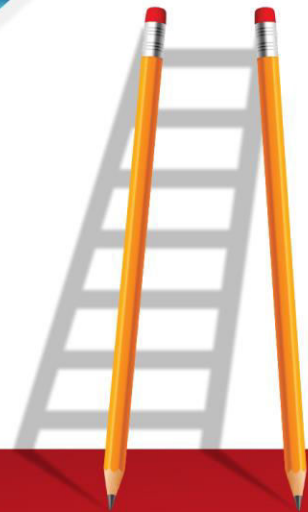


BIOLOGY



Worksheet-6



STP

A PROJECT BY PUNJAB GROUP

Worksheet-6**(Genetics)**

Q.1 Gregor John Mendel laid down the foundation of:

- A) Modern genetics
- B) Classical genetics
- C) Population genetics
- D) Phylogenetics

Q.2 Mendel performed series of breeding experiments on garden pea:

- A) In his farmhouse garden
- B) In his monastery garden
- C) In a public park garden
- D) In his school garden

Q.3 Pick up the dominant one among the following traits of *Pisum sativum*:

- A) Yellow pod
- B) Constricted pod
- C) Green colored seed
- D) Round shaped seed

Q.4 As a result of monohybrid cross Mendel got:

- A) 25% round
- B) 50% round
- C) 75% round
- D) 100% round

Q.5 Punnet square indicates that _____ of F_2 progeny would have been homozygous round and _____ heterozygous round and _____ wrinkled, respectively:

- A) $1/4$, $2/4$, $1/4$
- B) $1/4$, $1/4$, $2/4$
- C) $2/4$, $1/4$, $1/4$
- D) $2/4$, $1/4$, $2/4$

Q.6 Mendel devised a cross called test cross, which is used to test the _____ of an individual showing a dominant _____:

- A) Genotype, phenotype
- B) Phenotype, genotype
- C) Vigor, phenotype
- D) Vigor, genotype

Q.7 _____ could be homozygous (RR) or heterozygous (Rr) genotype:

- A) A genotypically round seed
- B) A phenotypically round seed
- C) A genotypically wrinkled seed
- D) A phenotypically wrinkled seed

Q.8 Wrinkled seed plant is:

- A) Always heterozygous recessive
- B) Always heterozygous dominant
- C) Always homozygous recessive
- D) Always homozygous dominant

Q.9 What is depicted from the results of test cross given here below?

Round = 50%

Wrinkled = 50%

- A) The tested individual was heterozygous dominant
- B) The tested individual was heterozygous recessive
- C) The tested individual was homozygous dominant
- D) The tested individual was homozygous recessive

Q.10 What was the ratio of new phenotypic combination in F_2 of Mendel's dihybrids?

- A) $3/16$
- B) $1/16$
- C) $9/16$
- D) $6/16$

Q.11 What type of gametes will be formed by a plant with RrYy genotype?

- A) RR, YY, rr, yy
- B) RR, yy, Rr, Yy
- C) RY, Ry, rY, ry
- D) Rr, Yy, rr, yy

Q.12 In F_2 of a monohybrid cross the independent chance for a pea seed to be round is:

- A) $3/4$
- B) $1/4$
- C) $4/4$
- D) $2/4$

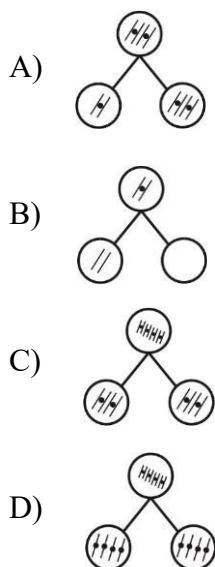
Q.13 Independent assortment of _____ depends upon independent assortment of their _____, respectively:

- A) Genes, chromosomes
- B) Chromosomes, genes
- C) Genes, nucleotide sequence
- D) Genes, cells

Q.14 Mendel's work was rediscovered and acknowledged after:

- A) Sixteen years of his death
- B) Twenty years of his death
- C) Twenty-four years of his death
- D) Thirty-four years of his death

Q.15 Which one of the following exhibits segregation?



Q.16 In F₂ of monohybrid cross Mendel got homozygous and heterozygous individuals respectively in:

- A) 1:1 ratio
- B) 3:1 ratio
- C) 1:2:1 ratio
- D) 1:3 ratio

Q.17 In F₂ of dihybrid cross Mendel obtained _____ % parental types:

- A) 37.5
- B) 62.5
- C) 66.5
- D) 33.5

Q.18 In P₁ of test cross, one parent will always be:

- A) Homozygous dominant
- B) Homozygous recessive
- C) Heterozygous dominant
- D) Heterozygous recessive

Q.19 Identify the genotype depicting complete dominance:

- A) Aa
- B) AB
- C) A₁A₂
- D) W⁺/W

Q.20 Any blood transfusion is ideally safe, if it does not cause:

- A) Hemopoiesis in the recipient
- B) Immunization in the recipient
- C) Circulation in the recipient
- D) Agglutination in the recipient

ANSWER KEY
(Worksheet-6)

1	B	11	C
2	B	12	A
3	D	13	A
4	C	14	A
5	A	15	D
6	A	16	A
7	B	17	B
8	C	18	B
9	A	19	A
10	D	20	D

EXPLANATION

Q.1 Answer is “Classical genetics”

Explanation: Gregor Johann Mendel laid down the foundation of classical genetics by formulating two laws of heredity. Law of segregation and law of independent assortment.

Q.2 Answer is “In his monastery garden”

Explanation: Mendel was a priest. He performed series of breeding experiments on garden pea *Pisum sativum* in his monastery garden for eleven years (1854-1865).

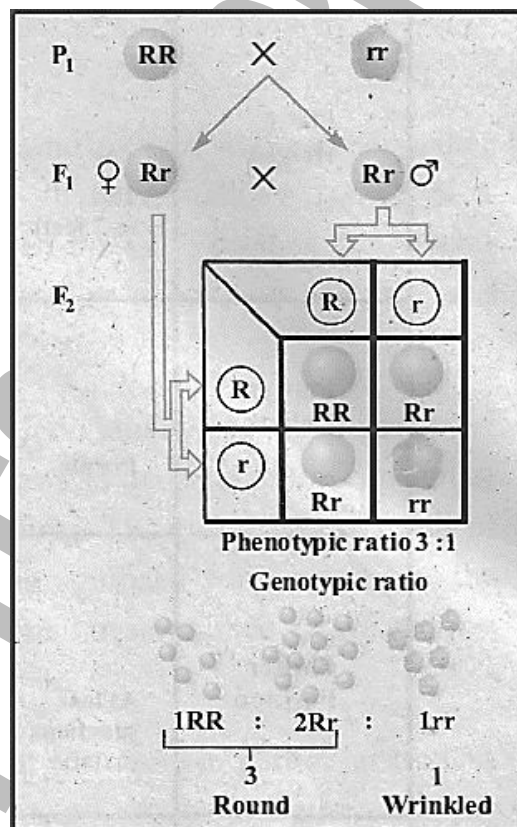
Q.3 Answer is “Round shaped seed”

Explanation:

Trait	Dominant	Recessive
Plant height	Tall	Short
Flower color	Purple	White
Flower position	Axial	Terminal
Pod color	Green	Yellow
Pod shape	Inflated	Constricted
Seed color	Yellow	Green
Seed shape	Round	Wrinkled

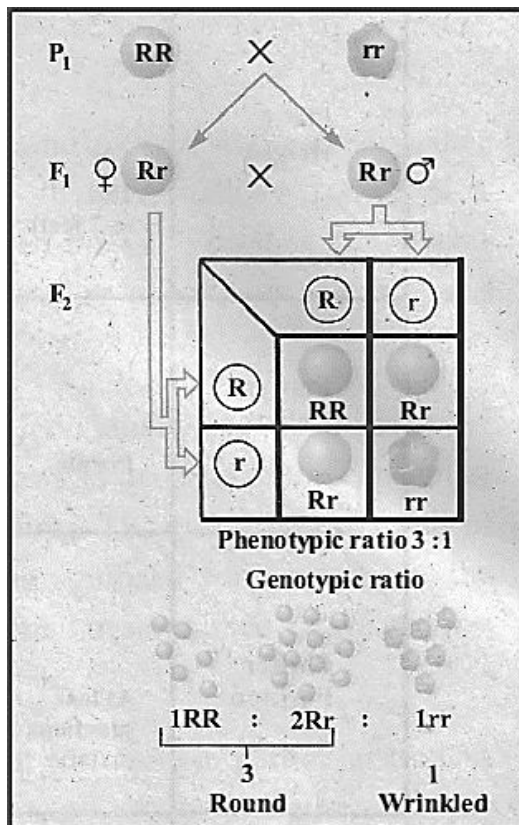
Q.4 Answer is “75% round”

Explanation:



Q.5 Answer is "1/4, 2/4, 1/4"

Explanation:



Q.6 Answer is "Genotype, phenotype"

Explanation: Mendel devised a cross called test cross, which is used to test the genotype of an individual showing a dominant phenotype. It is a mating in which an individual showing a dominant phenotype is crossed with an individual showing its recessive phenotype. This cross finds out the homozygous and heterozygous nature of the genotype.

Q.7 Answer is "A phenotypically round seed"

Explanation: Round shape in pea seed is dominant character and a dominant phenotype may have two genotypes RR (homozygous round) and Rr (heterozygous round).

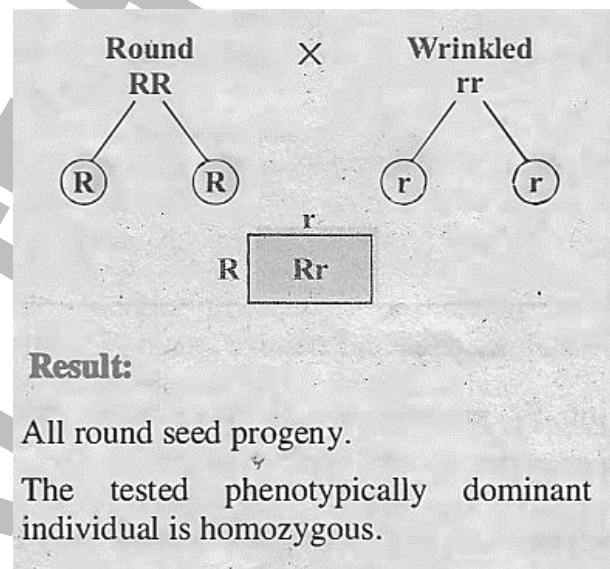
Q.8 Answer is "Always homozygous recessive"

Explanation: Wrinkled shape in pea seed is a recessive trait having single genotype rr (homozygous recessive) as recessive can't be heterozygous.

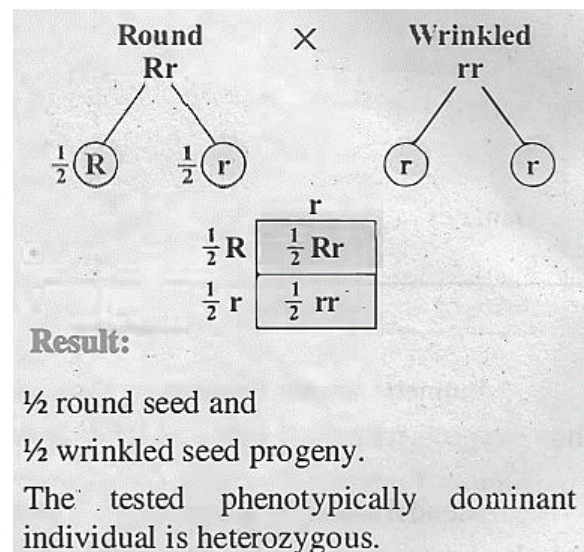
Q.9 Answer is "The tested individual was heterozygous dominant"

Explanation:

Test cross (Case I)



Test cross (Case II)



Q.10 Answer is “6/16”

Explanation: Phenotypic ratio of F_2 of Mendel's dihybrid cross was as under.

Round yellow	9/16	Parental type
Wrinkled yellow	3/16	Recombinants i.e. new combinations
Round green	3/16	
Wrinkled green	1/16	Parental type

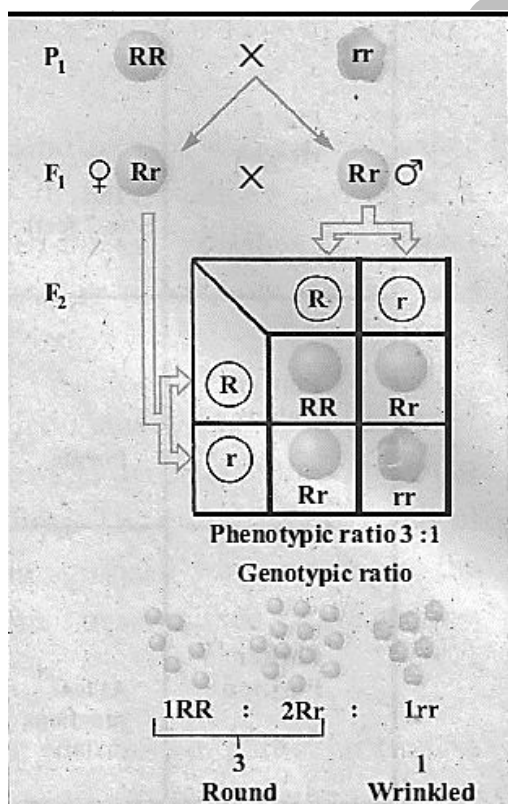
Q.11 Answer is “RY, Ry, rY, ry”

Explanation:

RrYy		
	R	r
Y	RY	rY
y	Ry	ry

Q.12 Answer is “3/4”

Explanation:



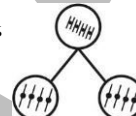
Q.13 Answer is “Genes, chromosomes”

Explanation: as given are carried by chromosomes so both exhibit parallel behavior.

Q.14 Answer is “Sixteen years of his death”

Explanation: In 1900, 16 years after Mendel's death, three botanists, Correns, De Vries and Tschermach independently rediscovered and acknowledged his work.

Q.15 Answer is “

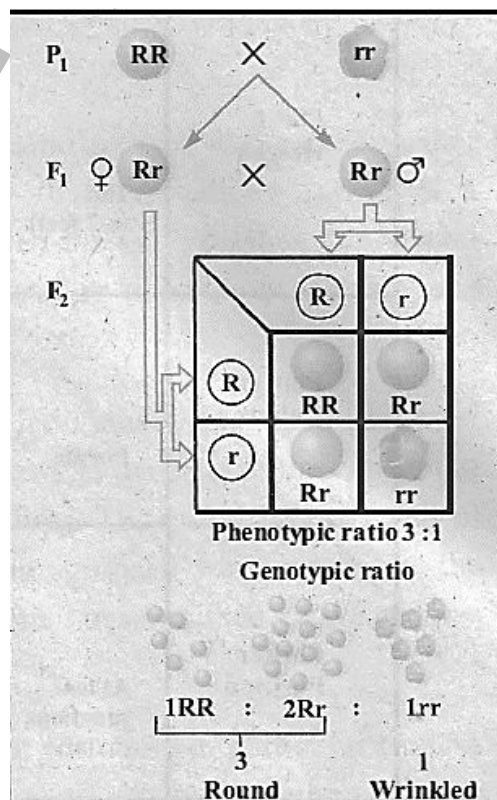


”

Explanation: According to the Mendel's law of segregation chromosomes split up into their respective chromatids during gametogenesis (meiosis) and each gamete receives one chromatid (with one allele of gene pairs).

Q.16 Answer is “1:1 ratio”

Explanation:



Q.17 Answer is “62.5”

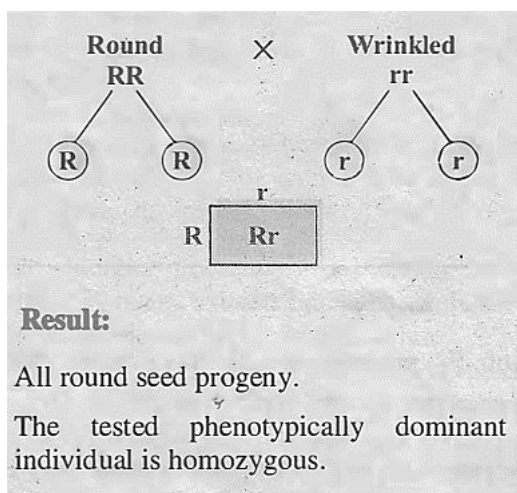
Explanation:

$$\begin{aligned} &\frac{9}{16} \text{ round yellow} \\ &+ \\ &\frac{1}{16} \text{ wrinkled yellow} \\ \text{Total} &= \frac{10}{16} \times 100 = 62.5\% \end{aligned}$$

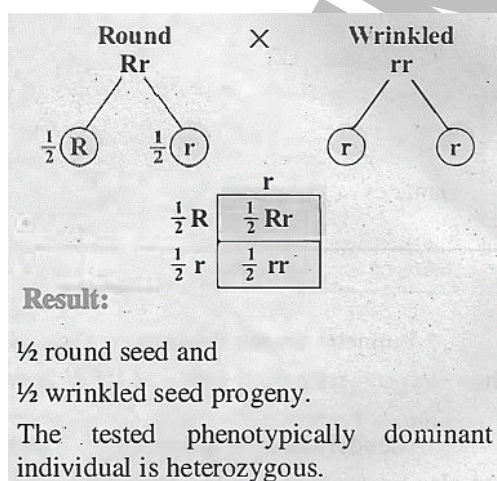
Q.18 Answer is “Homozygous recessive”

Explanation:

Test cross (Case I)



Test cross (Case II)



Q.19 Answer is “Aa”

Explanation:

Dominance rotations	Examples
Complete dominance	Rr/ Tr/ Yy etc.
Incomplete dominance	R ₁ R ₂
Codominance	MN
Over dominance	W ⁺ / W

Q.20 Answer is “Agglutination in the recipient”

Explanation: If we imagine population not as a group of individuals, but as a group of individually segregating and randomly assorting alleles, we can understand the concept of “beanbag genetics”. The alleles are like beans in a beanbag. The entire beanbag full of beans is the gene pool of the population. In the beanbag approach we can imagine the entire gene pool comprising all the alleles for all the different traits at once, or we can just focus on some subset, such as all the alleles for a single trait.

STOP

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