Collins

# AQA

GCSE

# Biology

F

## SET B – Paper 2 Foundation Tier

Author: Kath Skillern



**Materials**

Time allowed: 1 hour 45 minutes

**For this paper you must have:**

- a ruler
- a calculator.

**Instructions**

- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- There are 100 marks available on this paper.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions 04.6 and 06.5 you need to make sure that your answer:
  – is clear, logical, sensibly structured
  – fully meets the requirements of the question
  – shows that each separate point or step supports the overall answer.

**Advice**

- In all calculations, show clearly how you work out your answer.

**Name:** .....

**01** An ecosystem is the interaction of a community of living organisms with the non-living parts of their environment.

**01.1** How is the **non-living** part of the environment described?

Tick **one** box.

Abiotic ☐

Biotic ☐

Dead ☐

Habitat ☐ **[1 mark]**

**01.2** Name **two** resources that **plants** compete for.

1. .....

2. ..... **[2 marks]**

**01.3** Name **two** resources that **animals** compete for.

1. .....

2. ..... **[2 marks]**

**01.4** Within a community each species depends on other species to help it survive.

If one species is removed it can affect the whole community.

How is this described?

Tick **one** box.

Interaction ☐

Interdependence ☐

Ecosystem ☐

Environment ☐ **[1 mark]**

**01.5** Explain the term '**a stable community**'.

.....

.....

..... **[2 marks]**

**01.6** Biological material eventually dies and decays.

What does **anaerobic** decay produce?

Tick **one** box.

Carbon dioxide ☐

Ethane ☐

Lactic acid ☐

Methane ☐ **[1 mark]**

**01.7** Which **two** materials do microorganisms cycle through an ecosystem?

Tick **two** boxes.

Carbon dioxide ☐

Compost ☐

Mineral ions ☐

Oxygen ☐ **[2 marks]**

**02** The human body reacts to changes by coordinating a **nervous** response or a **hormonal** response.

**02.1** Draw a line from each response description to **either** the nervous system **or** the hormonal system.

| System | Response description | System |
|---|---|---|
| | Fast acting | |
| | Slow acting | |
| | Acts for short time | |
| | Acts for long time | |
| **Nervous system** | | **Hormonal system** |
| | Chemical | |
| | Electrical | |
| | Acts in a specific area | |
| | Acts more generally | |

**[4 marks]**

**02.2** In a scientific study, called **Scientific Study A**, reaction times were investigated after four volunteers had drunk alcohol.

A small can of beer contains about one unit of alcohol.

The results are shown in **Table 2.1**

**Table 2.1**

| Volunteer | Reaction time in milliseconds (ms) | | | | | |
|---|---|---|---|---|---|---|
| | Units of alcohol | 0.5 | 1.5 | 3.0 | 4.5 | 6.0 |
| **A** | | 34 | 45 | 59 | 71 | 85 |
| **B** | | 35 | 47 | 62 | 75 | 87 |
| **C** | | 32 | 46 | 64 | 72 | 83 |
| **D** | | 30 | 42 | 59 | 70 | 81 |
| **Mean** | | **33** | **45** | **61** | **72** | |

Calculate the mean reaction time of the volunteers after 6.0 units of alcohol.

.....

.....

Mean reaction time after 6.0 units of alcohol = ..... **[3 marks]**

**02.3** Use the results in **Table 2.1** to **describe** how alcohol affects reaction time.

.....

.....

..... **[2 marks]**

**02.4** In **Scientific Study B**, a test was carried out on 2000 people of all ages.

Comment on the repeatability of **Scientific Studies A and B**.

.....

..... **[2 marks]**



**Turn over >**

**03** Type 2 diabetes is a serious condition.

In Type 2 diabetes the body's cells no longer respond as effectively to control glucose concentration in the blood.

Look at **Table 3.1**

**Table 3.1**

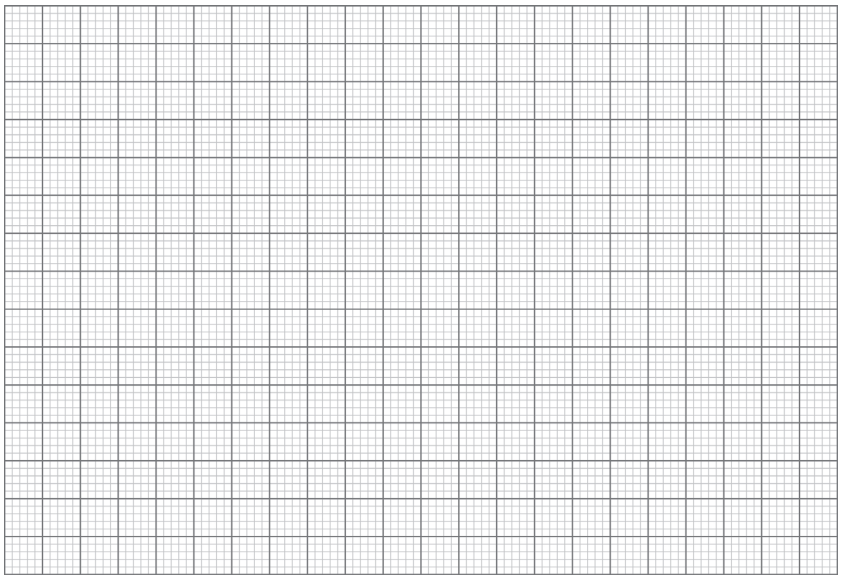
| Year | Proportion (%) of the population who have Type 2 diabetes | Mean body mass in kg |
|---|---|---|
| 1990 | 4.9 | 72.5 |
| 1991 | 5.0 | 73.0 |
| 1992 | 5.4 | 73.7 |
| 1993 | 4.7 | 74.0 |
| 1994 | 5.3 | 74.6 |
| 1995 | 5.5 | 75.0 |
| 1996 | 5.4 | 74.8 |
| 1997 | 6.2 | 75.3 |
| 1998 | 6.5 | 76.0 |
| 1999 | 6.9 | 76.6 |
| 2000 | 7.3 | 77.2 |

**03.1** Use the data in **Table 3.1** to plot a graph to show the effect of body mass on the percentage of the population who have Type 2 diabetes.

You do not need to use the Year column in **Table 3.1**.

Make sure to:

- choose an appropriate scale
- label both axes
- plot all points to show the pattern of results.



**[4 marks]**

**03.2** Describe the relationship between the mean body mass of the population and the percentage of people who have Type 2 diabetes.

.....

.....

**[1 mark]**

**03.3** Water moves around the body, and into and out of it, continuously.

Complete the sentences below.

When you **exhale**…

Tick **one** box.

| | | |
|---|---|---|
| A | water, ions and urea leave the body via the skin | |
| B | water, ions and urea are removed via the kidneys | |
| C | water leaves the body via the lungs | |

**[1 mark]**

When you **sweat**…

Tick **one** box.

| | | |
|---|---|---|
| A | water, ions and urea leave the body via the skin | |
| B | water, ions and urea are removed via the kidneys | |
| C | water leaves the body via the lungs | |

**[1 mark]**

When you **urinate**…

Tick **one** box.

| | | |
|---|---|---|
| A | water, ions and urea leave the body via the skin | |
| B | water, ions and urea are removed via the kidneys | |
| C | water leaves the body via the lungs | |

**[1 mark]**



**Question 3 continues on the next page**

**03.4** Which organ regulates water loss?

Tick **one** box.

Bladder ☐

Kidney ☐

Lung ☐

Skin ☐

**[1 mark]**

**03.5** Hormones control reproduction:

- Follicle stimulating hormone (FSH) causes maturation of an egg in the ovary.
- Oestrogen and progesterone are involved in maintaining the uterus lining.

Use this information to explain how **one hormonal** method of contraception works.

.....

.....

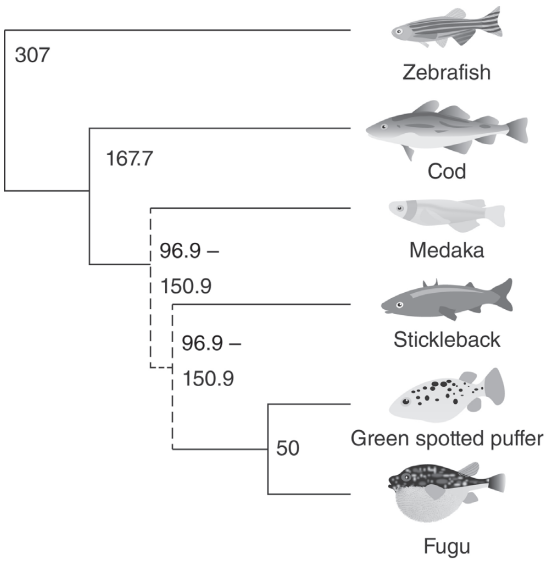
..... **[2 marks]**

**04** Evolutionary trees are used by scientists to show how organisms are related.

**Figure 4.1** shows an evolutionary tree.

The numbers on the branches of the evolutionary tree are the number of 'million years ago'.

**Figure 4.1**




**04.1** Which fish is the most **distantly** related to the others?

Tick **one** box.

Cod ☐

Fugu ☐

Green spotted puffer ☐

Medaka ☐

Stickleback ☐

Zebrafish ☐

**[1 mark]**



**Question 4 continues on the next page**

**04.2** Which **two** fishes are most **closely** related?

Tick **two** boxes.

- Cod ☐
- Fugu ☐
- Green spotted puffer ☐
- Medaka ☐
- Stickleback ☐
- Zebrafish ☐

**[1 mark]**

**04.3** How long ago did the cod split from medaka and stickleback?

.....

**[1 mark]**

**04.4** Suggest why there is only a **dotted** line between medaka and stickleback.

.....

.....

**[1 mark]**

**04.5** Name **one** type of evidence that helps scientists construct evolutionary trees.

.....

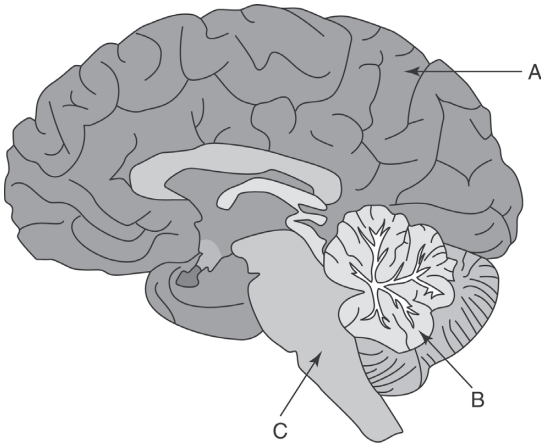
**[1 mark]**

**04.6** Describe the steps which may have given rise to medaka and stickleback becoming different species.

**[6 marks]**

**05** **Figure 5.1** shows a section through a human brain.

**Figure 5.1**




**05.1** What is the area labelled **A** on **Figure 5.1**?

Tick **one** box.

Cerebellum ☐

Cerebral cortex ☐

Medusa ☐

Pituitary ☐ **[1 mark]**

**05.2** What is the area labelled **B** on **Figure 5.1**?

Tick **one** box.

Cerebellum ☐

Cerebral cortex ☐

Hypothalamus ☐

Medulla ☐ **[1 mark]**

**05.3** What is the area labelled **C** on **Figure 5.1**?

Tick **one** box.

Medulla ☐

Medusa ☐

Optic nerve ☐

Spinal column ☐ **[1 mark]**

**05.4** The brain has many functions, including highly complex functions and unconscious, automatic functions.

What is the function of area **A**, area **B** and area **C**?

Give **one** example for each.

**Area A**

Function: .....

Example: .....

**Area B**

Function: .....

Example: .....

**Area C**

Function: .....

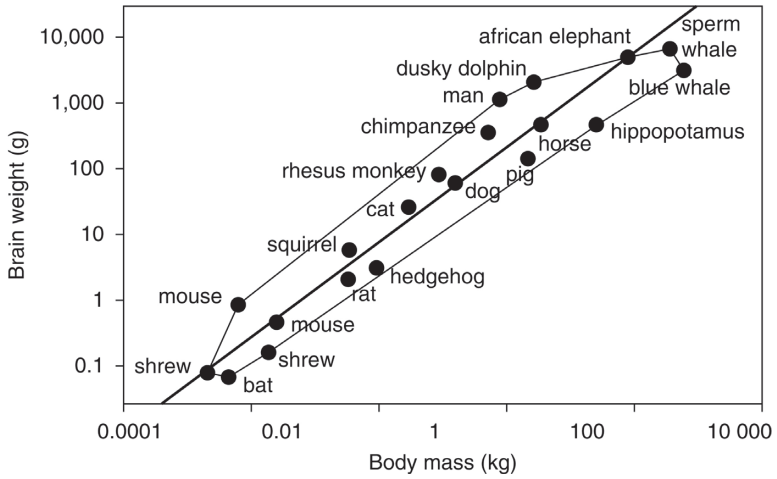
Example: ..... **[6 marks]**



**Question 5 continues on the next page**

**05.5** **Figure 5.2** shows the brain weight and body mass of animals.

**Figure 5.2**




Describe the relationship between the size of an animal and the size of its brain.

.....

.....

**[1 mark]**

**05.6** Suggest **one** reason for this relationship.

.....

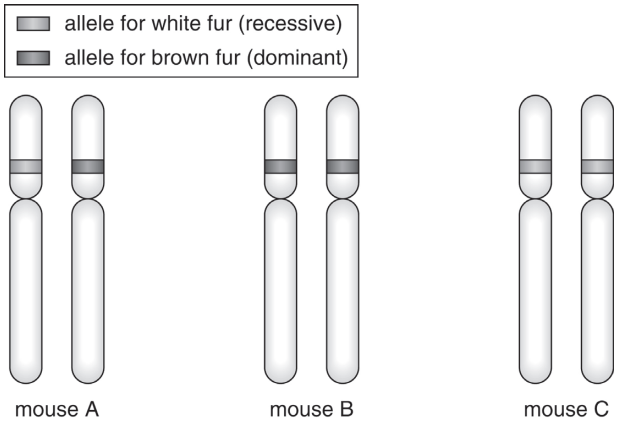
.....

**[1 mark]**

**06** Some of the characteristics of living things are controlled by a single gene, such as fur colour in mice.

**Figure 6.1** shows the alleles for fur colour for three mice.

**Figure 6.1**




**06.1** How are the alleles of Mouse A described?

Tick **one** box.

Dominant ☐

Heterozygous ☐

Homozygous ☐

Phenotype ☐

**[1 mark]**

**06.2** Which mouse or mice have brown fur?

Tick **one** box.

Mouse B only ☐

Mice A and B ☐

Mouse A only ☐

Mice A and C ☐

**[1 mark]**

**Question 6 continues on the next page**

**06.3** If Mouse B and Mouse C were to breed, what colour fur would their offspring have?

.....

**[1 mark]**

**06.4** Explain your answer to 06.3

.....

.....

.....

.....

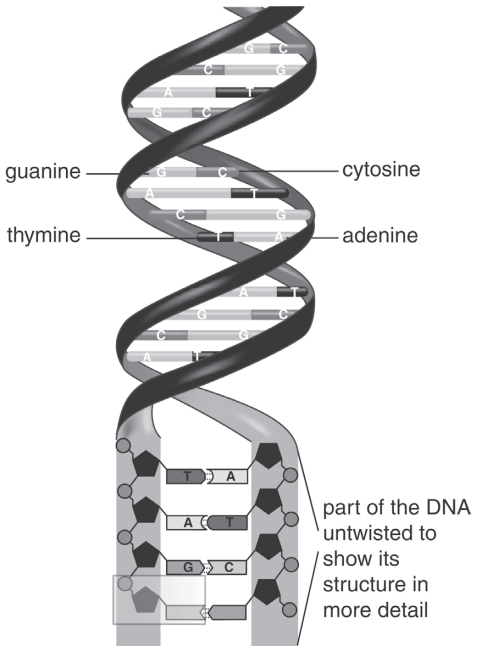
.....

**[3 marks]**

**06.5** The DNA molecule is a polymer, that contains four different bases.

**Figure 6.2** shows the structure of DNA.

**Figure 6.2**



Describe the structure and function of DNA.

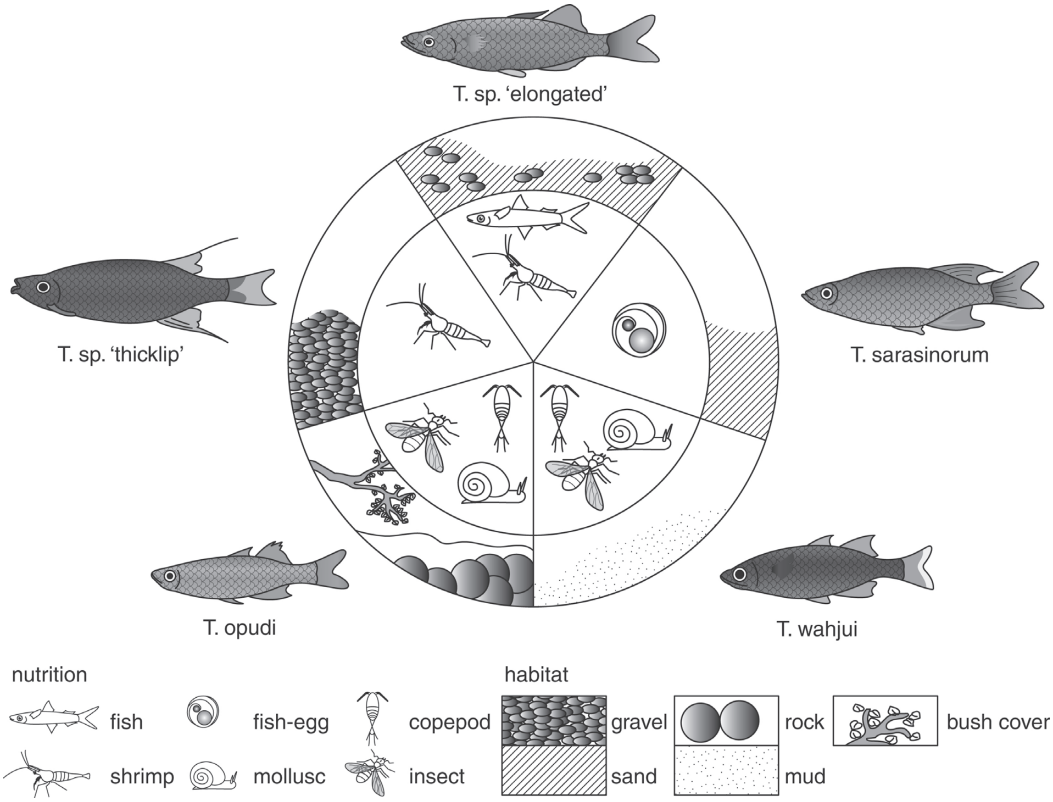
In your answer describe where DNA is found.

Use **Figure 6.2** to help you.

**[6 marks]**

**07** **Figure 7.1** shows five closely related species of fish, with their diets and habitats.

**Figure 7.1**




**07.1** The copepods in this community are primary consumers.

Suggest what their diet may consist of.

.....

**[1 mark]**

**07.2** In one year, there was a huge increase in the numbers of *T. sarasinorum*.

How would this affect the numbers of 'thicklip'?

Explain your answer.

**[3 marks]**

**07.3** Explain why *T. opudi* and *T. wahjui* are **not** competitors, even though they have similar diets.

**[2 marks]**

**07.4** Name a source of pollution that could affect the fish.

**[1 mark]**

**07.5** Explain why pyramids of biomass are rarely higher than four organisms.

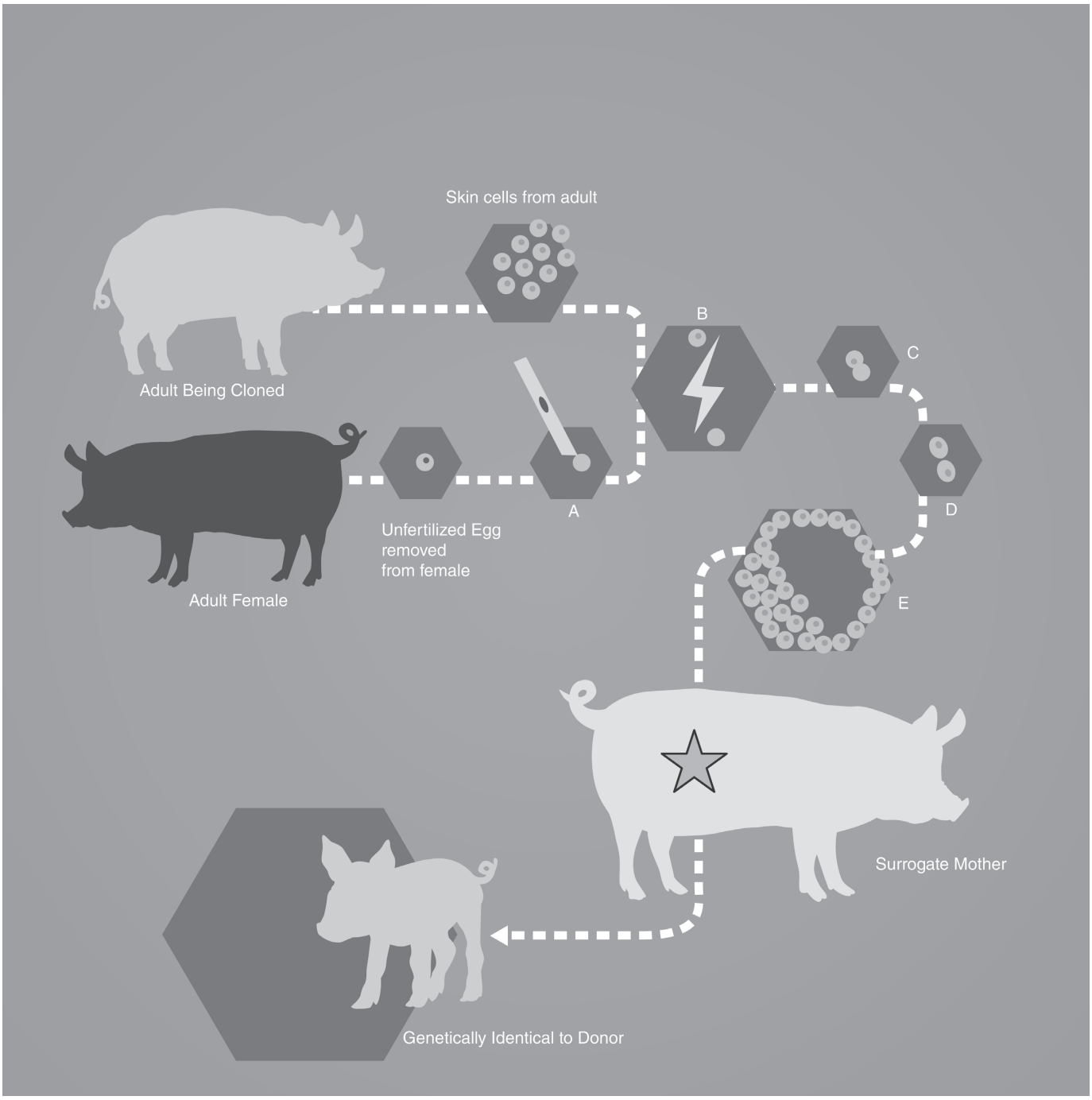
**[3 marks]**

**08** In the year 2000, a litter of piglets was produced by cloning.

One of the piglets born was called Millie.

**Figure 8.1** shows the cloning of Millie the piglet.

**Figure 8.1**



**08.1** Look at **Figure 8.1**

Suggest labels to describe the cloning process at points **A**, **B**, **C**, **D** and **E**.

A .....

B .....

C .....

D .....

E ..... **[5 marks]**

**08.2** In the year 2001, a kitten called Copy Cat was produced by cloning.

Copy Cat was genetically identical to the cloned cat, but the patterns on her fur were different.

Suggest a reason for this.

..... **[1 mark]**

**08.3** Some organisms naturally produce clones by **asexual** reproduction.

Name an organism that naturally produces clones.

..... **[1 mark]**



**Question 8 continues on the next page**

**08.4** Give **two** advantages of asexual reproduction.

**[2 marks]**

**08.5** A gardener has been breeding roses in her garden.

She selects the roses with the biggest blossoms and most fragrant flowers to breed together, and pollinates them herself.

How is the gardener's method of breeding described?

**[1 mark]**

**08.6** A farmer's cabbages suffer from white fly.

The farmer asks a local plant laboratory to create for him a resistant breed of cabbage.

How is the farmer's method of breeding described?

**[1 mark]**

**08.7** Describe the differences between the gardener's and the farmer's approaches to improving their plants.

**[2 marks]**

**09.1** Explain the difference between **population size** and **population density**.

.....

.....

.....

..... **[2 marks]**

**09.2** Mr Green needs to assess the population of plantain on a 10 m wide path in a national park.

**Figure 9.1** shows broadleaf plantain, which is a tough plant often found on footpaths.

**Figure 9.1**

Mr Green has a 25 $cm^2$ wire quadrat and a measuring tape.

He places the tape across the path, including the dense verges either side of the path.

What is the name of this line?

..... **[1 mark]**



**Question 9 continues on the next page**

**09.3** Mr Green places the quadrat at the end of the line, on the verge.

He counts the number of whole plants in the quadrat and records the number.

How should Mr Green decide where to place the **next** quadrat along the line?

**[2 marks]**

**09.4** Mr Green samples along the line, until he reaches the other end.

The whole path is 500 m long.

Describe the steps Mr Green should follow so that he has statistical evidence for the distribution of plantain **along the length of the path**.

**[3 marks]**

**09.5** Explain why there are likely to be more plantains in the **middle** of the path than at the edges.

**[2 marks]**



**END OF QUESTIONS**