the structures given below in the order of their appearance and identify corresponding glycosidic linkages.



- (a) Amylose, Cellulose; (α 1 \rightarrow 4), (β 1 \rightarrow 6)
 (b) Cellulose, Dextran; (β 2 \rightarrow 4), (α 3 \rightarrow 6)
 (c) Starch, Cellulose; (α 1 \rightarrow 6), (α 1 \rightarrow 4)
 (d) Amylopectin, Amylose; (α 1 \rightarrow 6), (α 1 \rightarrow 4)

17. Identify the correct statements.

In *Arabidopsis*, vernalization is associated with

- A. Chromatin modification at the FLC (Flowering Locus C) locus.
 B. Degradation of the FLC protein.
 C. Inactivating the FLC protein by post-translational modification.
 D. Down-regulation of FLC transcript.

- (a) B and D (b) A and D
 (c) A and C (d) B and C

18. Which of the following statements in plant respiration are correct?

- A. The oxidative Pentose Phosphate Pathway can accomplish the oxidation of glucose in the stroma of mitochondria.

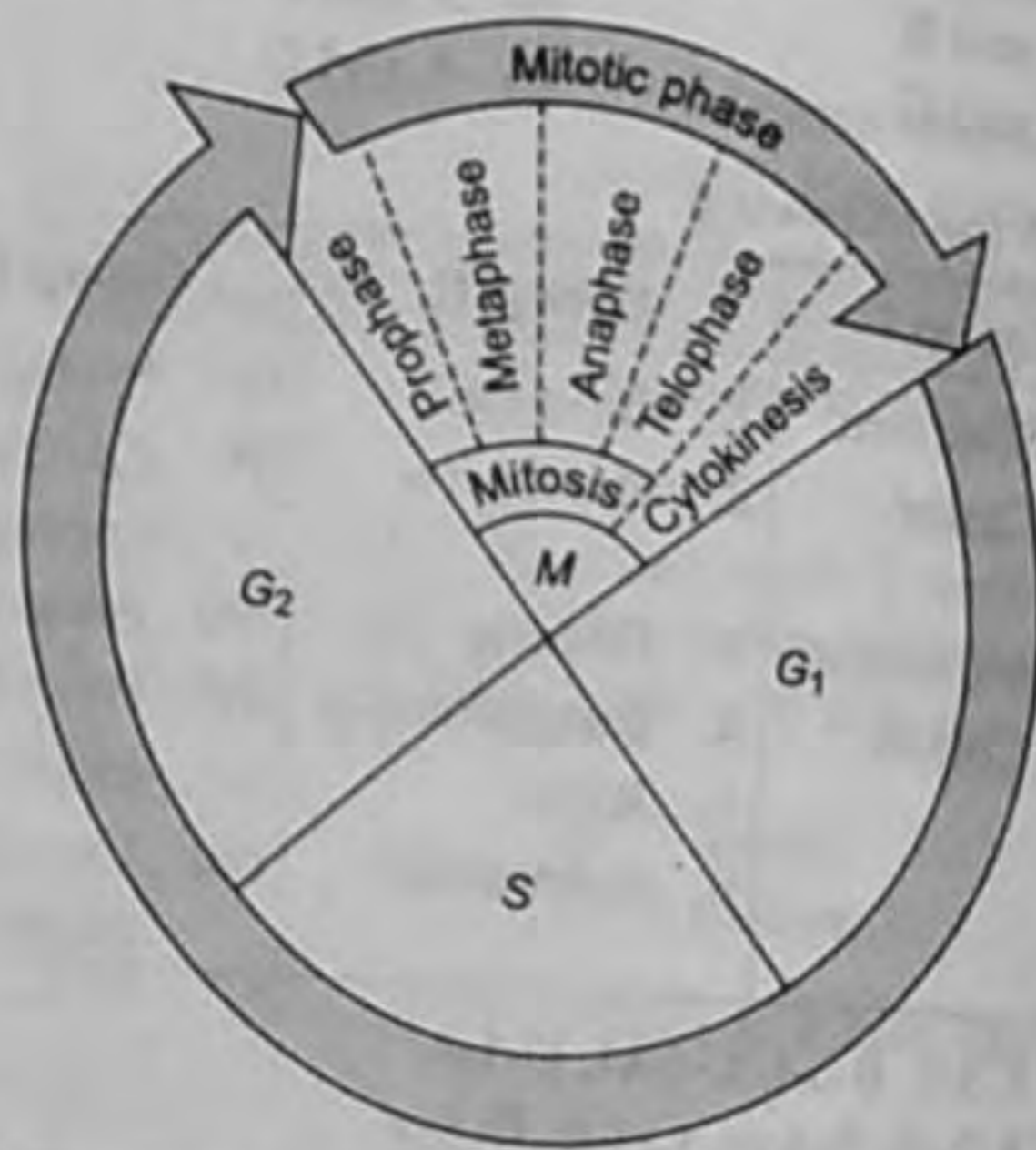
B. ATP is produced in the reaction step of TCA cycle catalysed by succinyl Co-A synthetase.

C. In addition to Cytochrome-c oxidase, an alternative oxidase enzyme resistant to cyanide reduces oxygen molecule in the electron transport system.

D. In glyoxylate cycle, acetyl Co-A reacts with citrate to form α -keto glutarate.

- (a) A and C (b) A and B
 (c) B and C (d) B and D

19. Study the following diagram depicting the plant cell cycle and match the following.



Stages of Cell Cycle	Type of Cyclin
A. Late G ₁ -phase	1. Cyclin B
B. Beginning of S-phase	2. Cyclin E
C. Prior to mitotic phase	3. S-cyclin
D. Early G ₁ -phase	4. Cyclin D

Codes

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

20. In the context of plant development, which of the following statements are correct?

- A. Cell migration is absent.
 Q. Apoptosis plays a major role.
 C. Pattern formation continues throughout life.
 D. Homeotic changes are caused by mutations in non-homeodomain proteins.

- (a) A, B and C (b) B, C and D
 (c) A, B and D (d) A, C and D