

Inheritance: practice questions

6 questions · 17 marks · mark scheme at the back

For Edexcel International GCSE Science (Double Award) 4SD0.

Name

Total / 17

1 A pea plant has the genotype Tt. Which word describes this genotype? [1 mark]

- A. ☐ Homozygous dominant
- B. ☐ Homozygous recessive
- C. ☐ Heterozygous
- D. ☐ Codominant

2 Explain the difference between a dominant allele and a recessive allele. [3 marks]

3 Human height shows a wide range of values. Explain why this is not a characteristic that can be explained by a simple monohybrid cross. [2 marks]

4 In rabbits, black fur (B) is dominant to brown fur (b). Two heterozygous black rabbits are crossed. (a) Draw a genetic diagram to show the genotypes of the possible offspring. (3) [4 marks]
(b) Give the probability that an offspring has brown fur. (1)

Answer =

- 5** In a family, parents 1 and 2 do not have a genetic disorder. They have three children: child 3 (a daughter) has the disorder, child 4 (a son) does not and child 5 (a daughter) does not. **[4 marks]**
- (a) State whether the disorder is caused by a dominant or a recessive allele. Give a reason. (2) (b) Using the letters D and d, give the genotypes of parents 1 and 2 and explain your answer. (2)

- 6** Describe how the sex of a baby is determined at fertilisation. Use a genetic diagram or describe the gametes in your answer. **[3 marks]**

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

C C (1)

2. [3]

- a dominant allele is expressed (in the phenotype) when one copy is present / in the heterozygous state (1)
- a recessive allele is only expressed when two copies are present / no dominant allele present (1)
- so a heterozygous individual shows the dominant characteristic (1)
- allow homozygous recessive for two copies

3. [2]

- it is controlled by many genes / polygenic inheritance (1)
- so there is a range of values rather than two clear categories / not one gene with a dominant and a recessive allele (1)

4. [4]

- gametes B or b from each parent (1)
- offspring BB, Bb, Bb, bb (1)
- phenotypes: 3 black : 1 brown (1)
- probability = $\frac{1}{4}$ / 0.25 / 25% (1)

5. [4]

- recessive (1)
- two parents without the disorder have a child with it (1)
- both parents are Dd / heterozygous (1)
- each parent must have passed on one recessive allele (d) to child 3, but they do not have the disorder themselves (1)

6. [3]

- females are XX and males are XY (1)
- all eggs carry an X chromosome (1)
- half the sperm carry X and half carry Y; whether an X or Y sperm fertilises the egg decides the sex (1)
- allow correct Punnett square for full credit