

Monohybrid inheritance: practice questions

7 questions • 27 marks • mark scheme at the back

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Name

Total / 27

1 Which genotype is heterozygous? [1 mark]

A. ☐ TT

B. ☐ Tt

C. ☐ tt

D. ☐ T

2 (a) Define the term genotype. [1] (b) Define the term phenotype. [1] (c) Two tall pea plants, both with genotype TT, are crossed. Explain why all their offspring will also be tall. [1] **[3 marks]**

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5

Supplement

[4 marks]

A farmer has a tall pea plant. Tall (T) is dominant to short (t). The farmer does a test cross to find the genotype of the tall plant. (a) State the genotype of the plant that should be crossed with the tall plant. [1] (b) Describe the offspring expected if the tall plant is TT. [1] (c) Describe the offspring expected if the tall plant is Tt. [1] (d) Suggest why the farmer should produce many offspring. [1]

[illegible]

6

Supplement

[5 marks]

A mother has blood group A and genotype IA Io. A father has blood group B and genotype IB Io. (a) Define the term codominance. [1] (b) Draw a Punnett square to show the possible genotypes of their children. [2] (c) State the probability that a child will have blood group O. [1] (d) State the blood group of a person with genotype IA IB. [1]

[illegible]

7

Supplement

[5 marks]

Red-green colour blindness is caused by a recessive allele on the X chromosome. XB is the normal allele and Xb is the colour blindness allele. A woman who is a carrier has children with a man who has normal colour vision. (a) State what is meant by a sex-linked characteristic. [1] (b) Explain why colour blindness is more common in males than in females. [2] (c) State the genotypes of the offspring of these parents. [1] (d) Give the probability that a son of these parents is colour blind. [1]

[illegible]

Mark scheme

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

1. [1]

B B (Tt) (1)

2. [3]

- (a) the genetic make-up of an organism / the alleles present (1)
- (b) the observable features of an organism (1)
- (c) both parents are homozygous / can only make T gametes, so all offspring are TT / pure-breeding (1)

3. [5]

- (a) recessive (1) reject dominant
- parents 1 and 2 do not have the condition but their daughter / person 3 does (1) allow the parents carry the allele without showing it
- (b) Dd and Dd (1) both needed
- (c) dd (1)
- (d) 1 in 4 / 25% / 0.25 (1) allow 1/4

4. [4]

- (a) heterozygous parent: B and b; brown parent: b (only) (1)
- (b) Bb, Bb, bb, bb (1)
- (c) 1 black : 1 brown (1) allow 1 : 1
- (d) 50% (1)

5. [4] **Supplement**

- (a) tt (1)
- (b) all tall (1)
- (c) about half tall and about half short (1) allow 1 : 1
- (d) a small number could all be tall by chance even if the plant is Tt / a larger number is more reliable (1)

6. [5] **Supplement**

- (a) both alleles in a heterozygous organism contribute to the phenotype (1) allow both alleles are expressed in the heterozygote
- (b) gametes IA, Io and IB, Io correctly placed (1)
- offspring IA IB, IA Io, IB Io, Io Io (1)
- (c) 1 in 4 / 25% / 0.25 (1)
- (d) AB (1)

7. [5] **Supplement**

- (a) the gene (responsible) is located on a sex chromosome (1) allow on the X chromosome
- (b) males have only one X chromosome / the Y has no matching allele, so one recessive allele causes colour blindness (1)
- females need two recessive alleles / would be carriers with one (1)
- (c) XB XB, XB Xb, XB Y, Xb Y (1) all four needed
- (d) 1 in 2 / 50% (1)