Unit 8 · Mendelian Genetics

WORKSHEET

Full marks 32

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 32

1 Key words [4]

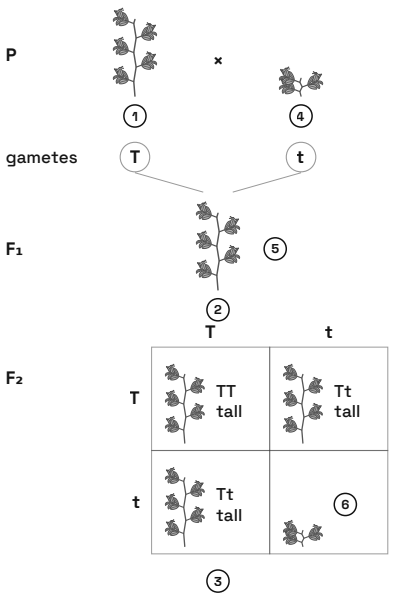
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

alleles	codominance	emasculation	epistasis	genotype	homozygous
incomplete dominance	linkage	locus	phenotype		

The different forms of the same gene are its _____, found at the same place, or _____, on a pair of homologous chromosomes. An organism with two identical alleles of a gene, such as TT, is _____. The genetic make-up of an organism is its _____, and its outward appearance its _____. Mendel removed the stamens of a flower before its anthers were ripe, which is called _____. When neither allele is dominant and the hybrid is in between, as in pink four o'clock flowers, the inheritance shows _____. When both alleles are fully expressed, as in blood group AB, it is _____.

2 Label the diagram [3]

The diagram shows Mendel's monohybrid cross for height. Write the missing words for 1 to 6. Each carries 0.5 mark.



1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. A pea plant with genotype Tt is tall. Which statement is true? [1]

a. it is homozygous, and its phenotype is Tt

b. it is heterozygous; its genotype is Tt and its phenotype is tall

c. it is a pure-breeding tall plant

d. its genotype is tall and its phenotype is Tt

ii. An F_1 plant has genotype TtPp. Which set lists all the kinds of gamete it makes? [1]

a. Tt and Pp

b. TP and tp only

c. TP, Tp, tP and tp

d. TT, tt, PP and pp

iii. In Mendel's monohybrid cross for height, what fraction of the **tall** F_2 plants are pure-breeding (TT)? [1]

a. 1/4

b. 1/3

c. 1/2

d. 3/4

iv. In snapdragons, red (RR) × white (rr) gives pink flowers. Which cross gives red, pink and white offspring in the ratio 1 : 2 : 1? [1]

a. red × pink

b. red × white

c. pink × pink

d. pink × white

v. A cow with a red coat (RR) is crossed with a bull with a white coat (WW). The calf has a roan coat: red hairs and white hairs mixed all over. What kind of inheritance is this? [1]

a. complete dominance

b. incomplete dominance

c. codominance

d. independent assortment

4 Short answers [9]

Write short answers to the following questions.

a. State the law of segregation. Why is it also called the law of purity of gametes? [2]

b. Write any four reasons why the garden pea suited Mendel's experiments. [2]

c. Both parents have brown eyes, but their child has blue eyes. Brown (B) is dominant over blue (b). Give the parents' genotypes and the chance of a blue-eyed child, with a Punnett square. **[2]**

d. How does the F_2 of a red × white cross in *Mirabilis jalapa* differ from the F_2 of tall × dwarf peas? What does it show? **[3]**

5 Numerical problem **[4]**

Show your working.

In peas, round seed (R) is dominant over wrinkled (r), and yellow (Y) over green (y). A pure round yellow plant is crossed with a wrinkled green one, and the F_1 is selfed. Out of 640 F_2 seeds, how many of each kind would you expect? How many of the F_2 seeds are expected to be pure-breeding round yellow (RRYY)?

Answer: _____

6 Long answer [4]

Write a long answer to the following question.

State the law of independent assortment and explain it with a dihybrid cross.

7 Think [3]

A farmer has a tall pea plant and wants to know whether it is TT or Tt. He has seeds of dwarf peas. What cross should he make, and how will he read the result?

8 Activity: Mendel's ratios with coins (not marked)

Two coins stand for the gametes of two Tt parents: heads for T, tails for t. Toss both together 40 times and record each pair.

Pair	Tally	Count	Expected
two heads (TT)			10
one of each (Tt)			20
two tails (tt)			10

Write your ratio of tall (at least one head) to dwarf, and the class's ratio. Which is closer to 3 : 1?