Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022–2023

Single Award Science: Biology

Unit 1

Foundation Tier

[GSA11]

GSA11

MONDAY 21 NOVEMBER 2022, MORNING

TIME

1 hour.

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 nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
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 **9(b)**.

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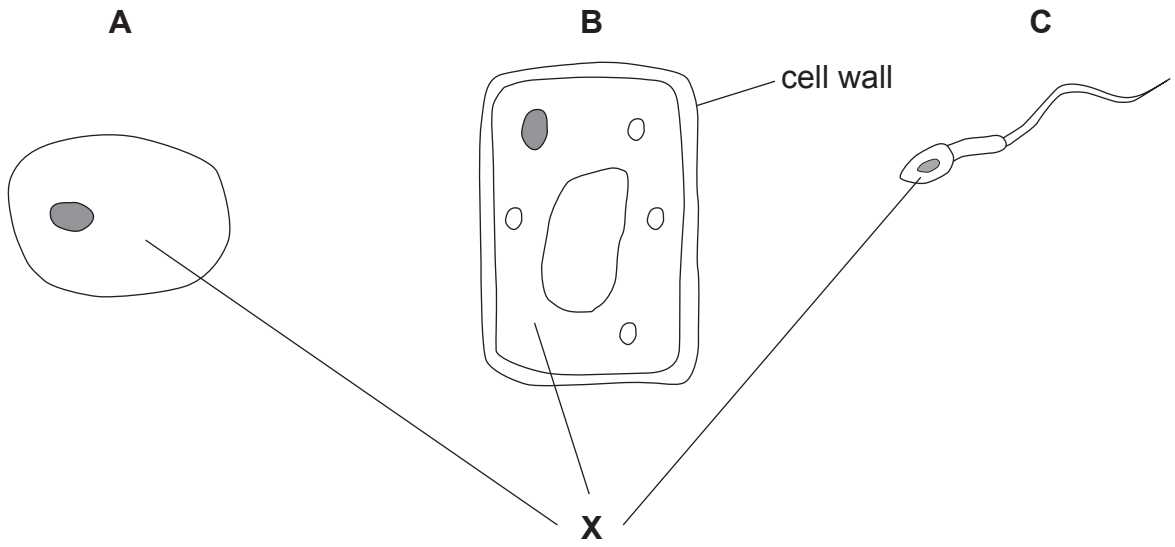
1 Shown below are diagrams of two animal cells and one plant cell.



(a) Name the part labelled **X** that is found in all cells.

Circle your answer.

chloroplast : **cell membrane** : **cytoplasm**

[1]

(b) Which diagram **A**, **B** or **C** is the plant cell?

_____ [1]

(c) Name the part of a cell that contains chromosomes.

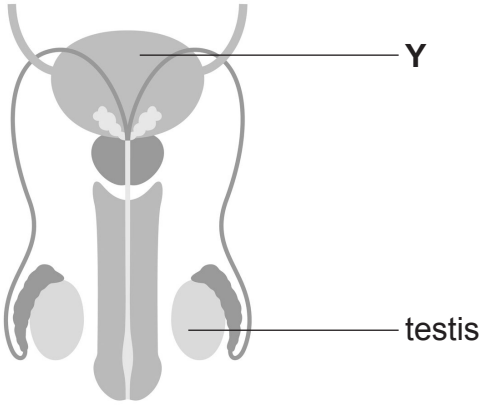
_____ [1]

(d) Name the piece of equipment used by scientists to make cells look bigger.

_____ [1]

[Turn over

2 **(a)** The diagram below shows the male reproductive system.



(i) Name the part labelled **Y**.

_____ [1]

(ii) What is the function of the testis?

_____ [1]

(b) Pregnancy can be prevented by using contraception.
Using lines, match each method of contraception to its description.

Method	**Description**
condom	cutting the sperm ducts to prevent sperm entering the penis
vasectomy	prevents the ovaries releasing eggs by changing hormone levels
	acts as a barrier to trap sperm

[2]

(c) **(i)** What term is given to the process of the nucleus of an egg fusing with the nucleus of a sperm?

Circle your answer.

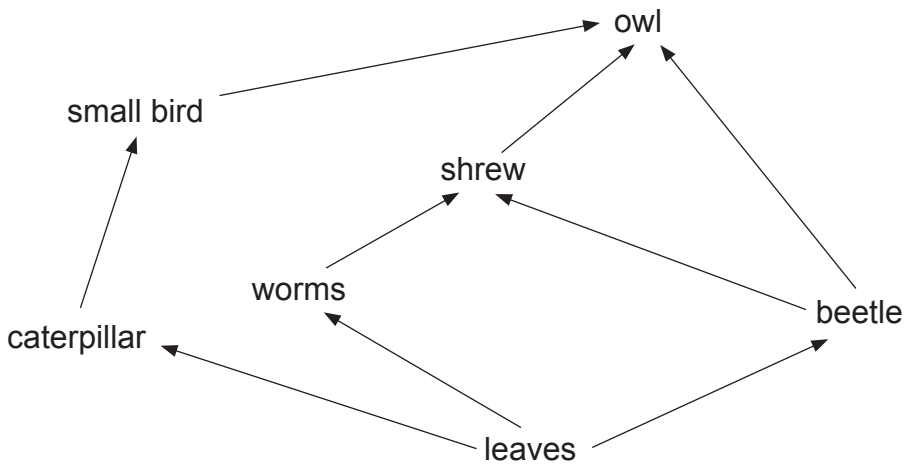
fertilisation **ovulation** **implantation**

[1]

(ii) What name is given to the cell formed when the egg and sperm nuclei fuse?

_____ [1]

3 **(a)** The food web below shows how a number of food chains in a field are interlinked.



(i) Name **one** secondary consumer in this food web.

_____ [1]

(ii) What do the arrows in a food web represent?

_____ [1]

(iii) How many food chains make up this food web?

_____ [1]

(iv) Using the food web, complete the diagram below to show a food chain containing four organisms.

[ ] → [ ] → [ ] → [ ]

[2]

(b) Biotic and abiotic factors are used to monitor changes in the environment of a food web.

Tick (✓) **two** factors below that are **abiotic**.

availability of food	☐
carbon dioxide levels	☐
diseases	☐
lichen	☐
rain fall	☐

[2]

(c) A builder wants to use this field to build houses but is told to use a brownfield site instead.

(i) What is meant by the term **brownfield site**?

_____

_____ [1]

(ii) What effect would building houses in this field have on the food web?

_____

_____ [1]

4 Diseases can be caused by microorganisms.

(a) Complete the table below to name the type of microorganism and how they are spread.

Disease	Microorganism	Spread by
HPV		sexual contact
Salmonella	bacteria	

[2]

(b) The body has defence mechanisms that prevent microorganisms from entering, for example mucous membranes.

(i) Describe how mucous membranes prevent harmful microorganisms from entering the body.

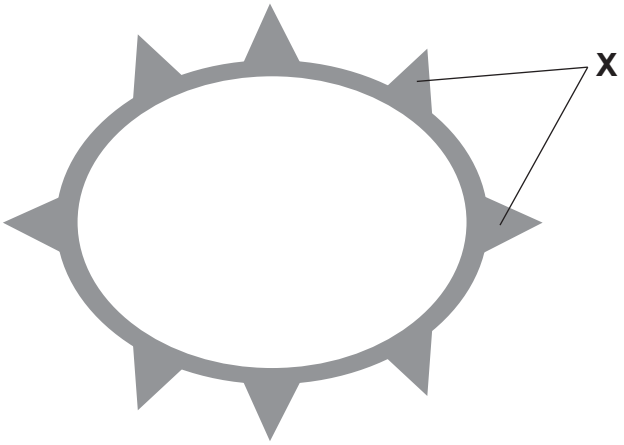
_____

_____ [1]

(ii) Name **one** other defence mechanism the body has to prevent the entry of microorganisms.

_____ [1]

(c) The diagram below shows a disease-causing microorganism which has entered the body.
The parts labelled **X** are chemical markers found on its surface.



(i) Name the parts labelled **X**.

_____ [1]

(ii) Complete the sentences below to describe the body's reaction to microorganisms.

Choose from:

antibiotics **antibodies** **penicillin** **phagocytes**

If microorganisms enter the body, two types of white blood cells called

lymphocytes and _____ work to destroy them.

Lymphocytes produce _____ which are

complementary in shape to the chemical markers on the microorganism. [2]

[Turn over

5 **(a)** The table below shows the recommended daily intake of some nutrients for different groups of males and females.

Group	Nutrients				
	Fat /g	Carbohydrate /g	Protein /g	Minerals/mg	
				calcium	iron
males 15–18 years	110	360	55	1000	11.3
females 15–18 years	82	275	40	800	14.8
males 19–50 years	100	332	56	700	9.0
females 19–50 years	75	250	42	700	14.8
pregnant females	85	280	86	730	14.8

(i) Give **one** nutrient, named in the table, that is the main source of energy for the body.

_____ [1]

(ii) What is the function of **calcium** in the body?

_____ [1]

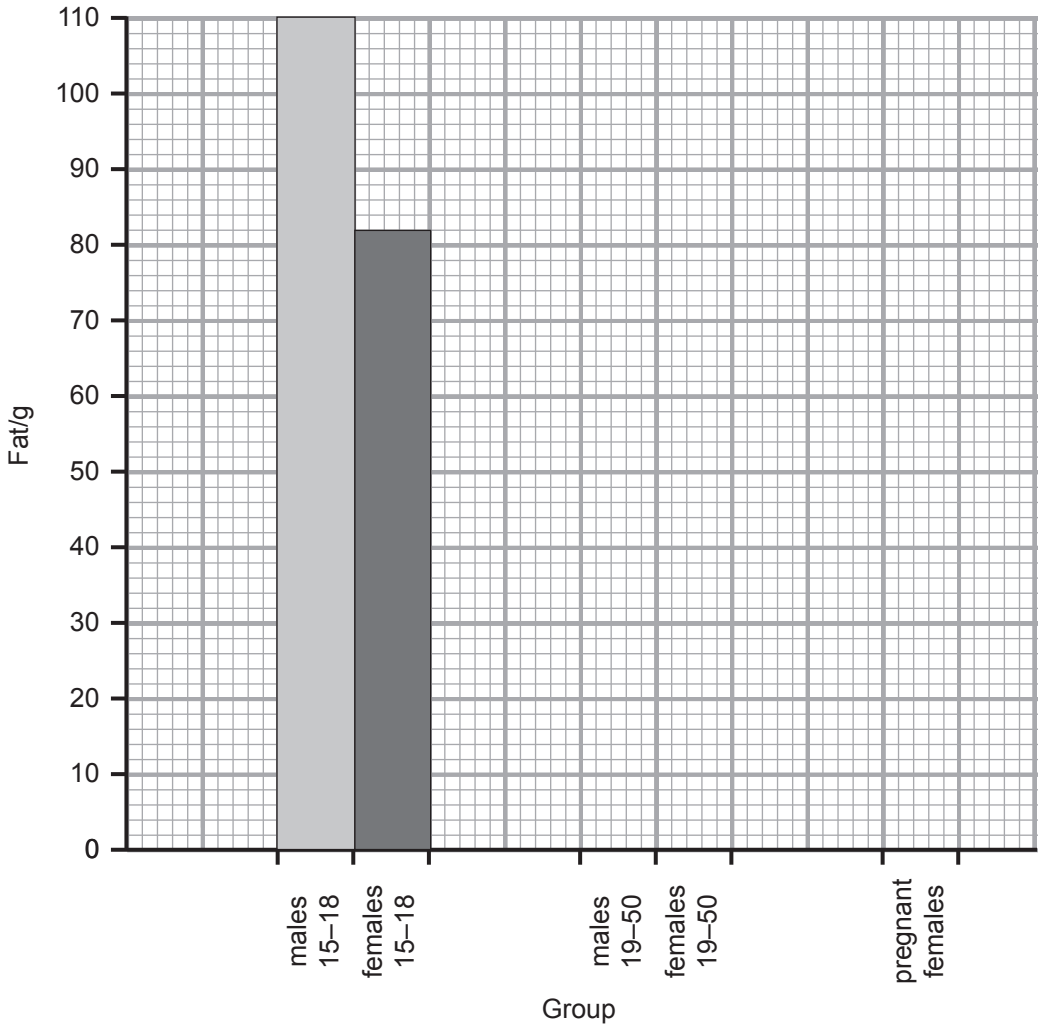
(iii) Using information in the table, give the main factor that affects the daily intake of **protein** needed by a female.

_____ [1]

(iv) Name **one** other type of nutrient, **not** listed in the table, that is needed by the body.

_____ [1]

(b) On the grid below, complete the bar graph showing the daily **fat** requirement for these groups of males and females.

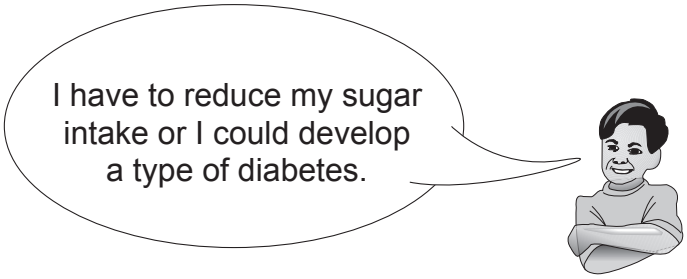


[2]

[Turn over

6 Diabetes is a condition in which the blood glucose control mechanism fails. Jack and Mary have a discussion about diabetes.

(a) Jack says:



(i) Which type of diabetes could Jack develop, Type 1 or Type 2? Explain your answer.

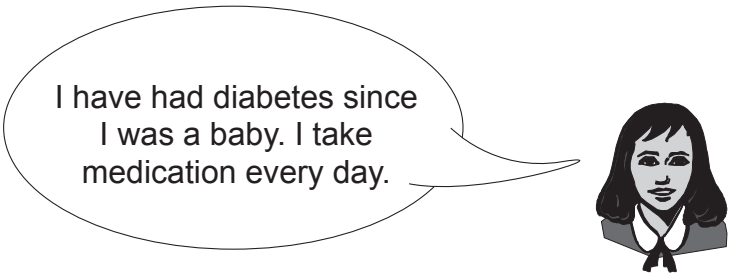
_____

_____ [1]

(ii) Apart from reducing his sugar intake, what else could Jack do to reduce his risk of developing diabetes?

_____ [1]

(b) Mary says:



(i) Name the medication Mary must take every day to control diabetes.

_____ [1]

(ii) Explain fully how this medication controls Mary's diabetes.

_____

_____

_____ [2]

(c) Give **one** long-term effect of diabetes.

_____ [1]

[Turn over

7 Tom carried out an investigation to find out if the number of lettuce plants in a pot affected the growth of the plants.

(a) Give **two** variables that needed to be controlled to make this investigation valid (fair test).

1. _____

2. _____ [2]

His results are shown below.

Number of lettuce plants in the pot	Average mass of each lettuce plant/g	Total mass of all plants in each pot/g
5	23	115
10	19	190
15	14	210
20	10	200
25	5	

(b) Calculate the total mass when there were 25 plants in the pot.

_____ g [1]

(c) Describe the effect of changing the number of plants in the pot on the average mass of each plant.

_____

_____ [1]

(d) Tom wants to produce and sell bags of lettuce. He can sell them for 1p per gram.

Using the information in the table, suggest how many lettuce plants Tom should have in each pot to make the most money.

_____ [1]

[Turn over

8 **(a)** Smoking is very harmful to the body because cigarette smoke contains a number of chemicals including nicotine and carbon monoxide.

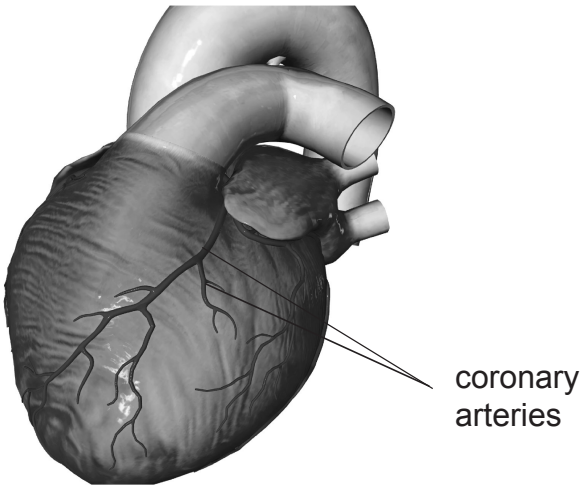
(i) Name **one** other harmful chemical found in cigarette smoke.

_____ [1]

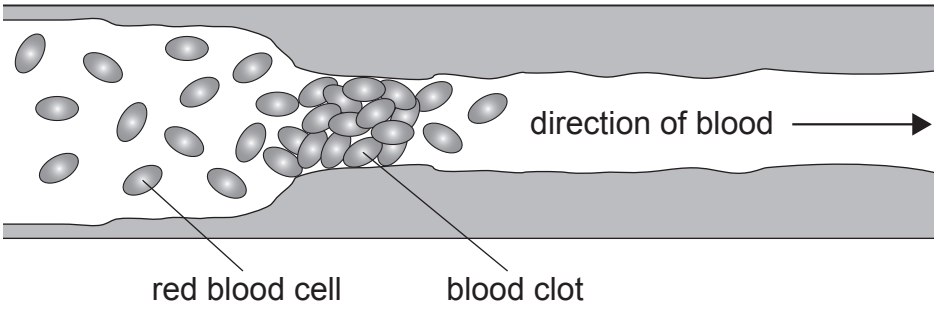
(ii) Nicotine is addictive and affects the brain. Name **one** other part of the body that is affected by nicotine.

_____ [1]

(b) The diagram below shows a heart and the coronary arteries that supply the heart muscle with blood.



The diagram below shows a smoker's coronary artery, where a blood clot has formed.



Respiration takes place in the cells of the heart muscle.

(i) Explain fully why a blood clot prevents the heart muscle cells from respiring.

_____

_____

_____ [2]

(ii) Suggest the effect that reduced respiration has on the heart muscle.

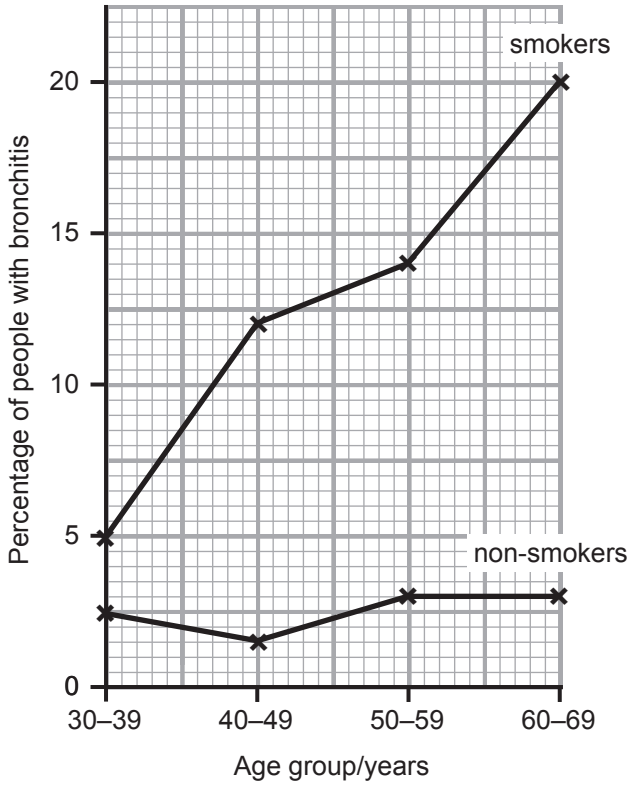
_____

_____ [1]

[Turn over

(c) Smoking can also cause bronchitis.

The graph below shows the percentage of smokers and non-smokers who suffer from bronchitis in different age groups.



(i) State the trend shown for smokers.

_____

_____ [1]

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(ii) Calculate the difference between the percentage of smokers with bronchitis and the percentage of non-smokers with bronchitis **aged 60–69**.

(Show your working out.)

_____ % [2]

(iii) A student suggests that smoking increases the chance of bronchitis. Explain fully how the information in this graph supports his conclusion.

_____

_____

_____ [2]

[Turn over

9 In 2014 a virus called Ebola killed almost 8000 people in Africa.

Antibiotics could not be used to treat Ebola, so drug companies developed a new drug to treat it.

(a) Why could antibiotics **not** be used to treat Ebola?

_____

_____ [1]

(b) All new drugs must be tested before they can be used on patients. In vitro testing is the first stage in this process.

Describe in vitro testing and all the other stages involved in the production of a new drug.

Your answer should include:

- the name and a description of each stage; and
- **one** reason for each stage.

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

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

[6]

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Question Number	Marks
1	
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Examiner Number

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