

BCM SCHOOL BASANT AVENUE DUGRI ROAD, LUDHIANA

SCIENCE ASSIGNMENT (2023-2024)

CLASS – X (BIO/CHEMISTRY)

1. Assertion (A) : The sex of a child in human beings will be determined by the type of chromosome he/she inherits from the father.
Reason (R) : A child who inherits 'X' chromosome from his father would be a girl (XX), while a child who inherits a 'Y' chromosome from the father would be a boy (XY).
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is, false.
(d) (A) is false, but (R) is true. (2020)
2. (a) Why did Mendel carry out an experiment to study inheritance of two traits in garden pea?
(b) What were his findings with respect to inheritance of traits in F₁ and F₂ generation?
(c) State the ratio obtained in the F₂ generation in the above mentioned.
3. A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other.
(a) List your observations regarding :
(i) Colour of stem in their F₁ progeny
(ii) Percentage of brown stemmed plants in F₂ progeny if plants are self pollinated.
(iii) Ratio of GG and Gg in the F₂ progeny.
(b) Based on the findings of this cross, what conclusion can be drawn?
4. (a) Why is the F₁ progeny always of tall plants when a tall plant is crossed with a short pea plant?
(b) How is F₂ progeny obtained by self-pollination of F₁ progeny different from F₁ progeny? Give reason for this observation.
(c) State a conclusion that can be drawn on the basis of this observation.
5. What are covalent bonds? Show their formation with the help of electron dot structure of methane. Why are covalent compounds generally poor conductors of electricity?
6. Give reasons for the following:
(i) Element carbon forms compounds mainly by covalent bonding.
(ii) Diamond has high melting point.
(iii) Graphite is a good conductor of electricity.
7. Elements forming ionic compounds attain noble gas electronic configuration by either gaining or losing electrons from their valence shells. Explain giving reason why carbon cannot attain such a configuration in this manner to form its compounds. Name the type of bonds formed in ionic compounds and in the compounds formed by carbon. Also explain with reason why carbon compounds are generally poor conductors of electricity.
8. Assertion (A) : Following are the members of a homologous series :
CH₃OH, CH₃CH₂OH, CH₃CH₂CH₂OH
Reason (R) : A series of compounds with same functional group but differing by -CH₂ unit is called homologous series.

- (a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

9. Case Study

Pea plants can have smooth seeds or wrinkled seeds. One of the phenotypes is completely dominant over the other. A farmer decides to pollinate one flower of a plant with smooth seeds using pollen from plant with wrinkled seeds. The resulting pea pod has all smooth seeds.

(i) Which of the following conclusions can be drawn?

- (1) The allele for smooth seeds is dominated over that of wrinkled seeds.
- (2) The plant with smooth seeds is heterozygous.
- (3) The plant with wrinkled seeds is homozygous.

- (a) 1 only
- (b) 1 and 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

(ii) Which of the following crosses will give smooth and wrinkled seeds in same proportion?

- (a) RR X rr
- (b) Rr x rr
- (c) RRX Rr
- (d) rrrr

(iii) Which of the following cross can be used to determine the genotype of a plant with dominant phenotype?

- (a) RR RR
- (b) Rr x Rr
- (c) Rr RR
- (d) RR x rr

(iv) On crossing of two heterozygous smooth seeded plants (Rr), a total of 1000 plants were obtained in F1

generation. What will be the respective number of smooth and wrinkled seeds obtained in F1 generation?

- (a) 750, 250
- (b) 500, 500
- (c) 800, 200
- (d) 950, 50

(v) The characters which appear in the first filial generation are called

- (a) recessive characters
- (b) dominant characters
- (c) lethal characters
- (d) non-mendelian characters.