

Wednesday 20 May 2015 – Afternoon

**GCSE GATEWAY SCIENCE
BIOLOGY B**

B731/01 Biology modules B1, B2, B3 (Foundation Tier)

Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)

Duration: 1 hour 15 minutes



| | | | |
|-----------------------|--|----------------------|--|
| Candidate forename | | Candidate surname | |
|-----------------------|--|----------------------|--|

| | | | | | | | | | | |
|---------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre number | | | | | | Candidate number | | | | |
|---------------|--|--|--|--|--|------------------|--|--|--|--|

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- Your quality of written communication is assessed in questions marked with a pencil (✎).
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **75**.
- This document consists of **28** pages. Any blank pages are indicated.

Answer **all** the questions.

SECTION A – Module B1

1 (a) Look at the picture of a cat.

The position of the cat's eyes is important for the way the cat feeds.



What **type** of vision does the cat have and what **advantage** does it give the cat?

Put ticks (✓) in the boxes next to the **two** correct answers.

Better judgement of distance

Binocular

Monocular

Narrower field of view

Wider field of view

[2]

(b) The cat has a blink reflex. Reflex actions protect the body from harm.

Write down **two other** features of reflex actions.

.....

.....

..... [2]

(c) (i) Cats have fur covering their skin.

The fur reduces heat loss from the skin.

Write down the method of heat loss that fur will reduce.

..... [1]

(ii) Cats lick saliva onto their fur more often in hot weather.

Suggest how this might help them during hot weather.

..... [1]

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2 (a) Bronchi are airways leading to the lungs.

(i) Smoking cigarettes damages cells lining the bronchi.

What is the name of these cells?

Choose your answer from the list.

ciliated epithelial cells

gamete cells

red blood cells

white blood cells

..... [1]

(ii) Smoking can cause cancer in cells lining the bronchi.

Describe and explain **one other** way the smoke affects cells lining the bronchi.

.....
.....
..... [2]

(b) People who smoke are more likely to get infections in their lungs.

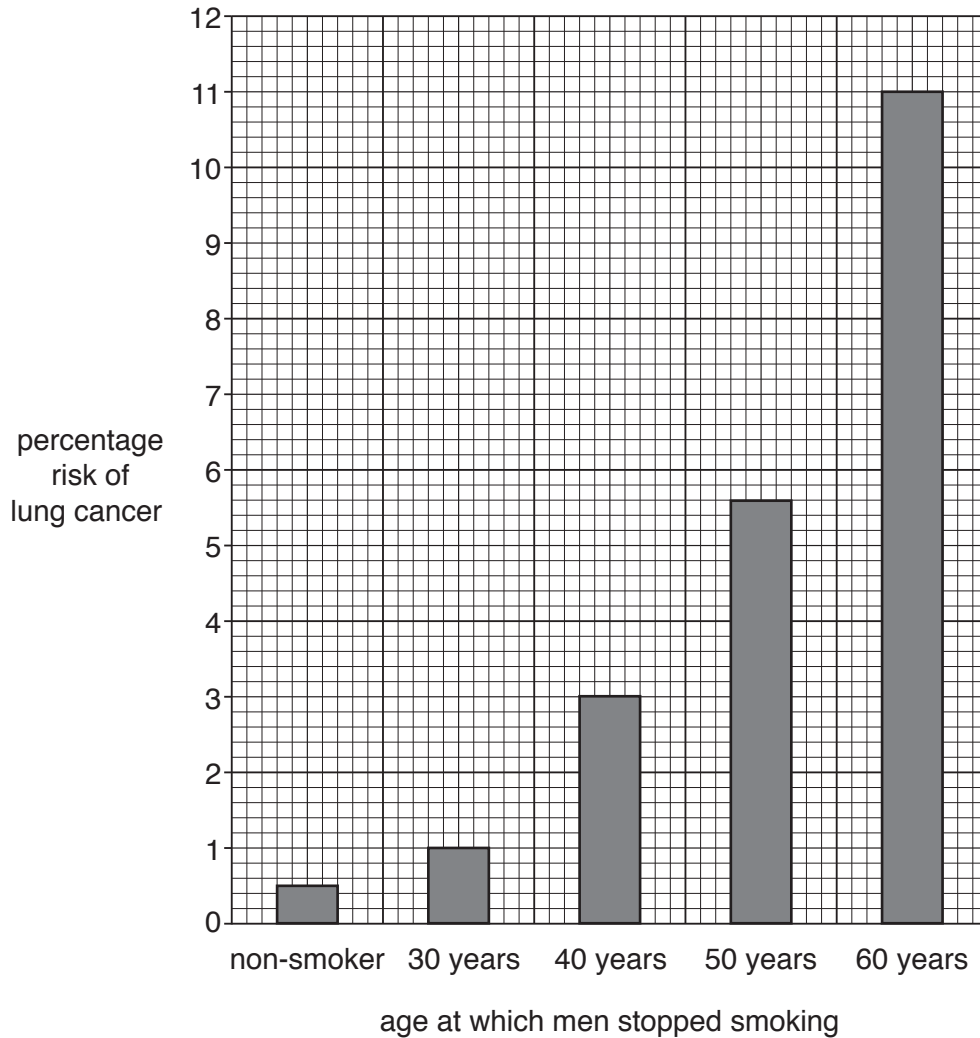
Explain why.

.....
.....
..... [2]

(c) Smoking cigarettes increases the risk of lung cancer.

Look at the graph.

It shows the risk of lung cancer in men who have stopped smoking.



(i) What conclusion can be made about the age when men stop smoking and the risk of getting lung cancer?

.....

.....

..... [2]

(ii) What is the difference in risk of getting lung cancer between men who stop smoking at 40 years compared with men who stop smoking at 60 years?

..... % [1]

(iii) Many smokers want to stop smoking.
Some companies sell nicotine replacements to help them.

One company makes the following claim:

'If a 40-year-old man stops smoking, he will reduce his risk of getting cancer by 10% compared with stopping smoking twenty years later.'

Can the claim be supported by the evidence in the graph and your answer to part (ii)?

Explain your answer.

.....
.....
..... [2]

3 Amir is in hospital.

(a) A nurse measures Amir's blood pressure.

Explain why blood in the arteries is under pressure.

.....

.....

..... [2]

(b) The nurse also monitors Amir's liquid input and output during 24 hours.

The liquids are mainly water.

Look at the notes made by the nurse.

| | Volume of water in ml | |
|---|-----------------------|---|
| | Amir's daily record | Normal daily measurements for average human |
| water taken into body in food and drinks | 2300 | 2300 |
| body water made during respiration | 200 | 200 |
| Total input = | 2500 | 2500 |
| | | |
| water lost from kidneys in the form of urine | 1800 | 1500 |
| water lost through skin, lungs and digestive system | 1000 | 1000 |
| Total output = | | |

Calculate the missing totals in the table and describe how Amir's totals are different from the normal daily totals. What conclusions can you make about how well Amir's water control systems are working?

Use the data in the notes made by the nurse to support your answer.



The quality of written communication will be assessed in your answer to this question.

..... [6]

(c) ADH (anti-diuretic hormone) is a **hormone** involved in controlling water levels in the body.
Suggest how ADH travels around the body.

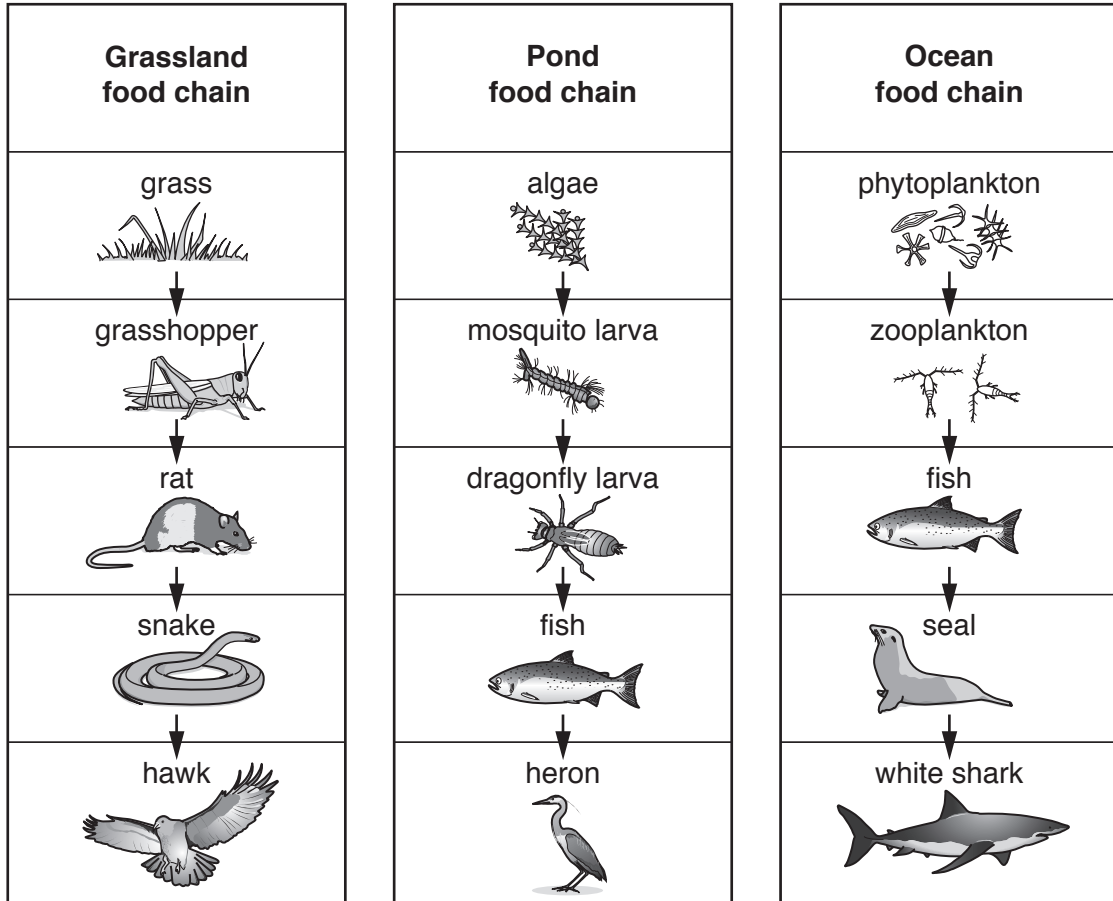
..... [1]

SECTION B – Module B2

4 This question is about energy flow in different habitats.

(a) Look at the picture.

It shows food chains from three different habitats.



(i) Grass is a producer and photosynthesises.

Name **one other** organism that can photosynthesise.

Choose from the organisms in the food chains.

..... [1]

(ii) Look at the grassland and pond food chains.

Which organisms are in the third trophic level?

Put a tick (✓) in the box next to the correct answer.

grasshopper and mosquito larva

grasshopper and rat

rat and dragonfly larva

rat and mosquito larva

rat and snake

[1]

(b) Archaea are a group of single-celled organisms.

Some archaea live in hot vents deep at the bottom of the ocean.

There is no natural light at this depth.

Archaea make their own food using chemicals that come out of the hot vents.

What type of organisms are archaea?

Choose from the list.

consumer

parasite

predator

producer

..... [1]

12
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5 (a) Look at the picture of a lemming.



Lemmings are prey to a number of animals.

Explain how lemmings are adapted to avoid being caught as prey.

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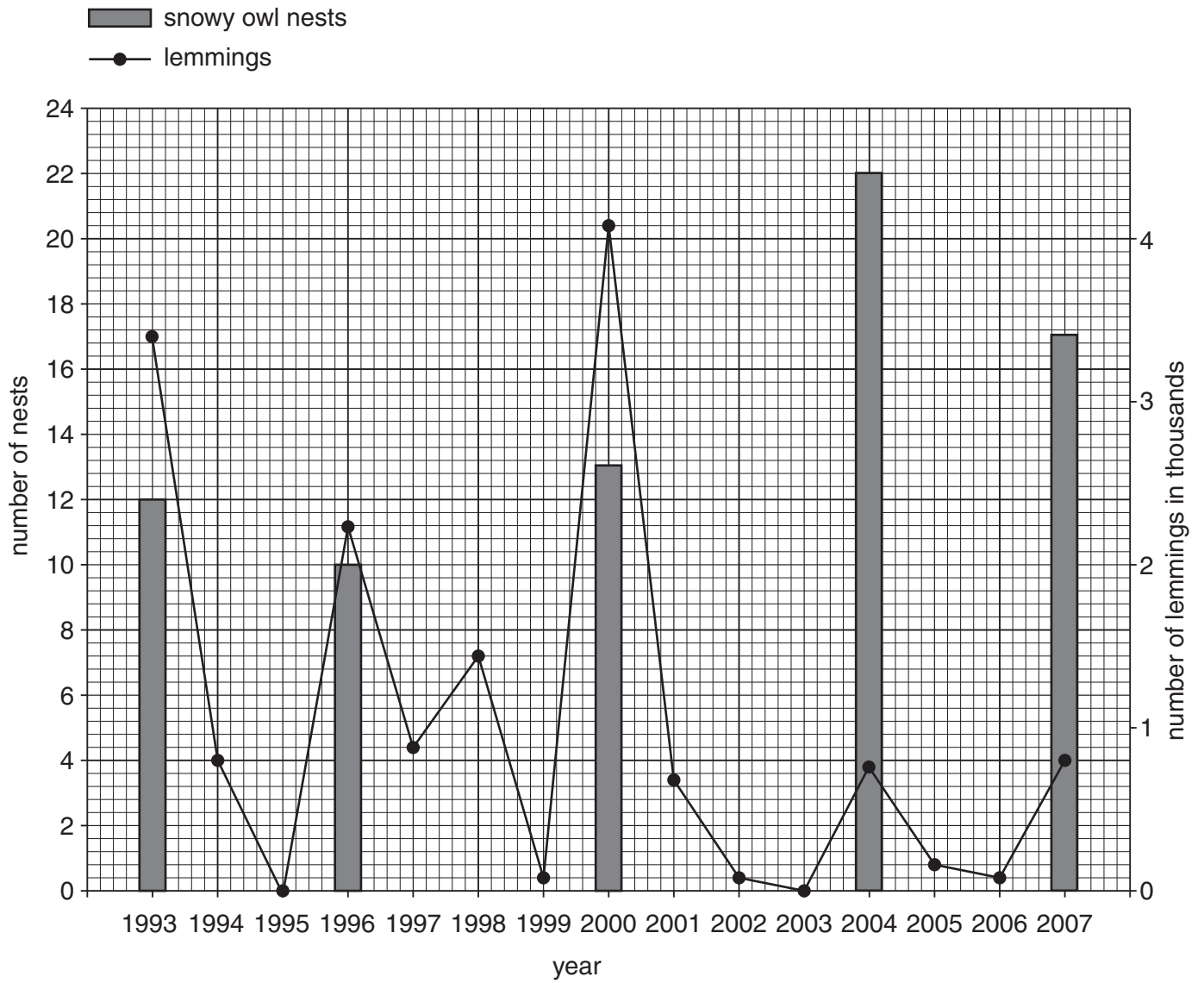
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.....

..... [2]

(b) Snowy owls feed on lemmings.

The graph shows the number of snowy owl nests and the number of lemmings found on Bylot Island, Canada.



Scientists think there is a strong link between the breeding of snowy owls and the numbers of lemmings.

- (i) Suggest what the link is between the breeding of snowy owls and the numbers of lemmings shown between **1993** and **2001**.

.....
..... [1]

- (ii) Look at the data between **2001** and **2007**.

What conclusion can you now make about how strong the link is between the breeding of snowy owls and the numbers of lemmings?

Explain your answer.

.....
.....
..... [2]

- (c) Lemmings migrate when the population increases rapidly and food becomes scarce.

Many lemmings die during these migrations. Their bodies decay.

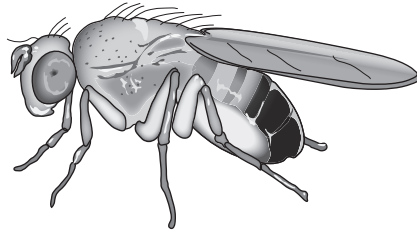
What type of organism decays the dead lemmings?

..... [1]

6 This question is about classification.

(a) Look at the picture.

It shows a species of fruit fly, *Drosophila melanogaster*.

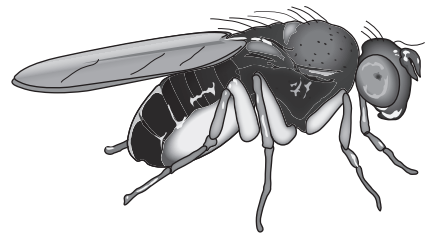
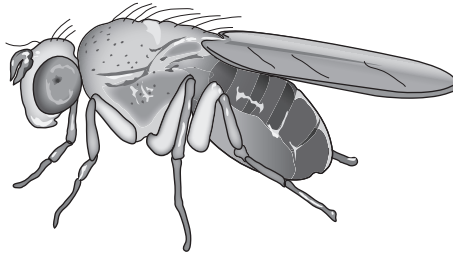
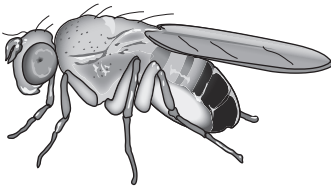


A biologist finds three pictures of other drosophila flies.

fly A

fly B

fly C



Which fly **A**, **B** or **C** is most likely to be *Drosophila melanogaster*?

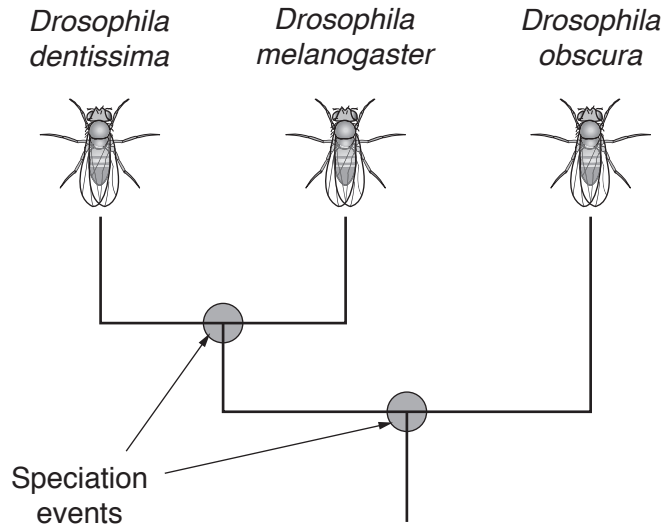
Fly

Explain your answer.

.....
..... [2]

(b) Look at the diagram.

It shows part of an evolutionary tree for three different drosophila fruit flies.



What is the genus of all three fruit flies?

..... [1]

(c) (i) Natural selection can help explain how species evolve.

When Charles Darwin suggested his ideas about evolution by natural selection, some people were against his theory.

Explain why.

.....

 [2]

(ii) Natural selection is now widely accepted as a theory about evolution.

Explain why.

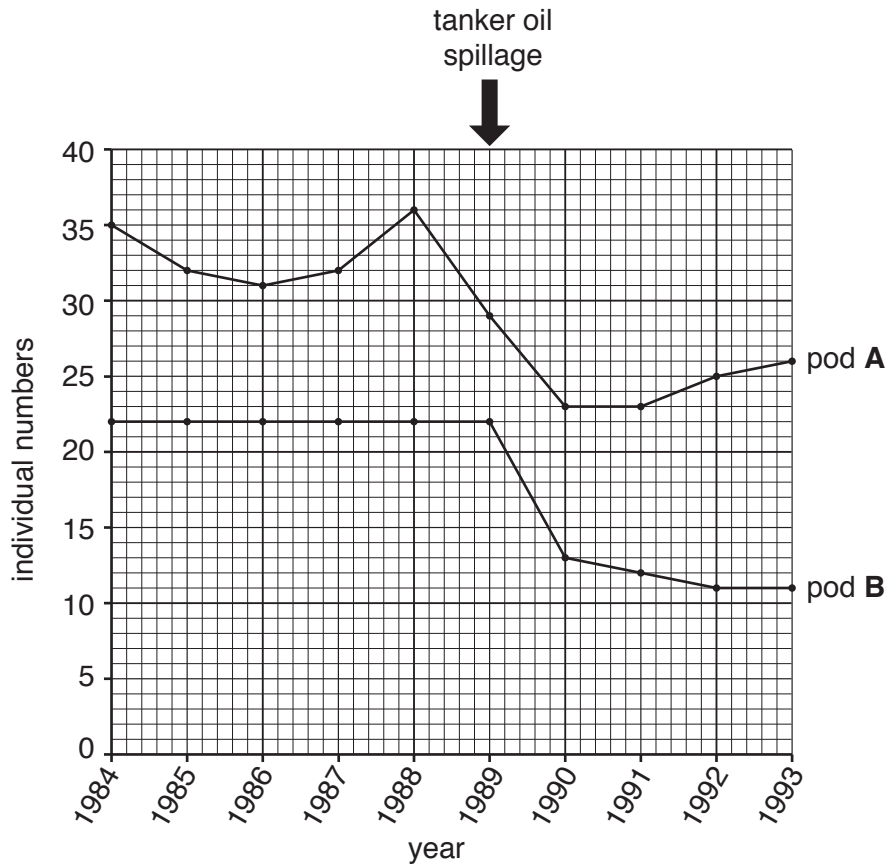
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 [2]

- 7 (a) An oil tanker spilled a massive amount of oil off the coast of Alaska in 1989. This affected killer whales living in the sea near the spillage.

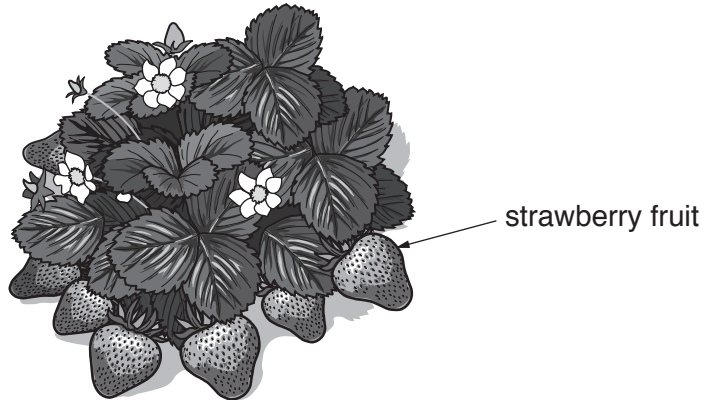
Look at the graph.

It shows the population of two groups of these killer whales, pod **A** and pod **B**, between 1984 and 1993.



SECTION C – Module B3

8 Liz grows strawberry plants.



(a) Liz wants to breed plants that have larger fruit.

Describe how she can do this by selective breeding.

.....

.....

.....

.....

.....

.....

..... [3]

(b) Liz eventually breeds a strawberry plant that has larger fruit.

She then decides to let this plant reproduce **asexually**.

Explain why Liz wants the plant to reproduce asexually instead of planting seeds.

.....

.....

.....

..... [2]

21
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9 Read the newspaper article.

Scientists make eggs from skin cells

In 2012, Japanese scientists reported that they had used normal skin cells from mice to make mouse stem cells.

They then used these stem cells to make eggs.

The eggs were fertilised with sperm from a male mouse and implanted into a female mouse.

When the baby mice were born they were perfectly healthy and grew up to breed normally and have babies of their own.

The scientists have also produced sperm cells in a similar way.

If these techniques could be used with humans they could help infertile couples have children.

(a) What are stem cells?

.....

.....

..... [2]

(b) The stem cells used by the Japanese scientists were different from normal mouse stem cells.

How were these stem cells different from normal mouse stem cells?

.....

.....

..... [2]

(c) A mouse skin cell contains 40 chromosomes in its nucleus.

(i) How many chromosomes would be in the nucleus of a mouse stem cell?

..... [1]

(ii) How many chromosomes would be in the nucleus of a mouse egg cell?

..... [1]

(d) In the future, scientists could try to use similar techniques to produce human children.

Some people would be in favour of this and some people would not.

Suggest reasons why people may have these opinions.

You may use ideas from the article in your answer.

.....

.....

.....

..... [2]

- 10 During exercise, the rate of blood flow to different parts of the body changes.

Look at the table.

| Part of body | Rate of blood flow in ml per minute | |
|-------------------------------------|-------------------------------------|-----------------|
| | At rest | During exercise |
| digestive system | 1 350 | 600 |
| kidneys | 1 100 | 600 |
| muscles | 1 000 | 12 500 |
| brain | 700 | 750 |
| skin | 300 | 1 900 |
| heart muscle | 200 | 750 |
| other | 350 | 400 |
| Total blood flow to the body | 5 000 | |

- (a) Write down **one** part of the body that has a **decrease** in blood flow during exercise.

..... [1]

- (b) (i) Muscles have the greatest **increase** in blood flow during exercise.

By how much does the blood flow to the muscles increase during exercise?

..... [1]

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