

CBSE Test Paper 02
Ch-5 Principles of Inheritance and Variation

1. Two alleles of a gene pair are located on homologous site on
 - a. Sex chromosomes
 - b. Autosomal chromosome
 - c. Homologous chromosome
 - d. Heterologous chromosome
2. Which of the following is not a deviation from Mendelism?
 - a. Multiple alleles
 - b. ABO blood grouping
 - c. Dihybrid cross
 - d. Incomplete dominance
3. In our society, female are blamed for producing female children due to
 - a. Scientific reasons
 - b. False notation
 - c. Production of same kind of gametes
 - d. Biological concepts
4. Assertion: Chromosomes and genes both occur in pair.
Reason: The two alleles of gene pair are located on homologous sites on homologous chromosomes.
 - a. Reason is not related to assertion
 - b. Assertion is correct but reason is incorrect
 - c. Assertion and reason both are correct
 - d. Assertion and reason both are incorrect
5. When two genes present on different loci produce the same effect when present alone but interact to form a new trait when present together are called
 - a. Polymeric genes
 - b. Duplicate genes
 - c. Complementary genes
 - d. Supplementary genes
6. What kind of test will you perform to find out whether the given plant is homozygous

dominant or heterozygous?

7. A garden pea plant produced axial white flowers. Another of the same species produced terminal violet flowers. Identify the dominant traits.
8. Which one of the following diseases could be avoided in the progeny by analyzing the pedigree of the parents: Down's syndrome, Phenylketonuria, Poliomyelitis.
9. A man of A blood group marries a woman of AB blood group. Which type of progeny would indicate that man is heterozygous A?
10. The following table shows the genotypes for ABO blood grouping and their phenotypes. Fill in the gaps left in the table.

S.No.	Genotype	Blood Group
1	$I^A I^A$	A
2	_____	A
3	$I^B I^B$	B
4	_____	B
5	$I^A I^B$	_____
6	_____	O

11. Write the sex chromosomal complement of the following:

	Animal	Sex Chromosomes
i	Drosophila ♂	a
ii	Grasshopper ♂	b
iii	Fowl ♀	c
iv	Homo Sapiens ♀	d

12. A dihybrid heterozygous round, yellow-seeded garden pea was crossed with a double recessive plant.

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- i. What type of cross is this?
 - ii. Work out the genotype and phenotype of the progeny.
 - iii. What principle of Mendel is illustrated through the result of this cross?
 13. The Biology teacher asked the students to verify the experiment on Transformation principle in bacteria to establish DNA as genetic material. The class was divided into two groups. The teacher asked them to submit the reports. Group 2 did not use the mouse and did not repeat Griffith's experiment. The teacher praised them.
 - i. What values did the Group 2 exhibit?
 - ii. Which experiment did they perform? Explain in brief.
 14. In a pea plant, the smooth seed coat is dominant over wrinkled seed coat. What will be the expected ratio of phenotypes of the offspring in a cross between
 - i. Heterozygous smooth \times Heterozygous smooth
 - ii. Heterozygous smooth \times Homozygous wrinkled
 - iii. Heterozygous smooth \times Homozygous smooth
 15. A woman with blood group O married a man with AB group. Show the possible blood groups of the progeny. List the alleles involved in this inheritance.

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Answer

1. c. Homologous chromosome, **Explanation:** Two alleles of gene pair are located on homologous site on homologous chromosomes. During gamete formation, homologous chromosome separate from each other carrying one set of allelomorphic genes.
2. c. Dihybrid cross, **Explanation:** The events that do not follow Mendel's laws of inheritance are called deviation from Mendelism. Incomplete dominance, ABO blood grouping and multiples alleles are deviation from Mendelism.
3. b. False notation, **Explanation:** In our society, female are blamed for producing female children due to false notation. Although, male sperm decide the sex of the baby during fertilization.
4. c. Assertion and reason both are correct, **Explanation:** In diploid cells both chromosomes and genes occur in pairs. Two alleles of gene pair are located on homologous sites on homologous chromosomes.
5. c. Complementary genes, **Explanation:** complementary genes are one of two or more genes that when present together produce effects qualitatively distinct from the separate effect of any one of them.
6. Test cross will be performed where the given plant is crossed with recessive plant.
7. Axial and violet.
8. Phenylketonuria
9. A man of A-blood group marries a woman of AB blood group then the progeny of B Blood group can indicate the man is heterozygous.

If the male parent is homozygous for A Blood group, then only possibility of progeny will be showing either A blood group or AB blood group. If the the male parent is heterozygous for A blood group then the possibility of progeny will be showing A blood group, AB blood group or B blood group.

Thus, the distinction would be made only on the basis of progeny showing B Blood group

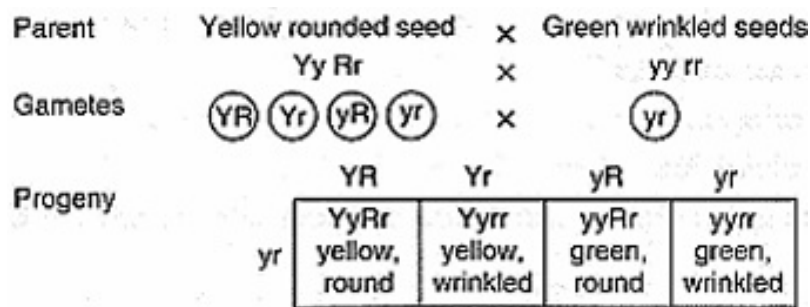
10.

S.No.	Genotype	Blood Group
1	$I^A I^A$	A
2	$I^A i$	A
3	$I^B I^B$	B
4	$I^B i$	B
5	$I^A I^B$	AB
6	ii	O

11. (i) XY (ii) XO (iii) ZW (iv) XX

12. i. It is a test cross

ii.



	YR	Yr	yR	yr
yr	YyRr yellow, round	Yyrr yellow, wrinkled	yyRr green, round	yyrr green, wrinkled

The test cross ratio is 1 : 1 : 1 : 1

iii. The principle of segregation.

13. i. Scientific attitude, awareness and love for animals and respect towards government policies.

ii. The students repeated the experiment performed by Oswald Avery, Colin MacLeod and Maclyn McCarty (1933-44), who worked to determine the biochemical nature

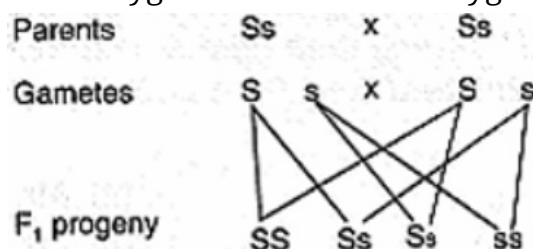
of 'transforming principle' in Griffith's experiment. They purified biochemicals (proteins, DNA, RNA, etc.) from the heat-killed S cells to see which ones could transform live R cells into S cells. They discovered that DNA alone from S bacteria caused R bacteria to become transformed. They also discovered that protein-digesting enzymes (proteases) and RNA-digesting enzymes (RNases) did not affect transformation, so the transforming substance was not a protein or RNA. Digestion with DNase did inhibit transformation, suggesting that the DNA caused the transformation.

Follow the diagram below.



14. Smooth seed coat (dominant) = S
Wrinkled seed coat (recessive) = s

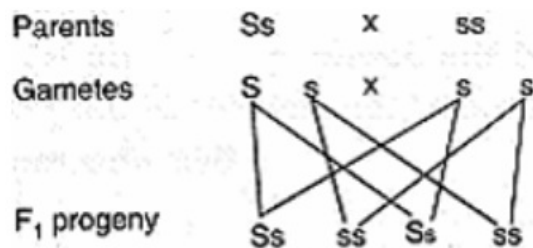
i. Heterozygous smooth Heterozygous smooth



3 smooth : 1 wrinkled

= 3 : 1 ratio-Heterozygous smooth \times Homozygous wrinkled

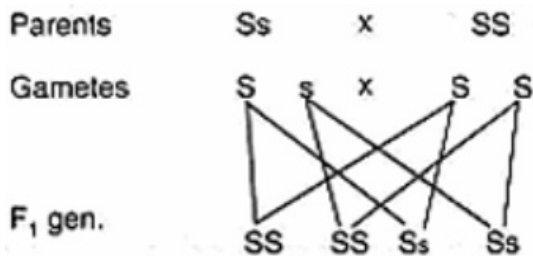
ii.



phenotype-2 smooth : 2 wrinkled

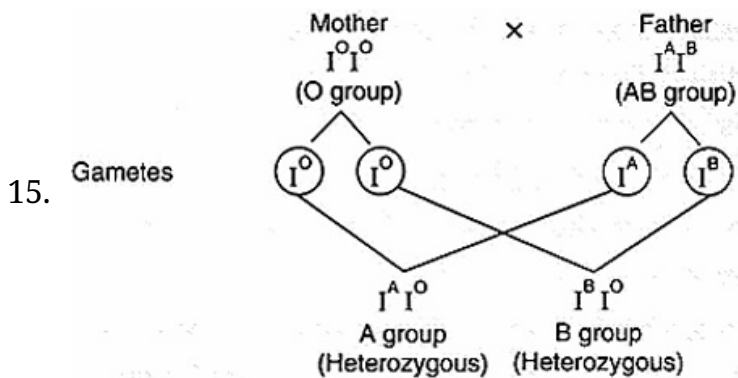
= 1 : 1

iii. Heterozygous smooth \times Homozygous smooth



Phenotype-all smooth

= 1 : 0



Possible groups: A, B

Alleles: I^A , I^B and I^O