



General Certificate of Secondary Education
2019

Centre Number

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Candidate Number

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Double Award Science Biology

Unit B2

Foundation Tier



[GDW41]

GDW41

FRIDAY 7 JUNE, MORNING

TIME

1 hour 15 minutes.

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.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all eleven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question 11.



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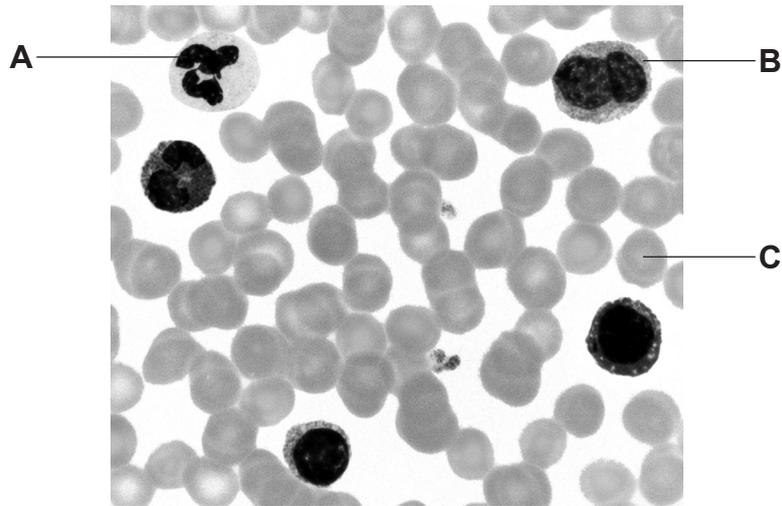
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1 The photograph shows a blood smear.



© Steve Gschmeissner / Science Photo Library

The function of red blood cells is to carry oxygen around the body.

Identify which cell, **A**, **B**, or **C**, is a red blood cell and give **two** ways that red blood cells are adapted for their function.

Cell _____

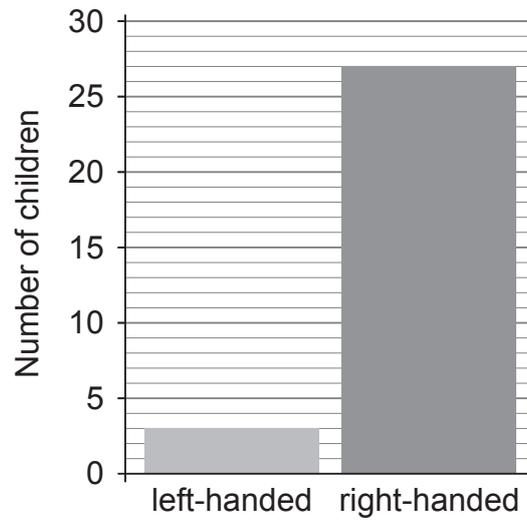
Adaptations _____

[3]

[Turn over



- 2 The bar chart shows the number of children in a class who were left-handed and the number who were right-handed.



- (a) Calculate the percentage (%) of children in the class who were left-handed.

Show your working.

_____ % [3]



Being left-handed or right-handed is an example of discontinuous variation.

(b) Draw a circle around another example of discontinuous variation in the list below.

height of a person	length of a person's thumb	ability to roll the tongue
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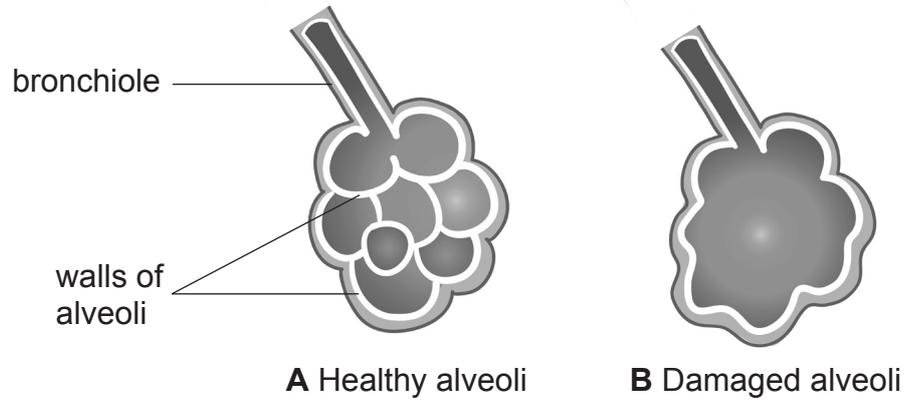
[1]



- 3 (a) Emphysema is a disease in which alveoli are damaged.

Diagram **A** shows healthy alveoli.

Diagram **B** shows damaged alveoli in a person with advanced emphysema.



© Jeanette Engqvist / Science Photo Library

- (i) Use the diagrams to describe the damage to the **walls** of the alveoli in a person with advanced emphysema.

[1]

- (ii) Suggest why a person with advanced emphysema needs to receive extra oxygen.

[2]



(b) Carbon monoxide is a component of cigarette smoke.

(i) Describe the effect of carbon monoxide on the oxygen-carrying capacity of the blood.

[1]

(ii) Explain this effect.

[1]

[Turn over



- 4 (a) Complete the sentences below about transpiration by writing the correct words in the blank spaces.

Choose the words from the list below.

mesophyll	osmosis	evaporation	diffuses	guard
air spaces	photosynthesis	stomata	epidermal	root hair

Transpiration is the _____ of water from
_____ cells in the leaf.

The water _____ through _____
in the leaf and then exits the leaf through small pores called
_____ .

[5]

- (b) Three factors that affect the rate of transpiration in a plant are given in the table below.

Complete the table by writing a tick [✓] in the correct box to show how **increasing each factor** affects the rate of transpiration in a plant.

Factor	How the rate of transpiration is affected		
	increases	no change	decreases
surface area			
wind			
humidity			

[3]

- (c) Give **one** use of water in a plant.

[1]



5 (a) (i) Give a definition of cancer.

[1]

Cancer can result in a benign tumour or a malignant tumour.

(ii) Describe **two** characteristics of a benign tumour.

1. _____

2. _____

[2]

(b) (i) Skin cancer is the most common form of cancer in Northern Ireland. It accounts for 30% of all types of cancer.

In one year in Northern Ireland, 3,780 people were diagnosed with skin cancer.

Calculate the total number of people diagnosed with **all types** of cancer in Northern Ireland that year.

Show your working.

[2]

(ii) Name the type of radiation in sunlight that can cause skin cancer.

[1]

[Turn over



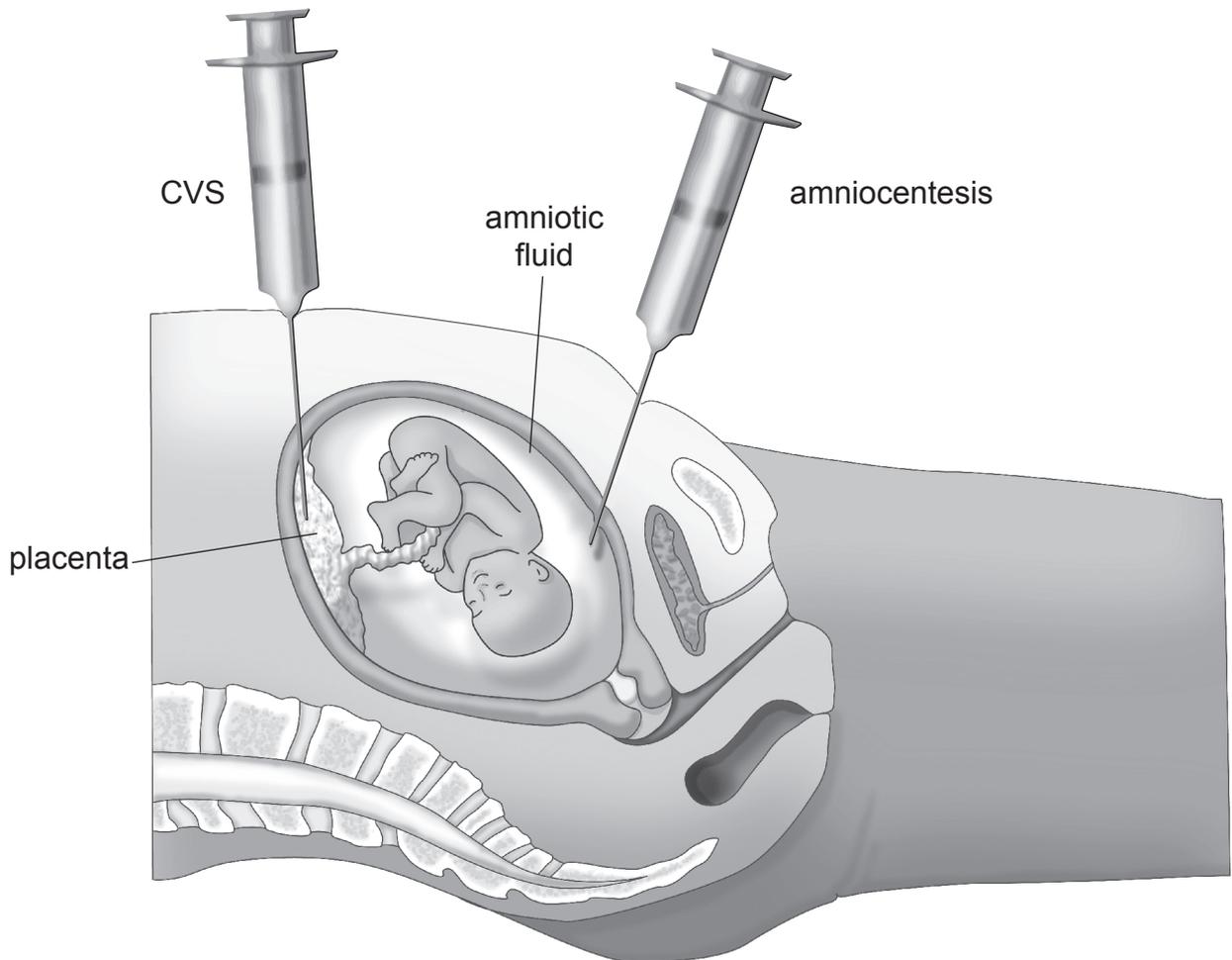
6 Amniocentesis is a procedure that may be offered to pregnant women.

(a) What does amniocentesis test for?

[1]

(b) As an alternative, another procedure called chorionic villus sampling (CVS) can be carried out.

The diagram shows how both of these procedures are carried out.



© Monica Schroeder / Science Photo Library



The table shows some information about the two procedures.

	Amniocentesis	Chorionic villus sampling (CVS)
What it involves	Taking a sample of amniotic fluid	Taking a sample of the placenta
When the procedure is carried out	After 15 weeks of pregnancy	Between 10 and 14 weeks of pregnancy
The risk of miscarriage	1%	2%

© Data from: www.rcog.org.uk 'Chorionic villus sampling and amniocentesis', September 2011

- (i) Give **one** advantage of amniocentesis compared to chorionic villus sampling (CVS).

_____ [1]

- (ii) Give **one** advantage of chorionic villus sampling (CVS) compared to amniocentesis.

_____ [1]

- (iii) Suggest **one** reason why a pregnant woman may not want to have either of these procedures.

_____ [1]

[Turn over



7 Some genetic terms and definitions are given below.

(a) Draw a line to link each genetic term to its definition.

Genetic term	Definition
Heterozygous	where two alleles of a gene are the same
Diploid	the outward appearance of an organism
Phenotype	where two alleles of a gene are different
	the genetic make-up of an organism
	the normal number of chromosomes in the cells of an organism

[3]

(b) The sex of a baby is determined by X and Y chromosomes.

(i) Write the genotype of the parents in the spaces below.

	Father	Mother
Genotype	_____	_____

[2]



(ii) Draw a Punnett square to show how sex is determined.

[3]

(iii) What is the expected ratio of boys to girls?

Ratio _____ to _____

[1]

(iv) A couple have four children, three girls and one boy.

They are expecting another baby.

What is the chance their next child will be a boy?

[1]

Explain your answer.

[1]

[Turn over



- 8 (a) The table shows the predicted and actual percentage of women who experienced **unexpected** pregnancies in a year when different contraceptive methods were used.

Contraceptive method	Percentage of women who experienced unexpected pregnancies in a year	
	predicted	actual
Male condom	2	18
Contraceptive pill	0.3	9
Contraceptive implant	0.05	0.05
Male sterilisation	0.10	0.15

© Data from: www.arhp.org 'Quick Reference Guide for Clinicians: Choosing a Birth Control Method', June 2014

- (i) Which contraceptive method, shown in the table, is the most reliable?

_____ [1]

- (ii) Suggest **one** reason for the difference in the predicted and actual percentage of unexpected pregnancies when the contraceptive pill is used.

 _____ [1]



(b) Explain how a contraceptive implant works.

[2]

(c) One disadvantage of male sterilisation is that it does not prevent the transmission of a sexually transmitted infection.

(i) Explain why.

[1]

(ii) Give **one** other disadvantage of male sterilisation.

[1]

[Turn over

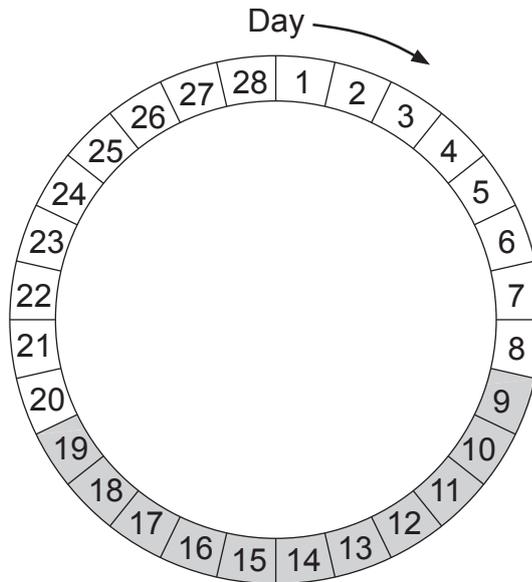


Some people object to using artificial contraception.

These people do not use artificial contraception but may abstain from sexual intercourse from day 9 to 19 of the woman's menstrual cycle.

Sperm can survive for up to five days inside a woman's body.

The diagram shows a woman's 28-day menstrual cycle.



(d) Suggest why abstaining from sexual intercourse from day 9 to 19 of this woman's menstrual cycle could avoid pregnancy.

[3]





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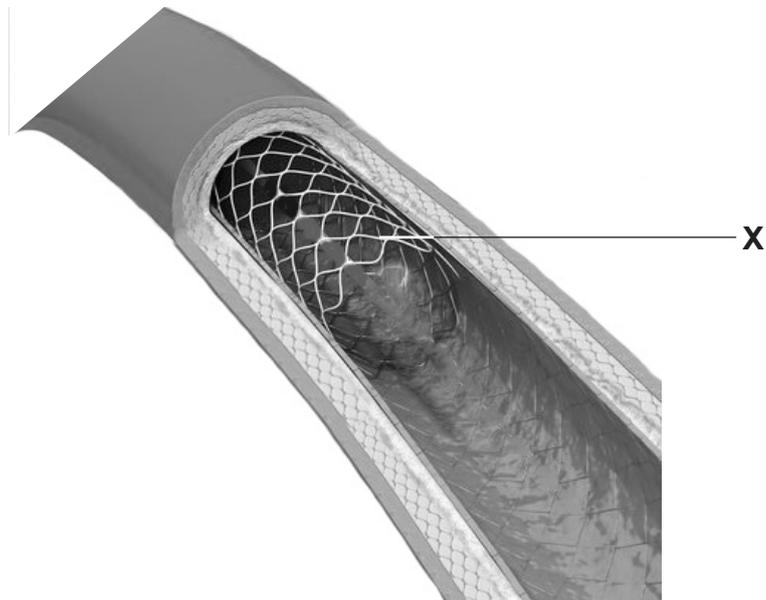
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9 (a) Angioplasty is a medical procedure carried out in an artery.

The diagram shows the end result of this procedure.



© Pixologicstudio / Science Photo Library

(i) Why is angioplasty carried out?

[1]

(ii) Name structure X which has been inserted into this artery during angioplasty.

[1]



(b) Drugs such as statins and aspirin can help prevent cardiovascular disease.

(i) How does treatment with statins help prevent cardiovascular disease?

[2]

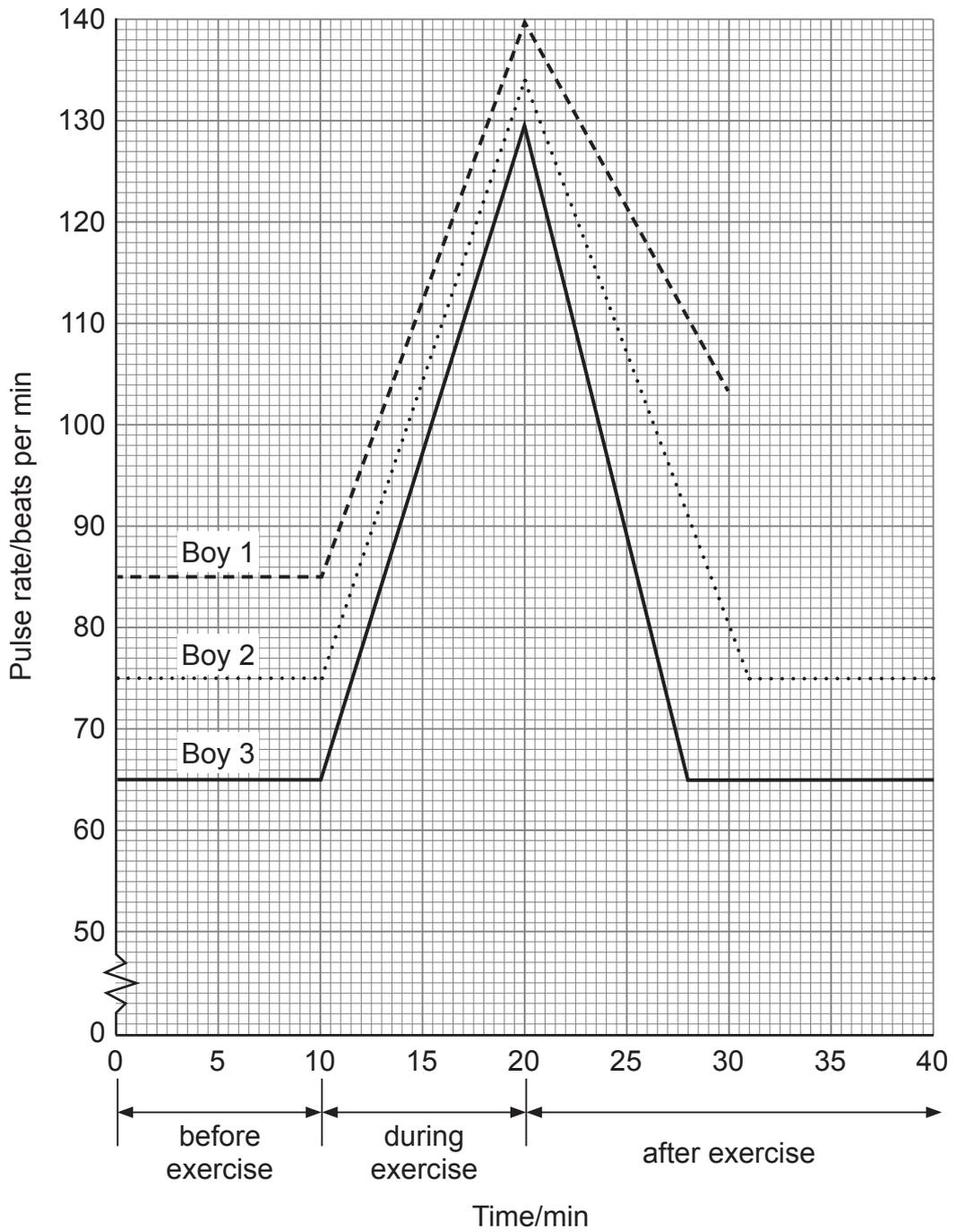
(ii) How does treatment with aspirin help prevent cardiovascular disease?

[2]

[Turn over



10 (a) The graph shows the pulse rates of three boys before exercise, during exercise and after exercise.



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[6]

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	Marks
1	
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Total Marks	
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Examiner Number

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