Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2017

Biology

Unit 2
Foundation Tier

MV18

[GBY21]

FRIDAY 16 JUNE, MORNING

Time

1 hour 30 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Complete in black ink only.
Answer **all fourteen** questions.

Information for Candidates

The total mark for this paper is 90.
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **14(b)**.

1 Oestrogen and testosterone are sex hormones which cause changes in girls and boys during puberty.

(a) Name the male reproductive organ which produces testosterone. [1 mark]

_____

(b) Give **two** changes that happen **only** in girls during puberty. [1 mark for each]

1. _____

_____

2. _____

_____

(c) Give **one** change that happens in **both** boys and girls during puberty. [1 mark]

_____

2 Look at the words in the box.

genes	**Down syndrome**	**environmental**
gamete	**cystic fibrosis**	**random**

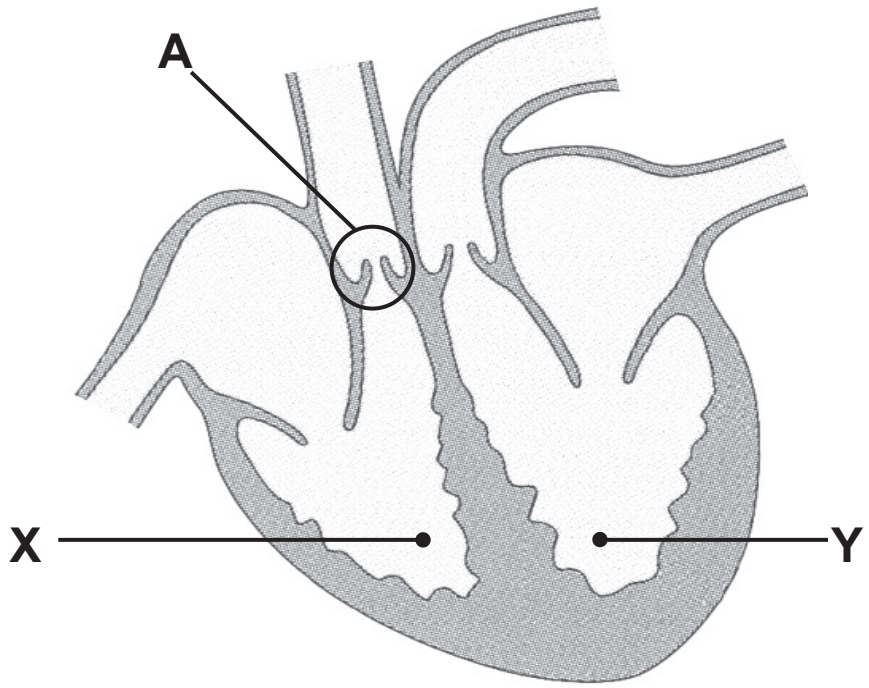
Use words from the box **to complete the sentences**.
[4 marks]

One type of mutation is caused by a _____ change in the structure of _____.

_____ _____ is a condition caused by an extra chromosome.

_____ factors can increase the chance of mutations.

3 The diagram shows a heart.



Look at the diagram.

(a) Name part **A** and describe its function.
[2 marks, 1 mark for the name and 1 mark for the function]

A _____

Function _____

_____

(b) (i) Name the **type** of chambers labelled **X** and **Y**. [1 mark]

_____

(ii) Explain why chamber **Y** has a thicker wall than chamber **X**. [1 mark]

_____

_____

_____

(iii) The composition of blood in chamber **X** is different from the composition of blood in chamber **Y**.

Explain how. [1 mark]

_____

_____

_____

4 The pictures show two glasses.

Each glass contains one unit of alcohol.

half pint of beer

half glass of wine

It takes one hour for the human body to remove one unit of alcohol from the blood.

(a) Ethan drinks three pints of beer and two full glasses of wine.

Use the information in the pictures to calculate how many hours it will take Ethan's body to remove the alcohol from his blood.

Show your working. [2 marks]

Answer _____ hours

(b) What term describes drinking large amounts of alcohol in a short period of time? [1 mark]

_____

(c) Describe **two** effects on society of drinking large amounts of alcohol. [1 mark for each]

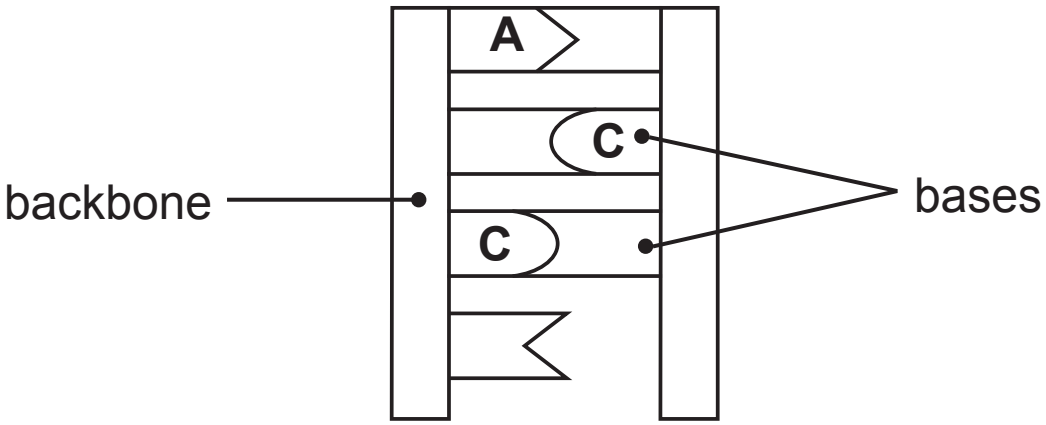
1. _____

_____

2. _____

_____

5 The diagram shows part of a DNA molecule.



Look at the diagram.

(a) (i) Label the four blank bases on the DNA molecule. [2 marks]

(ii) Complete the diagram by drawing and labelling the missing base. [1 mark]

(b) Name the **two** molecules that make up the backbone of the DNA molecule. [1 mark for each]

_____

_____

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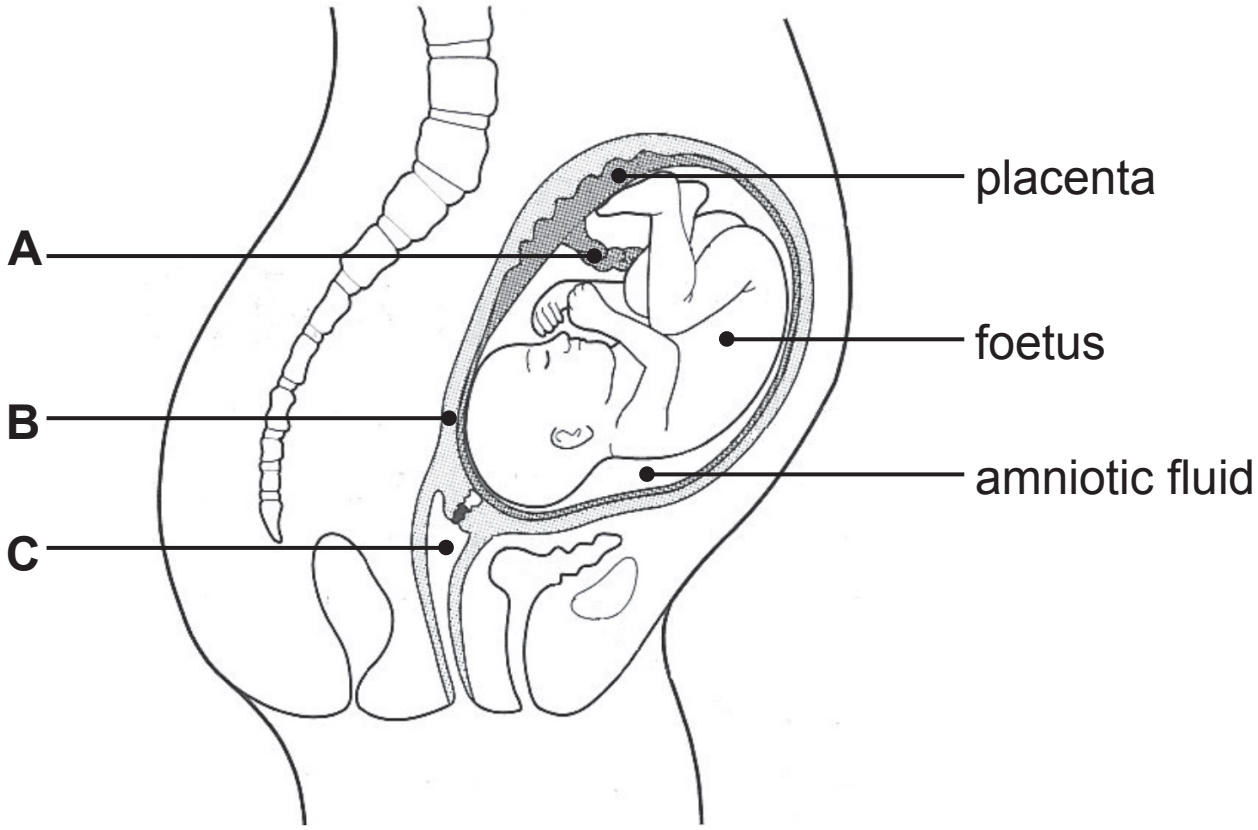
(Questions continue overleaf)

6 The diagram shows a foetus just before birth.



Look at the diagram.

(a) Name **A**, **B** and **C**. [1 mark for each]

A _____

B _____

C _____

(b) The placenta is adapted to provide the foetus with oxygen and food molecules.

Explain how. [2 marks]

(c) What is the function of the amniotic fluid? [1 mark]

7 A widow's peak is a hairline that forms a distinct point in the centre of the forehead.

A widow's peak is caused by a dominant allele **R**.

A normal hairline is caused by a recessive allele **r**.

(a) Complete the table. [4 marks]

Phenotype	Genotype	Homozygous or Heterozygous
Widow's peak		homozygous
	Rr	
Normal	**rr**	

(b) Dave has a widow's peak.

His wife Ann has a normal hairline.

The Punnett square shows Dave's and Ann's gametes.

		Name	
	Gametes	**r**	**r**
Name	**R**		
	r		

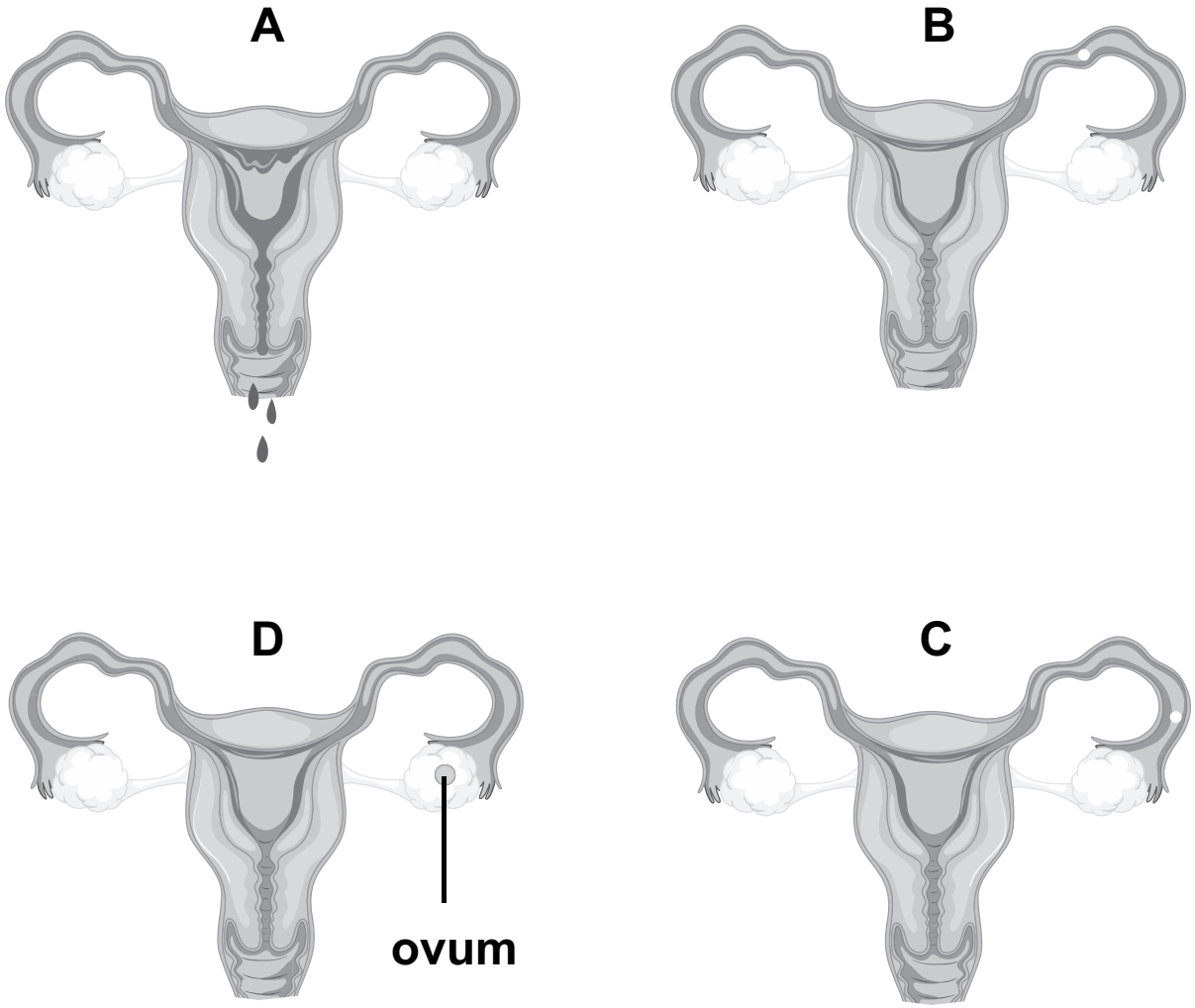
(i) Write the name of the parent in the box beside the correct gametes. [1 mark]

(ii) **Complete** the Punnett square to show the possible genotypes of their children. [2 marks]

(iii) What proportion of the children could have a widow's peak? [1 mark]

_____

8 The diagrams show some stages of the menstrual cycle.



(a) Diagram **A** shows menstruation.

Give **one** piece of evidence from the diagram that supports this statement. [1 mark]

_____

_____

Fertilisation happens in the oviduct.

(b) In which **two** diagrams could fertilisation happen? [2 marks]

_____ and _____

(c) Describe what happens during fertilisation. [3 marks]

_____

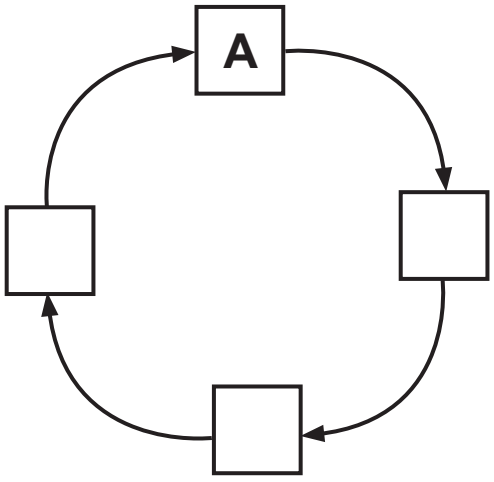
_____

_____

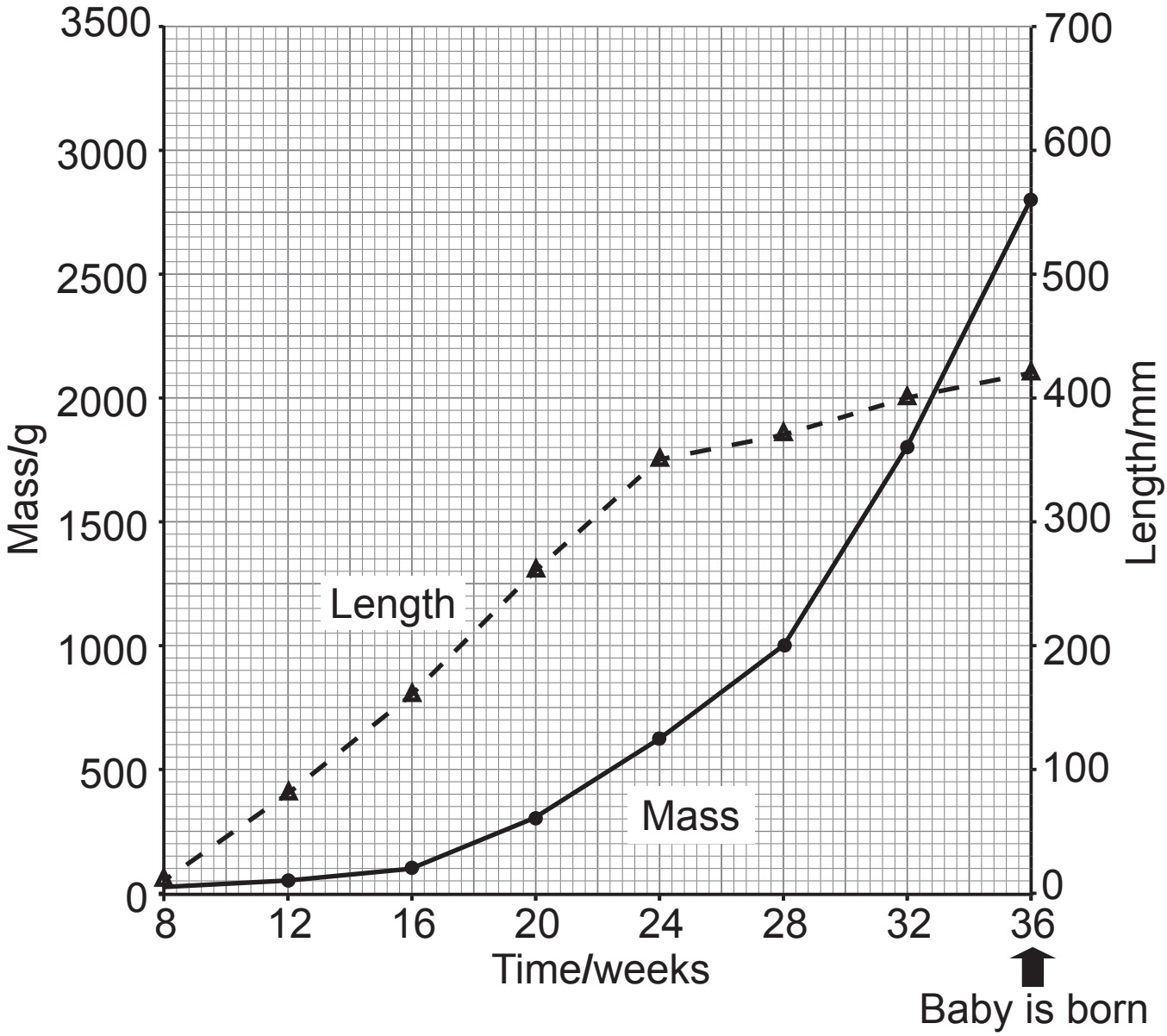
_____

_____

(d) **Complete the diagram** using the letters **B**, **C** and **D** to show the order of the stages during the menstrual cycle. [2 marks]



9 The graph shows changes in length and mass of a human foetus during pregnancy.



Look at the graph.

(a) Describe the change in **length** of the foetus during pregnancy. [3 marks]

Use data from the graph in your answer.

The average pregnancy in humans is **forty weeks**.

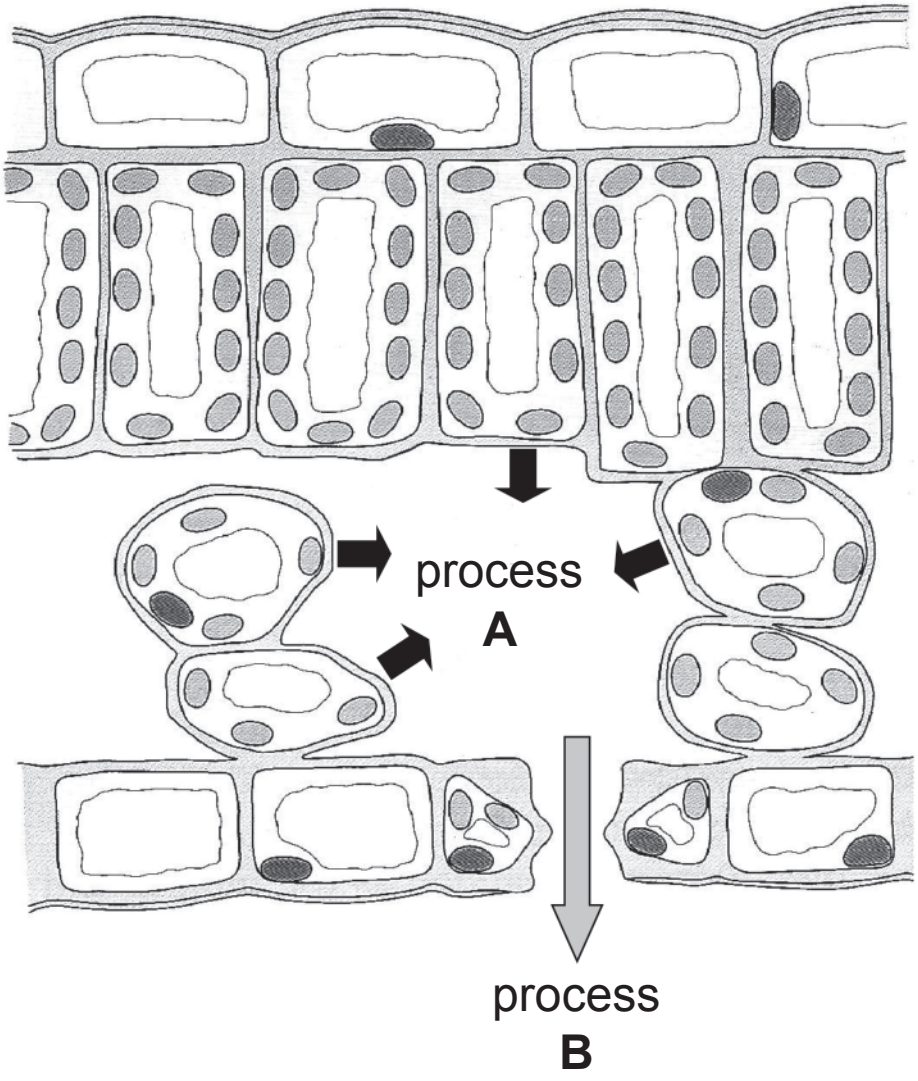
The average mass of a newborn baby is 3200 g.

(b) Use data from the graph to suggest why the health of the baby may be at risk after it is born. [3 marks]

(c) (i) Name the **type** of cell division which causes the foetus to increase in length and mass. [1 mark]

(ii) Give **one other** function of this type of cell division in living organisms. [1 mark]

10 The diagram shows a section through a leaf.



Look at the diagram.

The arrows show the processes in transpiration.

(a) Name the **processes** shown by arrows **A** and **B**.
[1 mark for each]

A _____

B _____

(b) A pupil investigated water loss from a tomato leaf.

He weighed the tomato leaf every two hours over a ten hour period.

The results are shown in the table.

Time/hours	0	2	4	6	8	10
Mass of tomato leaf/g	8.4	7.8	7.4	7.0	6.6	6.3

(i) Calculate the percentage of water lost from the tomato leaf over the ten hours. [3 marks]
Show your working.

_____ **%**

(ii) What effect would increasing the humidity have on the rate of water loss? [1 mark]

_____

Other environmental factors also affect the rate of water loss.

(iii) Describe **two other** environmental factors which **increase** the rate of water loss. [2 marks]

_____

_____

_____

_____

(c) The table shows the number of stomata on the leaves of four different plants.

Type of plant	Number of stomata per cm^2
Apple	32 400
Tomato	14 200
Pea	32 800
Bean	32 100

Plants which come from warm climates are often adapted to reduce water loss.

(i) Suggest which plant comes from the warmest climate.

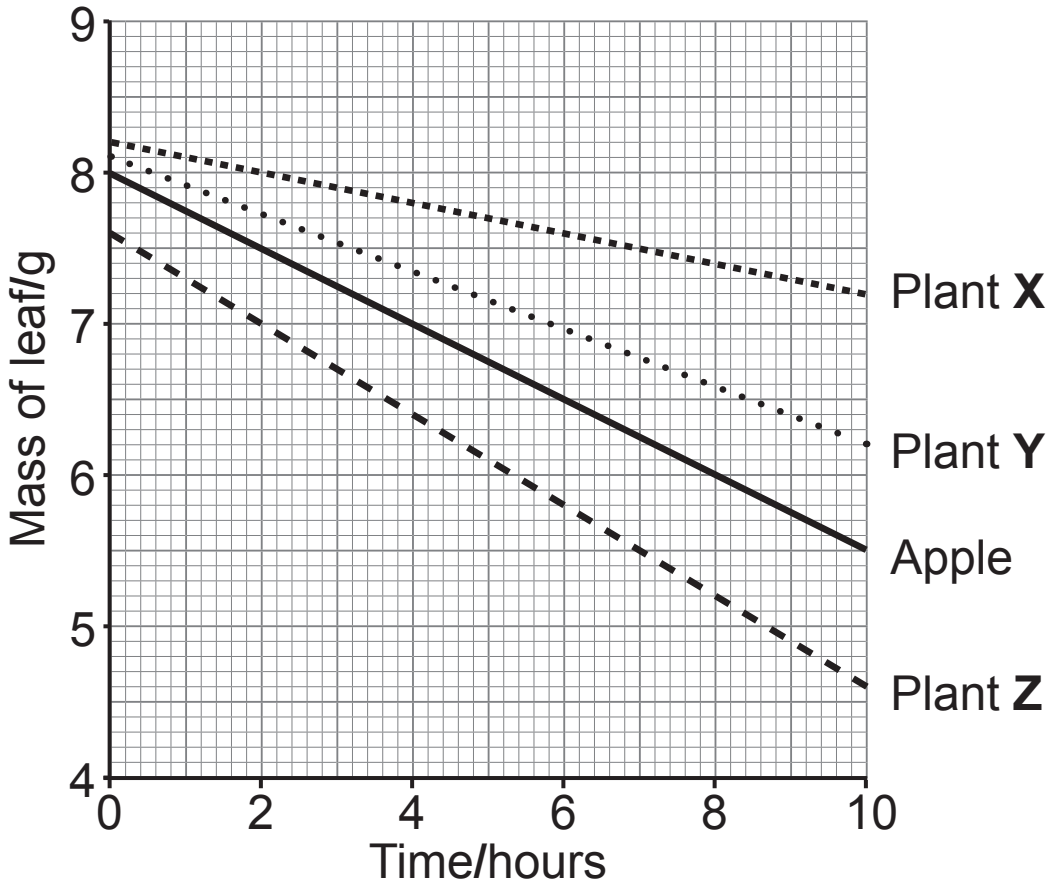
Explain your choice. [2 marks]

Plant _____

Explanation _____

_____

The graph below shows the rate of water loss from leaves of the four plants.



Look at the graph.

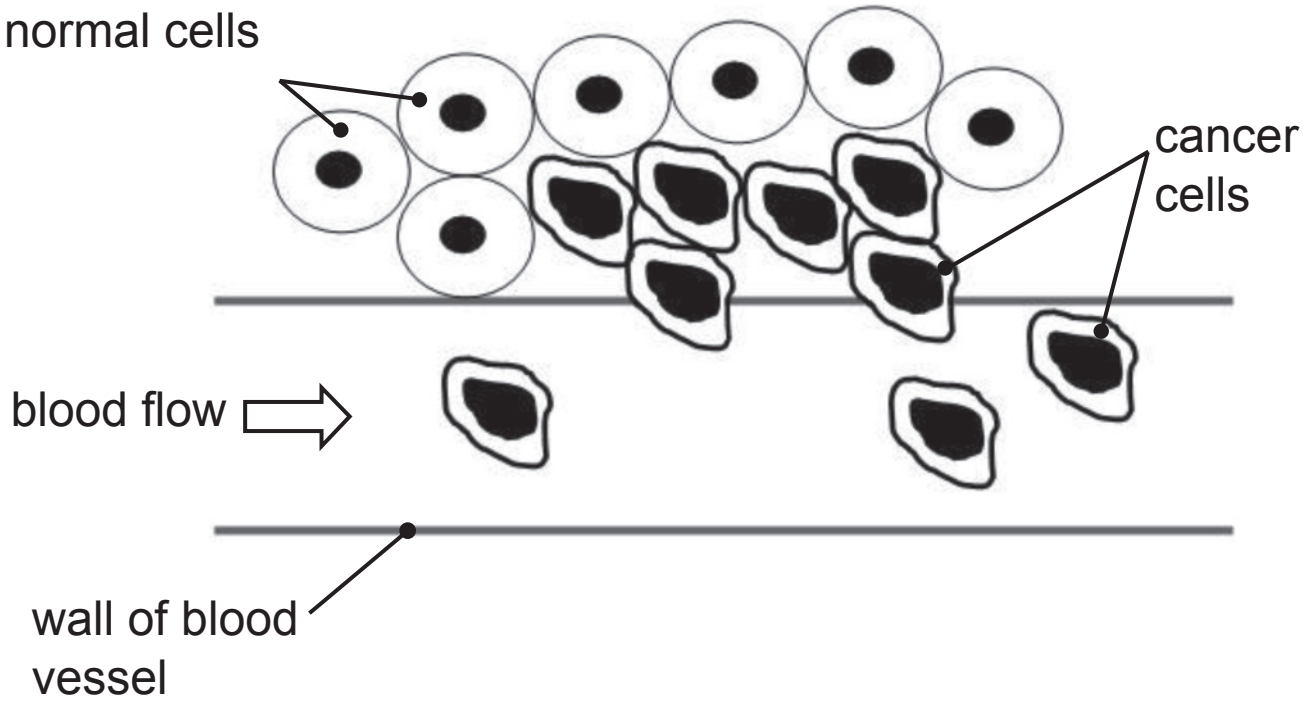
(ii) Suggest which of the graphs, **X**, **Y**, or **Z** shows the results for the pea plant.

Use the graph and the table to explain your answer. [3 marks]

11 Cancer cells are produced by uncontrolled cell division.

This results in a tumour.

The diagram shows a malignant tumour and a blood vessel **before** chemotherapy treatment.



Look at the diagram.

(a) Describe **two** differences between a cancer cell and a normal cell. [1 mark for each]

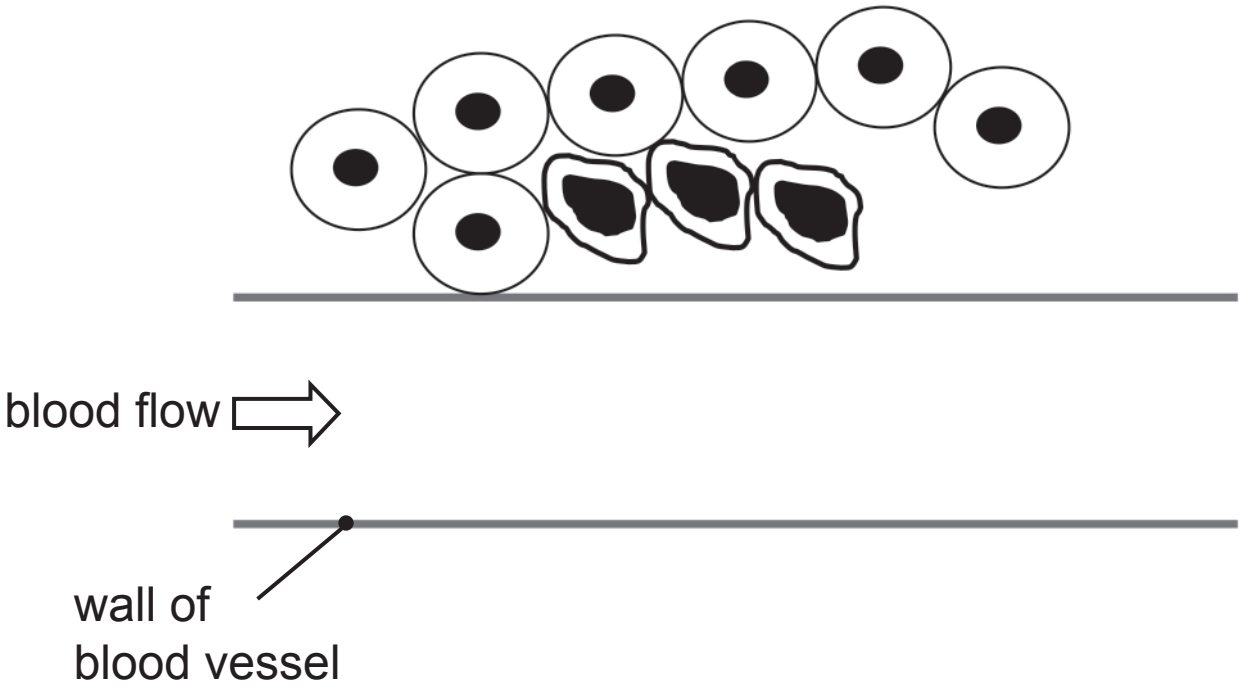
1. _____

_____

2. _____

_____

The diagram shows the tumour and the blood vessel **after** chemotherapy treatment.



Look at the diagrams.

(b) Give **two** ways the tumour has changed after chemotherapy treatment. [1 mark for each]

1. _____

_____

2. _____

_____

Chemotherapy is one way of treating cancer.

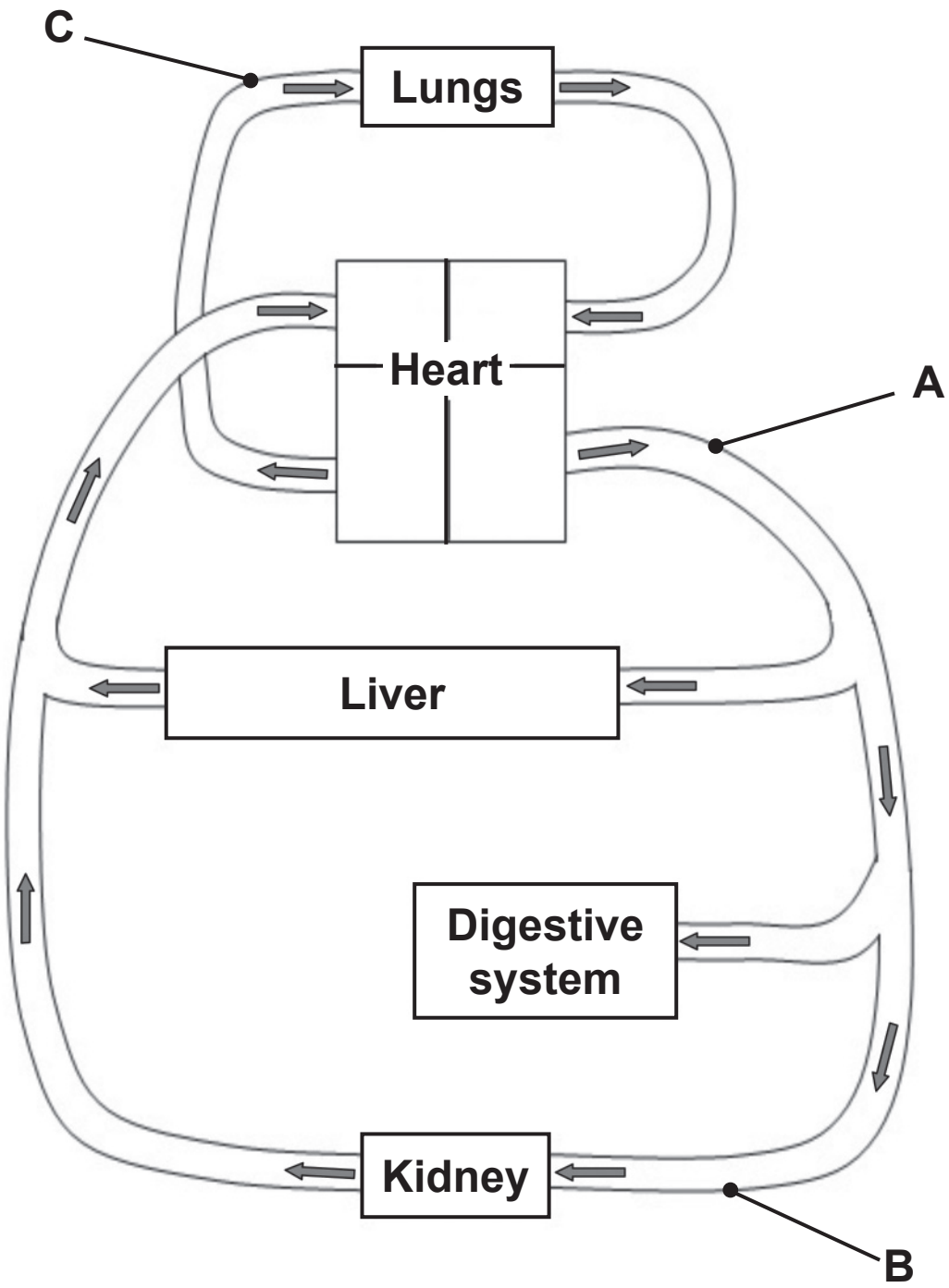
(c) Give **two** other ways of treating cancer. [1 mark for each]

1. _____

2. _____

12 The diagram shows part of the human circulatory system.

The arrows show the direction of blood flow.



Look at the diagram.

(a) Name blood vessels **A**, **B** and **C**. [1 mark for each]

A _____

B _____

C _____

(b) (i) **Complete** the diagram by drawing the hepatic portal vein. [1 mark]

(ii) Draw an arrow to show the direction of blood flow in the hepatic portal vein. [1 mark]

13 Blood groups are an example of variation.

(a) (i) Name this type of variation. [1 mark]

_____

(ii) Give **one other** example of this type of variation in humans. [1 mark]

_____

(b) The table shows information about blood groups in the Northern Ireland population.

Blood group	Number of people in Northern Ireland	Percentage of Northern Ireland population
O	954 000	53
A		34
B	180 000	10
AB	54 000	3

Look at the table.

(i) The population of Northern Ireland is 1 800 000.

Calculate the number of people in the Northern Ireland population with blood group **A**.

Show your working. [2 marks]

_____

It is preferable that people receive a blood donation of their own blood group.

(ii) Suggest why people with group **AB** in Northern Ireland are at a disadvantage. [1 mark]

During surgery blood transfusions are often necessary.

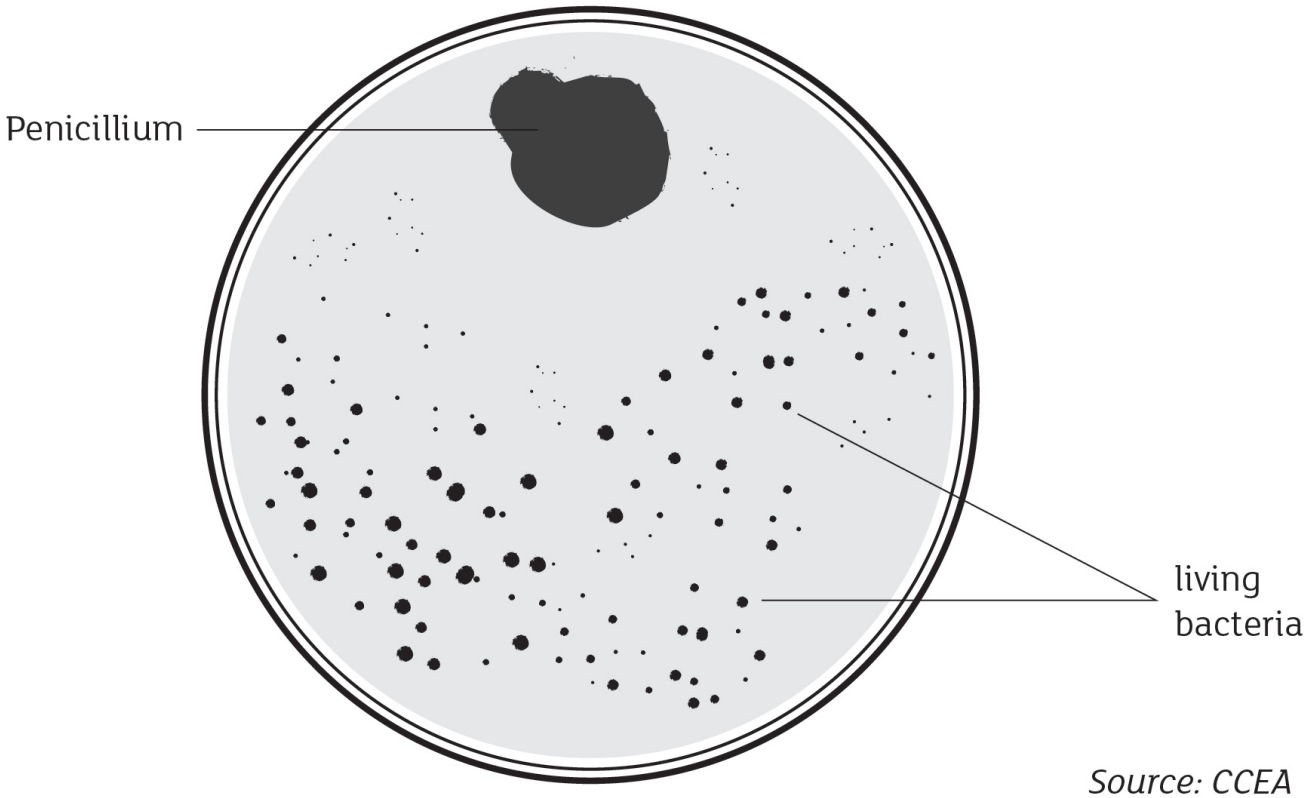
(c) What is a blood transfusion? [1 mark]

14 (a) Penicillin was discovered in 1928.

Name the scientist who discovered penicillin. [1 mark]

_____

(b) The diagram shows the result of the experiment which led to the discovery of penicillin.



Source: CCEA

Use the diagram to help explain how penicillin was discovered. [6 marks]

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

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Q13(b).....Statistics adapted from the Northern Ireland Blood Transfusion Service "About Blood".

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Question Number	Marks
1	
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Examiner Number