



*Rewarding Learning*

General Certificate of Secondary Education  
2021–2022

Centre Number

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

Candidate Number

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

# Single Award Science: Biology

Unit 1

Foundation Tier



[GSA11]

\*GSA11\*

**WEDNESDAY 23 FEBRUARY 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

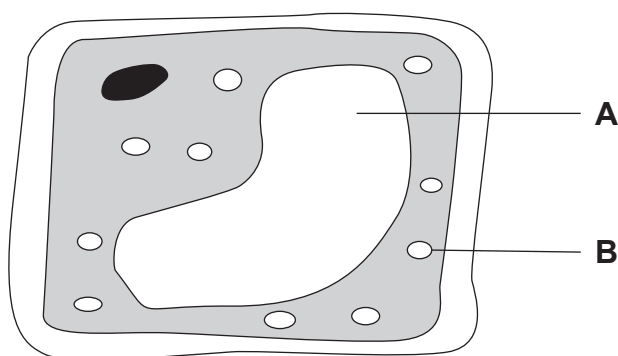
The total mark for this paper is 60.

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**.



- 1 The diagram below shows a plant cell.



Source: Principal Examiner

- (a) Name the parts labelled **A** and **B** in the cell.

Choose from:

nucleus

chloroplast

cytoplasm

vacuole

**A** \_\_\_\_\_

**B** \_\_\_\_\_

[2]

- (b) A student prepared a slide of onion skin cells by following the steps below.

1. Remove a thin piece of onion skin.
2. Place it on a microscope slide.
3. Add a few drops of iodine to the onion skin.
4. Place a cover slip on top of the onion skin.

- (i) In step 1 why did the student use a thin piece of onion skin?

Circle your answer.

so it will fit on the microscope slide

to let light pass through it

so it can fit on the stage

[1]



(ii) In step 3 why was iodine added to the onion skin?

Circle your answer.

to make the parts of the onion skin cells easier to see

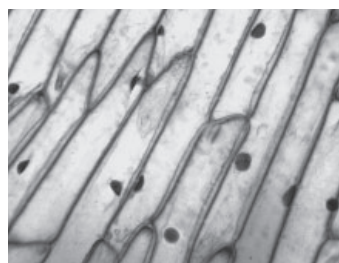
to make the onion skin stick to the slide

to keep the cover slip in place

[1]

The student then viewed the onion skin cells using a microscope.

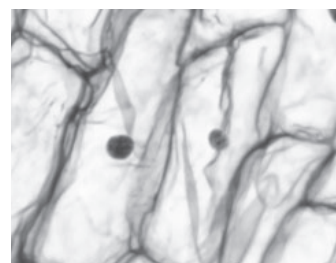
(c) Which image (X, Y or Z) shows the cells viewed under **low** power?



X



Y



Z

© Getty Images

[1]



- 2 (a) All cigarette packets carry a health warning because smoking cigarettes is addictive and damaging to health.



© Getty Images

- (i) Name **two** lung diseases caused by cigarette smoke.

1. \_\_\_\_\_
2. \_\_\_\_\_ [2]

- (ii) Name the substance present in cigarettes that makes them addictive.

\_\_\_\_\_ [1]

- (b) When cigarettes are smoked carbon monoxide is produced. It enters the lungs and then passes into the bloodstream.

- (i) Which gas does carbon monoxide stop red blood cells from carrying?

Choose from:

**carbon dioxide** : **oxygen** : **nitrogen**

\_\_\_\_\_ [1]



The percentage of carbon monoxide in the blood of four people was tested every two hours.

The results are shown below.

| Name  | Percentage of carbon monoxide in the blood |       |      |      |
|-------|--------------------------------------------|-------|------|------|
|       | 9 am                                       | 11 am | 1 pm | 3 pm |
| Amy   | 4.6                                        | 3.0   | 2.8  | 2.6  |
| Dan   | 1.8                                        | 1.3   | 1.2  | 1.2  |
| Pat   | 7.3                                        | 6.0   | 6.3  | 6.8  |
| Leigh | 0.4                                        | 0.2   | 0.2  | 0.2  |

Using information in the table answer the following questions.

(ii) Suggest which **two** people smoked cigarettes before 9 am.

\_\_\_\_\_ and \_\_\_\_\_ [1]

(iii) Suggest which person continued to smoke throughout the day. Explain your answer.

Name \_\_\_\_\_

Explanation \_\_\_\_\_ [1]

Dan says he is a non-smoker.

(c) Suggest **one** other way carbon monoxide could have entered Dan's blood.

\_\_\_\_\_  
\_\_\_\_\_ [1]

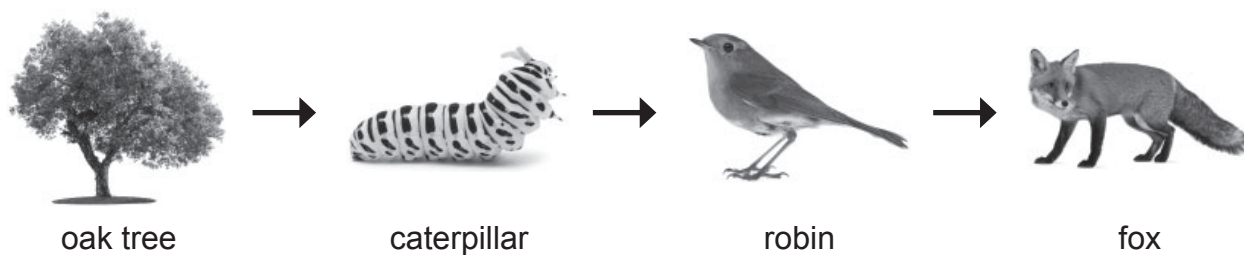
(d) Other addictive substances can damage different parts of the body. Name the addictive substance that can damage the liver.

\_\_\_\_\_ [1]

[Turn over



- 3 (a) A woodland food chain is shown below.



© Getty Images

- (i) Name the producer in this food chain.

\_\_\_\_\_ [1]

- (ii) What is the original source of energy for this food chain?

\_\_\_\_\_ [1]

- (b) In the food chain above the caterpillar takes in 350 kJ of energy from the oak tree but only passes on 45 kJ of energy to the robin.

- (i) Calculate how much energy the caterpillar uses.

\_\_\_\_\_ kJ [1]

- (ii) Suggest **one** way the caterpillar uses this energy.

\_\_\_\_\_ [1]



- (c) The table below shows how the number of robins and foxes in the woodland changed over a three year period.

| Year | Robins | Fox |
|------|--------|-----|
| 2000 | 20     | 5   |
| 2001 | 30     | 3   |
| 2002 | 40     | 1   |

- (i) Explain fully why the number of robins increases over the three year period.

---

---

---

[2]

- (ii) Suggest **one** reason for the change in the number of foxes.

---

[1]

A developer wants to build a shopping centre on the site of the woodland and will need to cut down all the oak trees.

- (d) Describe the effect this would have on the woodland food chain.

---

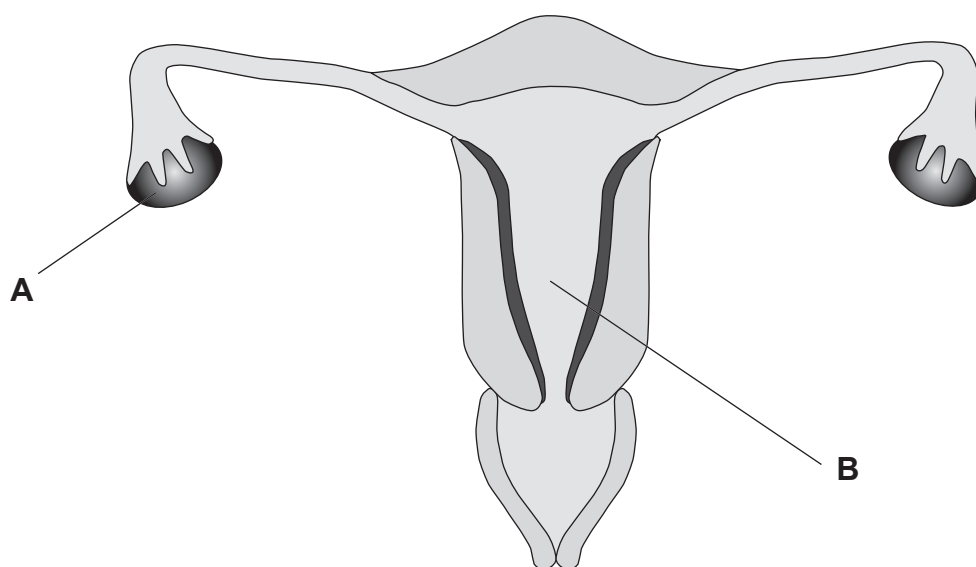
---

[1]

[Turn over



- 4 The diagram below shows the female reproductive system.



Source: Principal Examiner

- (a) Name the parts labelled **A** and **B**.

**A** \_\_\_\_\_

**B** \_\_\_\_\_ [2]

- (b) The table below gives information about three methods of contraception.

- (i) Using ticks (✓) complete the table to show which statement is correct for each method.

The first one has been done for you.

| Method of contraception | Permanent | Prevents sexually transmitted diseases | Changes hormone levels |
|-------------------------|-----------|----------------------------------------|------------------------|
| female sterilisation    | ✓         |                                        |                        |
| condom                  |           |                                        |                        |
| contraceptive pill      |           |                                        |                        |

[2]



(ii) Complete the sentences below about female sterilisation.

Choose from:

**oviducts        :        sperm ducts        :        sperm**

**testes        :        fertilisation        :        ovulation**

Female sterilisation is permanent because the oviducts are cut.

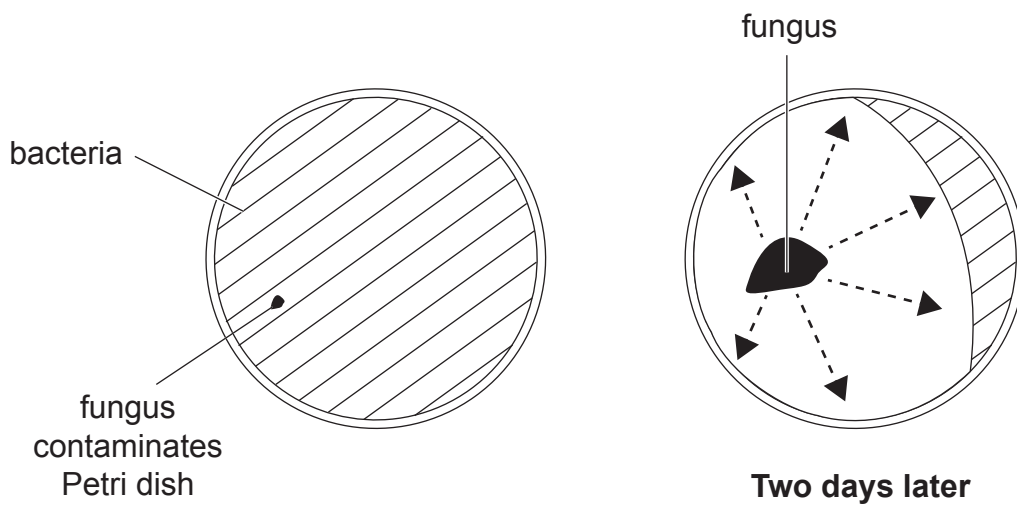
Therefore an ovum (egg) and a \_\_\_\_\_ do not  
meet and \_\_\_\_\_ cannot happen.

[2]

[Turn over



- 5 In 1928 Alexander Fleming was growing bacteria on a Petri dish. He recorded what happened when the dish became contaminated by a fungus.



Source: Principal Examiner

- (a) Describe and explain the effect of contamination by the fungus.

---

---

[2]

- (b) Name the antibiotic developed from this fungus.

---

[1]

- (c) Name **one** of the scientists who produced the first antibiotic based on the work of Alexander Fleming.

---

[1]

- (d) Why can antibiotics **not** be used to treat colds and flu?

---

[1]



[illegible]

13448



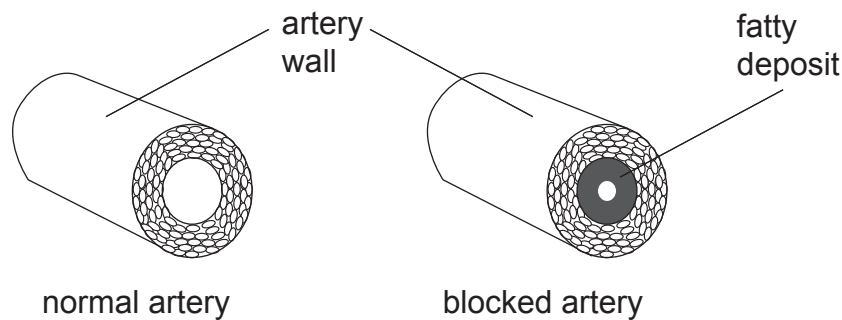
6 Respiration occurs in cells to release energy.

(a) Complete the word equation below for respiration.

glucose + oxygen  $\longrightarrow$  carbon dioxide + \_\_\_\_\_ + energy

[1]

(b) The diagram below shows two arteries that carry blood to heart muscle cells.



Source: Principal Examiner

(i) Name the fatty deposit that blocks the artery.

[1]

(ii) Describe and explain the effect this fatty deposit will have on the rate of respiration in the heart muscle cells.

[3]

(c) Give one **lifestyle** change that can help prevent a heart attack.

[1]





**BLANK PAGE**

**DO NOT WRITE ON THIS PAGE**

**(Questions continue overleaf)**

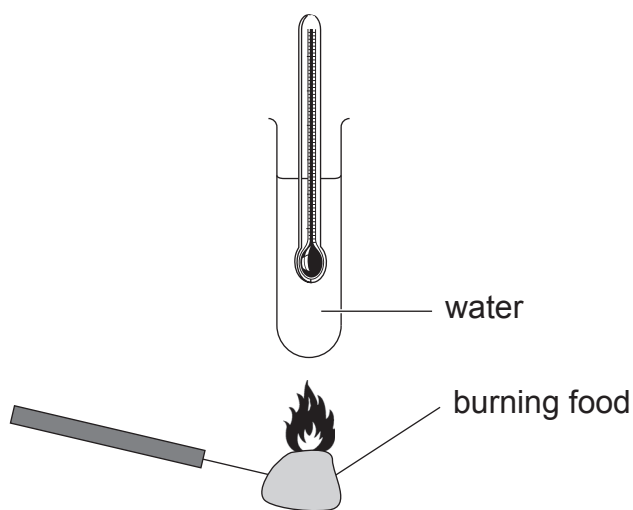
13448

**[Turn over**



\*20GSA1113\*

- 7 (a) A student investigated the energy content in different foods using the apparatus shown below.



Source: Principal Examiner

- (i) Give **two** ways the student can ensure that this is a fair (valid) investigation.

1. \_\_\_\_\_
2. \_\_\_\_\_ [2]

- (ii) Suggest **one** reason why **not** all the energy in the food will heat the water.

\_\_\_\_\_ [1]



(b) The table below shows the energy content in two meals **A** and **B**.

| Meal A        |            | Meal B               |           |
|---------------|------------|----------------------|-----------|
| Food          | Energy/kJ  | Food                 | Energy/kJ |
| brown rice    | 220        | bread and butter     | 600       |
| chicken curry | 350        | sausages             | 500       |
| salad         | 30         | chips                | 1000      |
| fruit juice   | 150        | cup of tea with milk | 200       |
| <b>Total</b>  | <b>750</b> | <b>Total</b>         |           |

(i) Calculate the total energy in meal **B**.

\_\_\_\_\_ kJ [1]

(ii) Calculate the percentage of energy provided by the fruit juice in meal **A**.

(Show your working out.)

\_\_\_\_\_ % [2]

(c) Which of the meals, (**A** or **B**) would be best if you did **not** want to gain weight?  
Give **one** reason for your answer.

\_\_\_\_\_  
\_\_\_\_\_ [1]

[Turn over]



- 8 (a) Explain fully what is meant by the term **hormone**.

---

---

---

[2]

- (b) Hormones control sexual development during puberty. The table below shows how the levels of these hormones change between the ages of 10 and 16 for females and males.

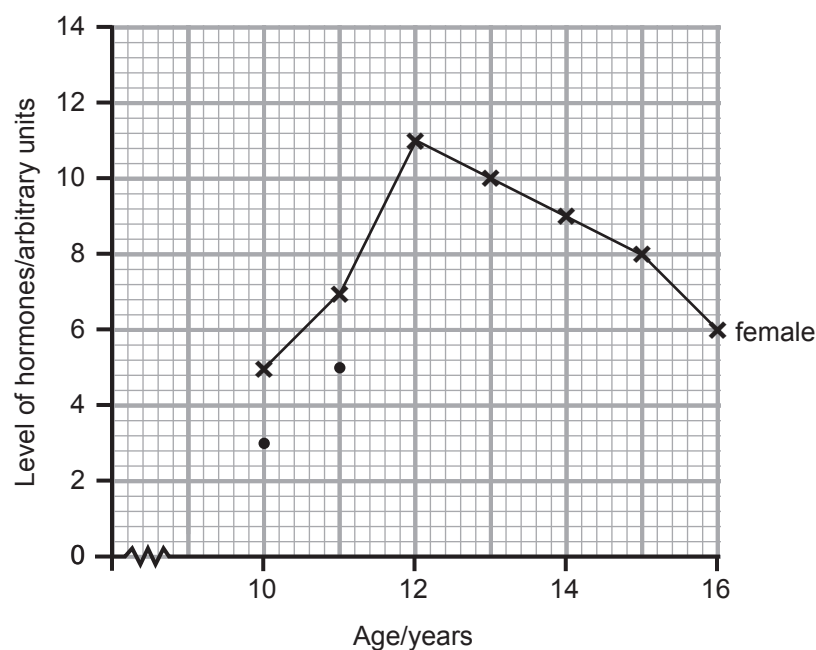
| Age/years | Level of hormones controlling puberty/arbitrary units |      |
|-----------|-------------------------------------------------------|------|
|           | Female                                                | Male |
| 10        | 5                                                     | 3    |
| 11        | 7                                                     | 5    |
| 12        | 11                                                    | 8    |
| 13        | 10                                                    | 9    |
| 14        | 9                                                     | 12   |
| 15        | 8                                                     | 10   |
| 16        | 6                                                     | 9    |



The values for the level of hormones in females have been plotted on the graph below.

(i) Plot and draw a line graph for the **male** hormone levels.

The first two points have been plotted for you.



[3]

(ii) Describe fully the trend shown by the **female** hormone levels.

---



---

[2]

(iii) Give **two** differences between the hormone levels of males compared to females.

1. \_\_\_\_\_
2. \_\_\_\_\_

[2]

[Turn over



9 Name and describe the **two** types of variation in living things, giving **one** example of each.

Your answer should also include:

- the name of the type of graph used to display data on each type of variation.

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

[illegible]

[6]





---

**THIS IS THE END OF THE QUESTION PAPER**

---

**BLANK PAGE**

**DO NOT WRITE ON THIS PAGE**



DO NOT WRITE ON THIS PAGE

| For Examiner's use only |       |
|-------------------------|-------|
| Question Number         | Marks |
| 1                       |       |
| 2                       |       |
| 3                       |       |
| 4                       |       |
| 5                       |       |
| 6                       |       |
| 7                       |       |
| 8                       |       |
| 9                       |       |

|             |  |
|-------------|--|
| Total Marks |  |
|-------------|--|

Examiner Number

Permission to reproduce all copyright material has been applied for.  
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA  
will be happy to rectify any omissions of acknowledgement in future if notified.

