Foundation Combined — only core Foundation content included.

Q1. Explain the inheritance of cystic fibrosis. Include the terms recessive, carrier and allele.

[3 marks]

Q2. Two carrier parents (Ff × Ff) are expecting a child. Use a Punnett square to calculate the probability the child (a) has cystic fibrosis, (b) is a carrier.

[3 marks]

Q3. Polydactyly is caused by a dominant allele (D). Explain why polydactyly is more likely to appear in every generation of a family than cystic fibrosis.

[3 marks]

Total: 9 marks

Q1 (3 marks)

Explain the inheritance of cystic fibrosis. Include the terms recessive, carrier and allel…

- Cystic fibrosis caused by a RECESSIVE allele (f) [1]
- Two copies of the allele needed to have the condition (ff genotype) [1]
- Carriers (Ff): heterozygous — carry allele but are unaffected [1]

Q2 (3 marks)

Two carrier parents (Ff × Ff) are expecting a child. Use a Punnett square to calculate the…

- Punnett square: FF, Ff, Ff, ff [1]
- (a) ff: 1 in 4 / 25% probability of cystic fibrosis [1]
- (b) Ff: 2 in 4 / 50% probability of being a carrier [1]

Q3 (3 marks)

Polydactyly is caused by a dominant allele (D). Explain why polydactyly is more likely to …

- Polydactyly: dominant — only ONE copy of D needed to show the condition [1]
- An affected person (Dd or DD) will always pass D to approximately 50% of children [1]
- Cystic fibrosis: recessive — BOTH parents must carry f and there is only 25% chance per child if both are carriers [1]