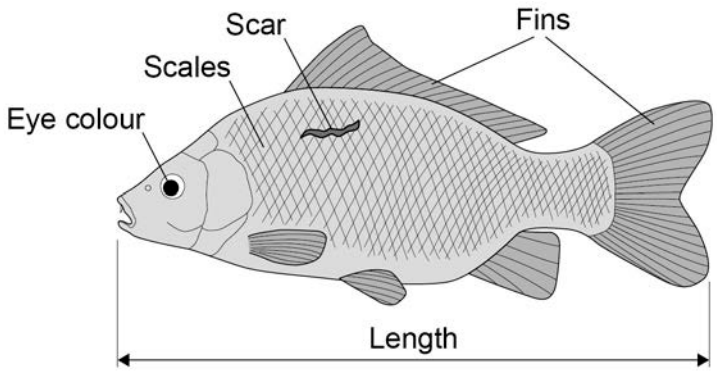
0 4 **Figure 7** shows a fish called a carp.

Figure 7



The characteristics of an animal can be a result of:

- only genetic causes
- only environmental causes
- both genetic **and** environmental causes.

0 4 . 1 Give **one** characteristic shown in **Figure 7** for each different cause.

[3 marks]

Only genetic causes _____

Only environmental causes _____

Both genetic **and** environmental causes _____

Question 4 continues on the next page

Two alleles control the body colour of carp:

- brown (**B**)
- blue (**b**).

The brown allele is dominant to the blue allele.

The genetic cross from breeding two carp is shown in **Figure 8**.

Figure 8

	B	**b**
b	Bb	
b		

0 4 . 2 Complete **Figure 8**.

[2 marks]

0 4 . 3 Draw a ring around **one** blue offspring shown in **Figure 8**.

[1 mark]

0 4 . 4 What is the probability that the offspring from this genetic cross will be brown?

[1 mark]

Tick **two** boxes.

0 ☐

0.25 ☐

0.5 ☐

1.0 ☐

0 4 . 5 Carp can produce large numbers of offspring.

The two carp crossed in **Figure 8** had 260 000 offspring.

Approximately how many offspring are expected to be brown?

[1 mark]

Brown carp offspring = _____

0 4 . 6 A pond contains carp used for breeding.

The carp for breeding are brown or blue.

A red carp has been seen.

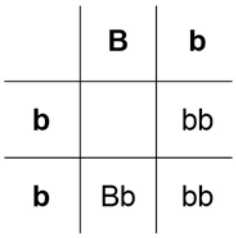
The red carp was **not** added to the pond.

Suggest what might have caused the red carp to appear.

[1 mark]

Turn over for the next question

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	**only genetic causes** any **one** from: • pattern of scales • number of fins • eye colour **only environmental causes:** • scar **both genetic and environmental causes:** • length		1 1 1	AO2/1 4.6.2.1 AO2/1 4.6.2.1 AO2/1 4.6.2.1
04.2		allow 2 correct for **1** mark	2	AO2/2 4.6.1.4
04.3	any bb circled		1	AO2/1 4.6.1.4
04.4	0.5	allow ecf from **04.2**	1	AO3/1b 4.6.1.4
04.5	(260 000/2 =) 130 000	allow ecf from **04.4**	1	AO2/2 4.6.1.4
04.6	mutation	allow change in diet / hormones / DNA	1	AO1/1 4.6.2.1
Total			**9**	