

1. A researcher carried out an investigation into patterns of inheritance using mice as a model organism and observed the coat colour of the mice.

- Coat colour is controlled by two alleles which are not sex linked.
- The allele for yellow coat colour (A) is dominant to the allele for normal (agouti) coat colour (a).

Heterozygous yellow mice were crossed with each other repeatedly and the offspring obtained are shown in **Table 19.1**.

Colour of coat	Number of offspring
yellow	1063
normal (agouti)	535

Table 19.1

Which of the following statements describes the correct way to analyse these results?

- A Use a student's t-test with an expected ratio of 2 : 1 yellow to normal mice.
- B Use a χ^2 test with an expected ratio of 2 : 1 yellow to normal mice.
- C Use a student's t-test with an expected ratio of 3 : 1 yellow to normal mice.
- D Use a χ^2 test with an expected ratio of 3 : 1 yellow to normal mice.

Your answer

[1]

2. The ABO blood group system in humans has three alleles for the antigen found on the cell surface membrane of erythrocytes. The three alleles are: I^O , I^A and I^B .

A male with the genotype $I^A I^O$ and a female with the genotype $I^B I^O$ have a child.

Which of the options, A to D, is the probability that this child will have a codominant genotype?

A 0.25

B 0.50

C 0.75

D 1.00

Your answer

[1]

3. The chi-squared (χ^2) test was used to determine whether the inheritance pattern of a dihybrid cross was statistically significant.

Four phenotypes were produced from the cross.

χ^2 was calculated as 8.62 and the significance level (p) was 0.05.

A table of χ^2 values is shown below.

df	Probability (p)							
	0.99	0.95	0.90	0.50	0.10	0.05	0.01	0.001
1	0.0016	0.0039	0.016	0.46	2.71	3.84	6.63	10.83
2	0.02	0.10	0.21	1.39	4.60	5.99	9.21	13.82
3	0.12	0.35	0.58	2.37	6.25	7.81	11.34	16.27
4	0.30	0.71	1.06	3.360	7.78	9.49	13.28	18.46

Which of the statements, A to D, is correct?

- A df is 3 and χ^2 is not significant
- B df is 3 and χ^2 is significant
- C df is 4 and χ^2 is not significant
- D df is 4 and χ^2 is significant

Your answer

[1]

4. Which of the options, A to D, describes the type of gene mutation that causes Huntington's disease?

- A change of nucleotide that affects the protein
- B change of nucleotide that does not affect the protein
- C deletion of nucleotides
- D insertion of nucleotides

Your answer

[1]

END OF QUESTION PAPER

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
1		D	1	
		Total	1	
2		A	1	
		Total	1	
3		B ✓	1	<p>Examiner's Comments It was encouraging to see that this question, testing understanding of probability tables, was correctly answered by many candidates.</p>
		Total	1	
4		D	1	<p>Examiner's Comments Huntingdon's disease is caused by insertion of many CAG repeats.</p>
		Total	1	