National 5 Biology

Variation & Inheritance

1. (a) Explain what is meant by discrete variation.
   (b) Give four examples of discrete variation.

   (3)

2. (a) Explain what is meant by continuous variation.
   (b) Give four examples of continuous variation.

   (3)

3. A group of pupils were checked to see if they could roll their tongue or not. The results are shown in the table below.

	Tongue roller	Non Tongue roller
Number of pupils	38	12

   Present this information as a pie chart.

   (3)

4. The same group of pupils had their height measured and these are shown in the table below.

140	173	135	132	151	171	141	146	148	154
152	144	152	145	137	141	153	149	151	155
148	157	154	143	159	148	136	158	130	160
164	140	147	156	154	149	152	139	151	146
151	153	168	157	148	165	154	152	156	163

   Present the above information as a histogram.

   (4)

5. In a certain species of plant, P represents a factor resulting in purple flowers. It is dominant to another factor p which produces cream flowers. True breeding purple-flowered plants were cross pollinated with pollen from cream-flowered plants. The resulting seeds were planted and grown to flowers.
   (a)   What would be the colour of the flowers of the resulting plants?

   (1)

   (b)   If one of these new plants were cross-pollinated with pollen from a cream-flowered plant, what colour of flowers would you expect among the offspring, and in what proportions?

   (2)

6. In maize, the gene for tallness (T) is dominant to the gene for shortness (t). What offspring phenotypes would be expected from the following crosses, and in what proportions?
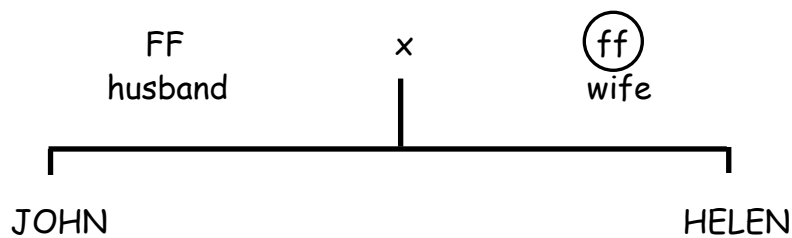(a) heterozygous x heterozygous;

(2)

(b) heterozygous x homozygous tall;

(2)

(c) homozygous tall x short.

(2)

7. In humans, free ear lobes (F) is dominant to attached ear lobes (f). A husband and wife, shown below, have 2 children, John and Helen, as shown in the family tree.
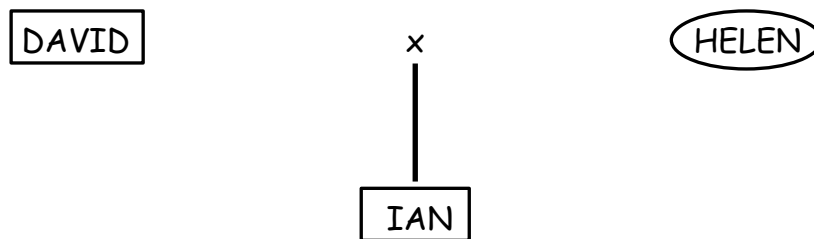
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        FF           x        (ff)
      husband                 wife
         |_____|
         |                        |
       JOHN                     HELEN
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(a) Which of the parents and offspring had free ear lobes?

(1)

(b)   Helen marries David, who has attached ear lobes. They have one child, Ian, who has the same genotype as his father. The family tree is shown below.
Write down all three genotypes.

(3)

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    [DAVID]          x        (HELEN)
       |
     [IAN]
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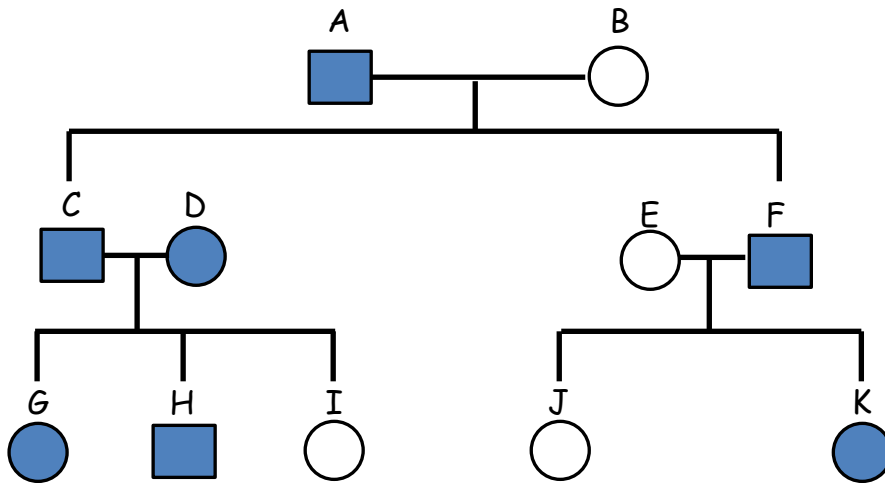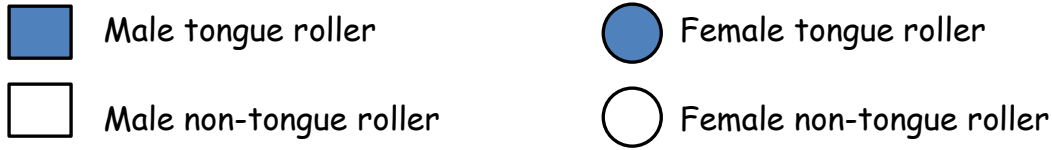(c)   Which of ALL the individuals named above, form the F2 generation?

(1)

(d)   What are the chances of Ian having attached ear lobes?

(1)

8. The following family tree shows the inheritance of the ability to roll the tongue. Use it to answer the questions which follow.

■ Male tongue roller   ● Female tongue roller

☐ Male non-tongue roller   ○ Female non-tongue roller

(a)   How many children do persons A and B have?

(1)

(b)   How many grand-children do they have?

(1)

(c)   How many males in this chart cannot roll their tongue?

(1)

(d)   Describe persons F, J and K.

(3)

(e)   How many generations are shown here?

(1)

(f)   Redraw the pedigree chart and replace the letters with the possible genotypes, using the letters R and r. (A will be RR)

(5)

Total - 40