



# **BIOLOGY**

**BOOKS - VIKRAM PUBLICATION (  
ANDHRA PUBLICATION)**

**PRINCIPLES OF INHERITANCE AND  
VARIATION**

**Very Short Answer Questions**

1. Two genes A and B are linked in a dihybrid cross involving these two genes, the  $F_1$  heterozygote is crossed with homozygous recessive parental type (aa bb). What would be the ratio of offspring in the next generation?



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2. Write a short note on the law of "inheritance of acquired characters".



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3. Who had proposed the chromosomal theory of the inheritance?



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4. When true breeding pea plant with yellow wrinkled seeds is crossed to true breeding pea plant with green round seeds the genotype of progeny will be



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5. Define and terms phenotype and genotype.



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6. What is point mutation? Give one example.



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7. The genotype of a dominant phenotype



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8. What will be the phenotypic ratio in the offsprings obtained from the following crosses.

(a)  $Aa \times aa$  (b)  $AA \times aa$  (c)  $Aa \times Aa$  (d)  $Aa \times AA$

Note : Gene 'A' is dominant over gene 'a'.



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9. In garden pea, the gene T for tall is dominant over its allele for dwarf. Give the

genotypes of the parents in the following crosses.

(a) Tall  $\times$  Dwarf producing all tall plants.

(b) tall  $\times$  tall producing 3 tall and 1 dwarf plants.



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## Short Answer Questions

1. Mendel selected a pea plant for his experiments. Mention the reasons for the

selection of these plants.



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2. Differentiate between the following -

(a) Dominance and Recessive (b) Homozygous

and Heterozygous

(c) Monohybrid and Dihybrid.



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**3. Differentiate between the following -**

(a) Dominance and Recessive (b) Homozygous  
and Hetrozygous

(c) Monohybrid and Dihybrid.



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**4. What is law of dominance?**



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5. The genotypic ratio and phenotypic ratio of back cross and test cross of a Mendelian monohybrid respectively



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6. What is the law of dominance?



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7. Explain the Incomplete Dominance with example.



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8. Write a brief note on chromosomal mutations and gene mutations



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9. State the law of segregation.



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## Long Answer Questions

1. Write about dihybrid cross with the help of checker board?



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## Important Questions

1. What is the cross between the  $F_1$  Progeny and the Homozygous recessive parent called ?

How is it useful ?



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2. Who had proposed the chromosomal theory of the inheritance?



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3. When true breeding pea plant with yellow cotyledons are round seeds is crossed to a plant with green cotyledons and wrinkled seeds the genotype of progeny will be



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4. Define and terms phenotype and genotype.



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5. What is point mutation? Give one example.



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6. The genotype of a dominant phenotype



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7. Differentiate between the following -

(a) Dominance and Recessive (b) Homozygous

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**8. Differentiate between the following -**

(a) Dominance and Recessive (b) Homozygous

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(c) Monohybrid and Dihybrid.



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**9.** The genotypic ratio and phenotypic ratio of back cross and test cross of a Mendelian monohybrid respectively



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**10.** Write a brief note on chromosomal mutations and gene mutations



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**11.** State the law of independent assortment.



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**12.** Write about dihybrid cross with the help of checker board?



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**Exercises**

1. Mendel crossed pea plants producing round seeds with those producing wrinkled seeds. From a total of 7324  $F_2$  seeds, 5474 were round and 1850 were wrinkled. Using the symbols R and r for genes, predict the (a) the parental (p) genotypes, (b) the gametes, (c)  $F_1$  progeny, (d) the cross between  $F_1$  hybrids, (e) genotypes, phenotypes, genotypic frequency, phenotypic ratio of  $F_2$  progeny.



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2. The following data was obtained from an experiment on peas. The grey coloured seed is dominant over white coloured seed. Use the letter G for grey and g for white traits. Predict genotypes of the parents in each of the following crosses.

Parent	Progeny	
	Grey	White
a) Grey × White	164	156
b) Grey × Grey	59	19
c) White × White	0	100
d) Grey × Grey	180	0



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3. In tomatoes red fruit colour (R ) is dominant yellow (r ). Suppose a tomato plant homozygous for red is crossed with one homozygous for yellow. Determine the appearance of following.

(a) The  $F_1$ , (b) The  $F_2$ , (c ) The offspring of a cross of the  $F_1$  back to the red parent, (d) The offspring of a cross of the  $F_1$  back to the yellow parent.



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4. In pea, axillary position of flowers T is dominant over its terminal position (t). Coloured flowers (C ) are dominant to white flowers (c ). A true breeding plant with coloured flowers in axils is crossed to one with white terminal flowers. Give the phenotypes, genotypes and expected ratio of  $F_1$ ,  $F_2$  back cross and test cross progenies. What genotype ratio is expected in the  $F_2$  progeny ?



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5. In summer squash, a plant with white flowers and disc shaped fruits is crossed to a plant with yellow flowers and sphere shaped fruits. The  $F_1$  hybrids had white flowers and disc shaped fruits. Which phenotypes are dominant ? Give the genotypes of the parents and the hybrids. If these hybrids were selfed and 256 progeny were obtained what would be the frequency of the various phenotypes ?



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6. What is the genotypic ratio of monohybrid cross?



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7. A diploid organism is heterozygous for 4 loci, how many types of gametes can be produced?



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**8.** Crossing over occurs between



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**9.** Which of the following is a inherited trait ?



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**10.** For the expression of traits, genes provide only the potentiality and the environment



provides the opportunity. Comment on the veracity of the statement.



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11. Two heterozygous parents are crossed. If the two loci are linked what would be the distribution of phenotypic features in  $F_1$  generation for a dihybrid cross ?



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12. In peas, tallness is dominant over dwarfness and violet colour of flowers is dominant over the white colour. When a tall plant bearing violet flowers was pollinated with a dwarf plant bearing white flowers, different phenotypic groups were obtained in the progeny in numbers mentioned against them.

Tall, violet = 138

Tall, white = 132

Dwarf, violet = 136

Dwarf, white = 128

Mention the genotypes of the two parents and of the four offsprings.



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**13.** The most important feature of all the living systems from the view point of their continuity is their capacity to



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