

Past-paper walk-through

Selection ■ 18.3

eXercise

Questions in this set

- 0610/21 N25 Q22 ■ 1 mark
- 0610/43 N25 Q2 ■ 17 marks
- 0610/21 J25 Q33 ■ 1 mark
- 0610/22 J25 Q27 ■ 1 mark
- 0610/22 J25 Q33 ■ 1 mark
- 0610/23 J25 Q35 ■ 1 mark

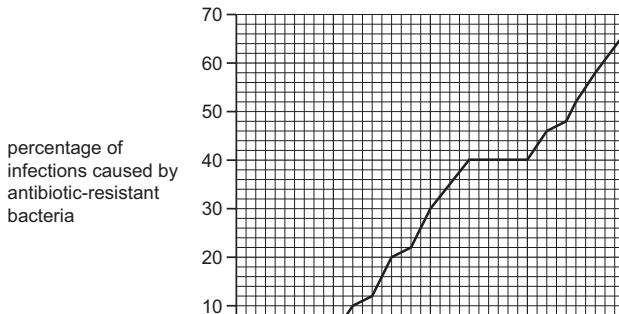
Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

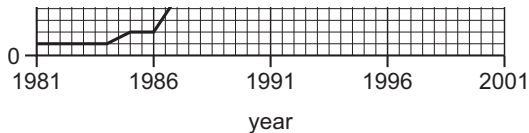
Question 22

0610/21 N25 ■ Q22 ■ 1 mark

- 22** The graph shows the change in the percentage of infections caused by antibiotic-resistant bacteria in one country.



Question 22



Which statements could explain the change in the percentage of infections caused by antibiotic-resistant bacteria?

- 1 The use of antibiotics has resulted in natural selection for resistant bacteria.
- 2 The use of antibiotics has caused a decrease in viral diseases.
- 3 The use of antibiotics when **not** essential increased the percentage of antibiotic-resistant infections.

A 1 and 2

B 1 and 3

C 2 and 3

D 3 only

Solution 22

Answer: **B**

Why

- Bacteria with a resistance allele survive treatment while the others die.
- They reproduce, so the resistant proportion of infections rises.
- The graph therefore tracks natural selection in favour of the resistant strain.

Question 2

0610/43 N25 ■ Q2 ■ 17 marks

- 2 Chickens are birds that are bred by farmers to produce eggs and meat. Modern farmed chickens are very different from the red junglefowl that is their wild ancestor.

Table 2.1 describes some of the characteristics of red junglefowl and farmed chickens.

Table 2.1

type of bird	mean body mass/g	mean number of eggs per year	mean mass of pectoral muscle/g	mean age at maturity/days
red junglefowl	775	12	91	142
chicken	4090	160	437	59

- (a) (i) Using Table 2.1, calculate the percentage change in the mean body mass from the red junglefowl to the chicken.

Give your answer to **three** significant figures.

Question 2

Space for working.

Question 2

- (ii) Suggest reasons why farmers have selectively bred chickens to reach maturity faster than red junglefowl.

Question 2

- (iii) Describe how a farmer could breed chickens with a larger body mass.

Question 2

(b) Chicken faeces can be used as a fertiliser.

Chicken faeces spread on agricultural land near lakes can act as a pollutant, and cause the destruction of the freshwater habitat.

Explain how the use of chicken faeces near freshwater lakes can lead to habitat destruction.

Question 2

(c) Chicken waste contains a substance that is similar to urea.

Explain how urea is made in humans.

Question 2

[Total: 17]

Solution 2

(a)(i) Mark scheme

- 428 (%) ;;;
- 3 MP1 correct selection of data i.e. 4090
- and 775 OR 3315 and 775
- MP2 correct calculation to any number
- of significant figures e.g.
- $((4090 - 775) \div 775) \times 100 = 427.742$
- MP3 correct rounding to three
- significant figures

Solution 2

- ecf from previous MP

Solution 2

(a)(ii) Mark scheme

- any two from:
- 1
- (chickens) can produce eggs, sooner / at an earlier age / younger / AW ; ora
- 2
- chicken reach, saleable size / have (more) meat, sooner / at an earlier
- age / younger / AW ; ora
- 3
- (chickens) can produce, chickens / chicks / offspring, sooner / at an earlier

Solution 2

- age / younger / AW ; ora
- 4
- increased / AW, profit ; ora
- 5
- AVP ;
- 2
- e.g. to meet (high) demand for human
- consumption

Solution 2

(a)(iii) Mark scheme

- 1
- breed / cross, chickens with the large(st) body mass together ;
- 2
- select offspring with the large(st) body mass to breed together ;
- 3
- (this process is) repeated for (many) generations ;
- 4
- AVP ;

Solution 2

- 3
- e.g. ref. to artificial insemination
- 0610/43
- October/November 2025
- Guidance

Solution 2

(b) Mark scheme

- any six from:
- 1
- run-off / washed into freshwater / AW ;
- 2
- chicken manure contains (increased availability of), nitrate / (mineral) ions ;
- 3
- eutrophication ;
- 4

Solution 2

- increased / rapid, growth of, producers / AW ;
- 5
- increased decomposition of dead, producers / AW ;
- 6
- increased aerobic respiration by (decomposers) ;
- 7
- (increased respiration causes a) reduction in (dissolved) oxygen (in water) ;
- 8
- death / migration / AW, of, (named aquatic) organisms requiring (dissolved)
- oxygen ;

Solution 2

- 9
- AVP ;;
- 6
- e.g. (algal bloom / AW) results in other
- (named) limiting factors of
- photosynthesis / spread of diseases
- from faeces in water

Solution 2

(c) Mark scheme

- any three from:
- deamination ;
- of excess amino acids ;
- (deamination) in the liver ;
- the removal of the nitrogen-containing part (of the amino acid) ;
- 3
- Guidance

Question 33

0610/21 J25 ■ Q33 ■ 1 mark

33 Which row correctly describes a type of selection?

	type of selection	humans involved	example
A	artificial	no	production of farmed animals that produce lots of milk
B	artificial	yes	production of bacteria that are resistant to antibiotics
C	natural	yes	production of insulin through genetic modification of bacteria

Question 33

D	natural	no	production of wild animals with long necks to reach tree leaves as a food source
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Solution 33

Answer: **D**

Why

- Artificial selection is carried out by humans choosing which organisms breed.
- Natural selection happens without human involvement, driven by the environment.
- So a high-milk-yield cow is artificial selection *with* humans involved.

Question 27

0610/22 J25 ■ Q27 ■ 1 mark

27 *Clostridium difficile* is a species of bacterium that is resistant to many antibiotics.

From 2002 to 2006, the number of people in one country infected with *Clostridium difficile* increased from 1300 to 6200 people.

What was the percentage increase in the number of people infected with *Clostridium difficile* from 2002 to 2006 to the nearest whole number?

A 21%

B 27%

C 79%

D 377%

Solution 27

Answer: **D**

Why

- Antibiotics kill the non-resistant bacteria but leave the resistant ones alive.
- Those survivors reproduce, so the resistant proportion of the population rises.
- Widespread antibiotic use is what selects for resistance – the bacteria do not become resistant *because* of it.

Question 33

0610/22 J25 ■ Q33 ■ 1 mark

- 33** How does artificial selection differ from natural selection?
- A** Artificial selection changes the characteristics of living things.
 - B** Artificial selection is based on genetic variation.
 - C** Artificial selection does **not** involve competition for resources.
 - D** Artificial selection occurs over many generations.

Solution 33

Answer: **C**

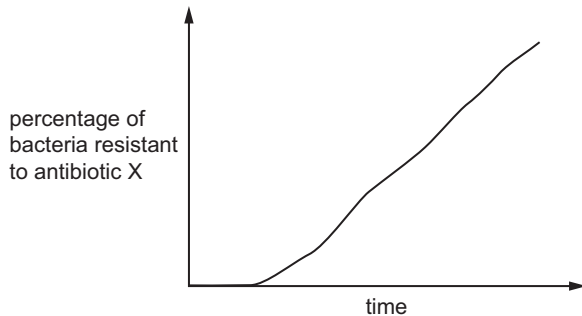
Why

- Both kinds of selection act on existing genetic variation and both change the characteristics of a population.
- The difference is who does the selecting.
- In artificial selection *humans* choose which individuals breed; in natural selection the environment does.

Question 35

0610/23 J25 ■ Q35 ■ 1 mark

35 The graph shows the change in the percentage of bacteria resistant to antibiotic X.



Question 35

What causes the change shown in the graph?

- A** artificial selection
- B** natural selection
- C** meiosis
- D** random fertilisation

Solution 35

Answer: **B**

Why

- A few bacteria already carry a resistance allele, by chance mutation.
- When the antibiotic is used, the non-resistant ones die and the resistant ones survive.
- The survivors reproduce, so the resistant *percentage* of the population climbs.