



# BIOLOGY

## BOOKS - USHA BIOLOGY (ODIA ENGLISH)

### HEREDITY & VARIATION

#### Exercise

1. The genotype of a plant showing the dominant phenotype can be determined by :

A. Test cross

B. Dihybrid cross

C. Pedigree analysis

D. Back cross

**Answer: A**



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2. Which one of the following cannot be explained on the basis of Mendel's Law of Dominance ?

- A. The discrete unit controlling a particular character is called a factor
- B. Out of one pair factors one is dominant and the other is recessive
- C. Alleles do not show any blending and both the characters recover as such in  $F_1$  generation
- D. Factors occur in pairs .

**Answer: C**



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**3.** Inheritance of flower colour is an example of incomplete dominance , which is seen in :

A. Antirrhinum

B. Pisum

C. Bamboo

D. Hibiscus

**Answer: A**



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4. The graphical representation to calculate the probability of all possible genotypes of offspring in a genetic cross is called :

A. pedigree analysis

B. karyotype

C. Punnett square

D. chromosome map

**Answer: C**



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5. The  $F_2$  genotype ratio of monohybrid cross is :

A. 1 : 1

B. 2 : 1 : 1

C. 1 : 2 : 1

D. 9 : 3 : 3 : 1

**Answer: C**



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6. To determine heterozygosity of a cross , one has to perform :

- A. back cross
- B. reciprocal cross
- C. test cross
- D. Any of these

**Answer: C**



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7. Test cross is a cross between :

A. *Hybrid* × *Do min antparent*

B. *Hybrid* × *Recessiveparent*

C. *Hybrid* × *Hybridparent*

D. Two distantly related species

**Answer: B**



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8. A gene that masks another gene's expression is called :

A. dominant

B. recessive

C. epistatic

D. assorted

**Answer: C**



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9. Genes exhibiting multiple effects are known as :

A. complementary genes

B. pleiotropic genes

C. cistrons

D. pseudogenes

**Answer: B**



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10. In case of incomplete dominance , what will be the phenotypic ratio of  $F_2$  generation ?

A. 3:1

B. 1:2:1

C. 1:1:1:1

D. 2:2

**Answer: B**



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**11. Genes are made up of :**

A. histones

B. hydrocarbons

C. polynucleotides

D. lipoproteins

**Answer: C**



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12. A dihybrid for qualitative trait is crossed with homozygous recessive individual of its type , the phenotypic ratio is :

A. 1 : 2 : 1

B. 3 : 1

C. 1 : 1 : 1 : 1

D. 9 : 3 : 3 : 1

**Answer: C**



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**13.** In garden pea, yellow colour of cotyledons is dominant over green and round shape of seed is dominant over wrinkled. When a plant with yellow and round seeds is crossed with a plant having yellow and wrinkled seeds, the progeny showed segregation for all the four characters. The probability of obtaining green round seeds in the progeny of this cross is :

A.  $1/4$

B.  $1/8$

C.  $1/16$

**Answer: B**



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**14.** A true breeding plant producing red flowers is crossed with a pure plant producing white flowers . Allele for red colour of flower is dominant . After selfing the plants of first filial generation , the proportion of plants

producing white flowers in the progeny would be :

A.  $3/4$

B.  $1/4$

C.  $1/3$

D.  $1/2$

**Answer: B**



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15. Test cross is a cross between :

A.  $Ww \times WW$

B.  $Ww \times Ww$

C.  $Ww \times ww$

D.  $WW \times WW$

**Answer: C**



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16. The phenotypic ratio in the  $F_2$  generation of dihybrid cross is :

A. 9 : 3 : 3 : 1

B. 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1

C. 7 : 1 : 1 : 7

D. 12 : 8 : 4

**Answer: A**



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17. Grain colour in wheat is determined by three pairs of polygene . Following the corss AAB<sub>2</sub>CC ( dark colour ) x aabbcc ( light colour ) , in  $F_2$  -generation , what proportion of the progeny is likely to resemble either parent ?

- A. Half
- B. Less than 5 percent
- C. One third
- D. None of these

**Answer: B**





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18. Which of the following genes show the heterozygous condition ?

A. Rr

B. RR

C. rr

D. None of these

**Answer: A**



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19. A dihybrid for qualitative trait is crossed with homozygous recessive individual of its type , the phenotypic ratio is :

A. 1 : 2 : 1

B. 3 : 1

C. 1 : 1 : 1 : 1

D. 9 : 3 : 3 : 1

**Answer: C**



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20. Which of the following is best suited for codominance ?

- A. Both recessive
- B. Both are dominance
- C. One is recessive
- D. One is dominance

**Answer: B**



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21. When a dihybrid cross is fit into a punnett square with 16 boxes , the maximum number of different phenotypes available are :

A. 8

B. 4

C. 2

D. 16

**Answer: B**



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22. In guinea pigs , black short hair ( BBSS ) is dominant over white long hair ( bbss ) . During a dihybrid cross , the  $F_2$  -generation individuals with genotypes BBSS . BbSS . BBSs and BbSs are in the ratio of :

A. 9 : 3 : 3 : 1

B. 4 : 2 : 1 : 2

C. 1 : 2 : 1 : 2

D. 1 : 2 : 2 : 4



**Answer: D**



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**23.** A pure tall and a pure dwarf plant were crossed to produced offsprings . Offsprings were self crossed then find out the ratio between true breeding tall to true breeding dwarf ?

A. 1 : 1

B. 3 : 1

C. 2:1

D. 1:2:1

**Answer: A**



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**24.** If  $\forall \times aaBB$ , then phenotypic ratio of its progeny will be :

A. 9:3:3:1

B. 1:2:1

C. 1:1:1:1

D. 4:1

**Answer: A**



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**25.** The experimental plant material used by

Mendel was :

A. Cow pea

B. Garden pea

C. Wild pea

D. Sweet pea

**Answer: B**



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**26.** In pea plants , yellow seeds are dominant to green . If a heterozygous yellow seeded plant is crossed with a green seeded plant , what ratio of yellow and green seeded plants would you expect in  $F_1$  - generation ?

A. 50:50

B. 9:1

C. 1:3

D. '3:1'

**Answer: A**



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27. In a given plant, red colour ( R ) of fruits is dominant over white fruit ( r ), and tallness ( T ) is dominant over dwarfness ( t ). If a

plant with genotype  $RRTt$  is crossed with a plant of genotype  $rrtt$  , what will be the percentage of tall plants with red fruits in the next generation ?

A. 100

B. 25

C. 50

D. 75

**Answer: C**



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**28.** Which of the following characters is not among the seven characters considered by Mendel for his hybridization experiments ?

- A. Seed colour
- B. Pod shape
- C. Flower position
- D. Flower shape

**Answer: D**



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29. When a tall plant with round seeds ( TTRR ) crossed with a dwarf plant with wrinkled seeds ( ttrr ) , the  $F_1$  generation consists of tall plant with round seeds . What would be the proportion of dwarf plant with wrinkled seeds in  $F_1$  -generation ?

A.  $1/4$

B.  $1/16$

C. 0

D.  $1/2$



**Answer: C**



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**30.** When a cross is conducted between black feathered hen and a white feathered cock , blue feathered fowls are formed . When these fowls are allowed for interbreeding , in  $F_1$  - generation , there are 20 blue fowls . What would be the number of black and white fowls .

A. Black 20 , white 10

B. Black 20 , white 20

C. Black 10 , white 10

D. Black 10 , white 20

**Answer: C**



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**31.** A plant of  $F_1$  - generation has genotype 'AABbCC' . On selfing of this plant . the phenotypic ratio in  $F_2$  -generation will be

A. 3:1

B. 1:1

C. 9:3:3:1

D. 27:9:9:3:3:3:1

**Answer: A**



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**32.** In a monohybrid cross involving incomplete dominance, the phenotypic ratio

equals the genotypic ratio in  $F_2$  -generation .

The ratio is :

A. 3:1

B. 1:2:1

C. 1:1:1:1

D. 9:7

**Answer: B**



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**33.** How many different kinds of gametes will be produced by a plant having the genotype AABbCC ?

A. Three

B. Four

C. Nine

D. Two

**Answer: D**



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34. When tall and dwarf plants are crossed ,  
from which cross 1 : 1 ratio is obtained ?

A. Tt and tt

B. tt and tt

C. Tt and Tt

D. TT and Tt

**Answer: A**



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35. In *Mirabilis*, a hybrid for red (RR) and white (rr) flower produces pink (Rr) flower. A plant with pink flower crossed with white flower, the expected phenotypic ratio is :

A. *red: pink: white*(1: 2: 1)

B. *Pink: white*(1: 1)

C. *red: pink*(1: 1)

D. *red: white*(3: 1)

**Answer: B**



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36. Ratio of progeny , when a red coloured heterozygote is crossed with a white coloured plant in which red colour is dominant to white colour :

A. 3:1

B. 1:1

C. 1:2:1

D. 9:3:3:3:1

**Answer: B**





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37. Two pea plants were subjected for cross pollination . Of the 183 plants produced in the next generation . 94 plants , were found to be tall and 89 plants were found to be dwarf.The genotypes of the two parental plants are likely to be :

A. TT and tt

B. Tt and Tt

C. Tt and tt

D. TT and TT

**Answer: C**



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**38.** The total number of progeny obtained from a dihybrid cross is 1280 in  $F_2$  -generation . How many of them are recombinant type ?

A. 240

B. 360

C. 480

D. 720

**Answer: C**



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**39.** What type of gametes will form by genotype  $RrYy$  ?

A.  $RY, Ry, rY, ry$

B.  $RY, Ry, ry, ry$

C. Ry , Ry , Yy , ry

D. Rr , RR , Yy , YY

**Answer: A**



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**40.** Pure tall plants are crossed with pure dwarf plants . In the  $F_1$  - generation , all plants were tall . These tall plants of  $F_1$  -generation were selfed and the ratio of tall to dwarf plants obtained was 3: 1 . This is called :

A. dominance

B. inheritance

C. codominance

D. heredity

**Answer: A**



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**41.** The term linkage was coined by

A. G. Mendel

B. W. Sutton

C. T.H. Morgan

D. T. Boveri

**Answer: C**



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**42.** Crossing over is advantageous because it brings about

A. variation

B. linkage

C. inbreeding

D. stability

**Answer: A**



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**43.** Law of Mendel , which is not completely applicable is ?

A. Codominance

B. Law of segregation

C. Law of independent assortment

D. Law of dominance

**Answer: C**



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**44.** If a plant having yellow and round seeds was crossed with another plant . having green and wrinkled seeds then  $F_1$  -progeny are in the ratio :



A. 15:1

B. 1:15

C. 1:13

D. All yellow & round seeds

**Answer: D**



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**45.** The 1:2:1 ratio with the pink flower in the  $F_2$  generation indicate the phenomenon of :

A. dominance

B. codominance

C. incomplete dominance

D. segregation

**Answer: C**



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**46.** Probability of genotype  $TTrr$  in  $F_2$  - generation of a dihybrid cross is :

A.  $1/16$

B.  $3/16$

C.  $9/16$

D.  $6/16$

**Answer: A**



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**47.** Which one of the following was rediscoverer of Mendel's work :

A. Muller

B. Morgan

C. Correns

D. Bridge

**Answer: C**



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**48.** How many different types of gametes can be formed by  $F_1$  progeny, resulting from the following cross?  $\forall BBC \times aa$  :

A. 3

B. 8

C. 27

D. 64

**Answer: B**



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**49.** What will be the gametic chromosome number of a cell , if somatic cell have 40 chromosomes ?

A. 10

B. 20

C. 30

D. 40

**Answer: B**



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**50.** An  $F_2$  genotypic ratio of 1:4:6:4:1 instead of 9:3:3:1 indicates :

A. 9: 3: 3: 1

B. 8: 6: 4: 1

C. 7: 4: 1: 4

D. 6: 6: 4: 7

**Answer: A**



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51. Which law Mendel would not have proposed , if the phenomenon of linkage was known to him ?

A. Law of unit character

B. Law of dominance

C. Law of segregation

D. Law of independent assortment

**Answer: D**



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**52.** The number of genotypes produced in  $F_2$  generation in Mendel's monohybrid cross was

:



A. 1

B. 2

C. 3

D. 4

**Answer: C**



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**53.** In which of the crosses , half of the offspring show dominant phenotype ?

A.  $Tt \times Tt$

B.  $T \times$

C.  $Tt \times$

D.  $T \times T$

**Answer: C**



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**54.** Two allelic genes are located on the :

A. Same chromosome

B. Two homologous chromosomes

C. Two non - homologous

D. Any two different chromosomes  
chromosomes

**Answer: B**



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**55.** Red ( RR ) Antirrhinum is crossed with white ( rr ) one . The  $F_1$  hybrid is pink . This is an example of :

A. Complete dominance

B. Co - dominance

C. Incomplete dominance

D. Complete recessive

**Answer: C**



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**56.** In a dihybrid cross , in  $F_2$  generation , the parental types are far greater in number than the recombinants . This is due to :

A. Linkage

B. Incomplete dominance

C. Multiple allelism

D. Complete dominance

**Answer: A**



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**57. Fill In The blank :** The accepted law of Mendel is .....



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**58.** Fill In The blank : The phenotypic ratio and genotypic ratio of monohybrid test cross is

.....



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**59.** Fill In The blank : Crossing over takes place

in .....



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**60.** Fill In The blank : When two or more genes remain together closely for a number of generation is known as .....



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**61.** Fill In The blank : The phenomenon of Linkage was discovered by .....



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**62.** Fill In The blank : One gene one enzyme hypothesis was given by .....



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**63.** Fill In The blank : The functional unit of gene is .....



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**64.** Fill In The blank : The smallest unit of gene is known as .....



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**65.** Fill In The blank : The genes which are constantly expressing themselves in a cell is know as .....



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**66.** Fill In The blank : Chromosome theory of inheritance was given by .....



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**67.** Distinguish between: HEREDITY AND VARI



**Watch Video Solution**

**68.** Distinguish between: Heredity and variation



**Watch Video Solution**

**69.** Distinguish between: Dominance and recessive



**Watch Video Solution**

**70.** Distinguish between: Phenotype and genotype



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71. Distinguish between: Homozygous and heterozygous



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72. Distinguish between: Monohybrid cross and dihybrid cross



[Watch Video Solution](#)

**73.** Distinguish between: Test cross and back cross



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**74.** Distinguish between: Dominance and incomplete dominance



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**75.** Distinguish between: Incomplete dominance and co-dominance



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**76.** Distinguish between: Chromosomes and Mendelian factors



**Watch Video Solution**

77. Distinguish between:Autosome and allosome



**Watch Video Solution**

78. Distinguish between: Mendelian disorder and chromosomal disorder



**Watch Video Solution**

**79.** Distinguish between: Complete linkage and incomplete linkage



**Watch Video Solution**

**80.** Distinguish between: Linkage and crossing over



**Watch Video Solution**



**81.** Distinguish between: Linked genes and unlinked genes



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