**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

**BIOLOGY** **0610/21**

Paper 2 Multiple Choice (Extended) **May/June 2018**

**45 minutes**

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 0 6 5 4 7 3 7 3 6 4 *

**READ THESE INSTRUCTIONS FIRST**

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

**Read the instructions on the Answer Sheet very carefully.**

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.


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**1** Which organisms carry out respiration, growth, movement and excretion?

**A** all animals and all plants

**B** animals only

**C** arthropods and flowering plants only

**D** plants only

**2** The diagram shows an animal whose scientific name is *Falco peregrinus*.



To which species does it belong?

**A** bird

**B** *F. peregrinus*

**C** *Falco*

**D** vertebrate

**3** What kind of skin do amphibians have?

**A** dry without scales

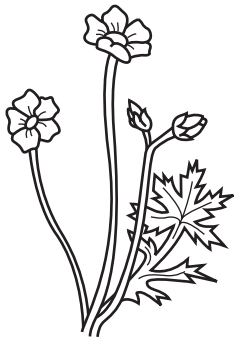
**B** dry with scales

**C** moist without scales

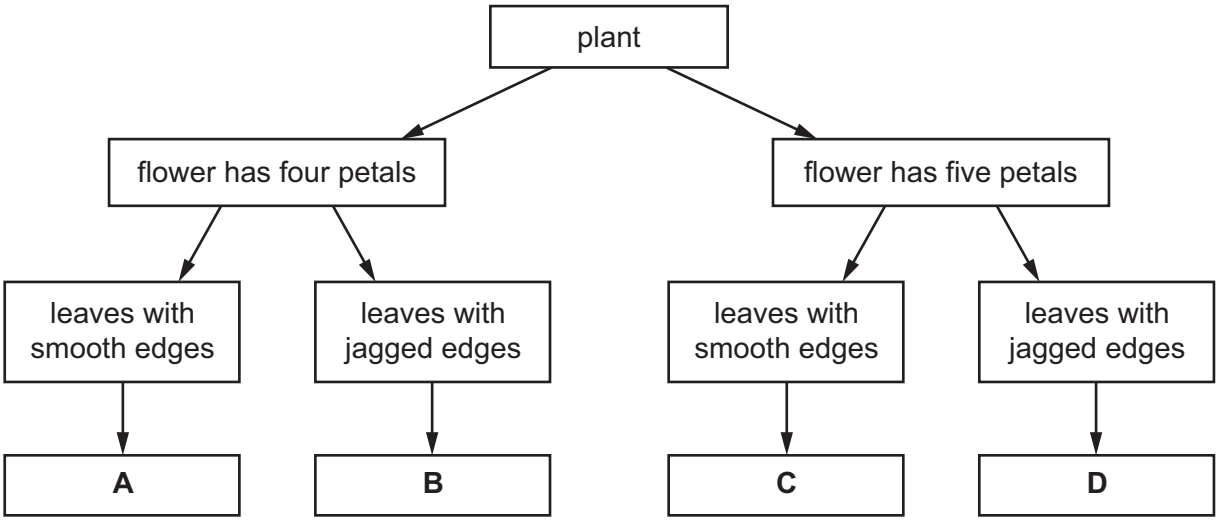
**D** moist with scales

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**4** The diagram shows a flowering plant.



Use the key to identify the plant.




**5** In which part of the cell does aerobic respiration occur?

**A** cytoplasm

**B** mitochondrion

**C** ribosome

**D** vesicle

**6** Why do some root cells have root hairs?

**A** for the maintenance of the temperature of the cell sap

**B** to increase the surface area of the cells

**C** to increase the volume of the cell sap

**D** to provide a place for cell nuclei

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**[Turn over**

**7** Which words correctly complete the paragraph?

Diffusion may be defined as the net movement of particles from a region of their ……1…… concentration, to a region of their ……2…… concentration, where movement is ……3…… a concentration gradient.

| | 1 | 2 | 3 |
|---|---|---|---|
| **A** | higher | lower | down |
| **B** | higher | lower | up |
| **C** | lower | higher | down |
| **D** | lower | higher | up |

**8** Which part of a plant root hair is partially permeable?

**A** the cell sap

**B** the cell surface membrane

**C** the cell vacuole

**D** the cell wall

**9** The table shows the results of food tests carried out on a fruit.

| test | Benedict's | biuret | ethanol | iodine |
|---|---|---|---|---|
| result | positive | positive | negative | negative |

What did the fruit contain?

**A** fat and reducing sugar

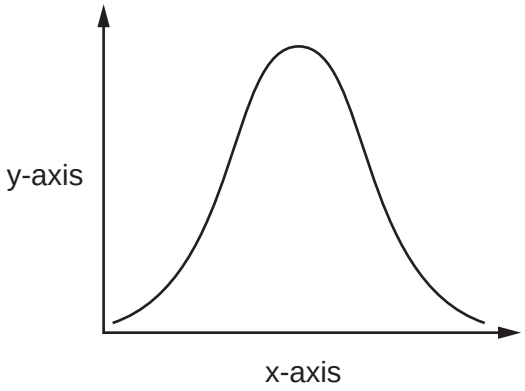
**B** fat and starch

**C** protein and reducing sugar

**D** protein and starch

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**10** An experiment was carried out to investigate the effect of pH on enzyme action. The graph shows the results.




What are the labels for the x-axis and the y-axis?

| | x-axis | y-axis |
|---|---|---|
| **A** | pH | rate of reaction |
| **B** | pH | time |
| **C** | rate of reaction | pH |
| **D** | time | pH |

**11** The equation for photosynthesis is shown.

.....1..... + .....2..... → glucose + .....3.....

Which words correctly complete gaps 1, 2 and 3?

| | 1 | 2 | 3 |
|---|---|---|---|
| **A** | carbon dioxide | light | oxygen |
| **B** | carbon dioxide | water | oxygen |
| **C** | oxygen | light | carbon dioxide |
| **D** | oxygen | water | carbon dioxide |

**12** What is the best source of vitamin C in a balanced diet?

**A** fish

**B** fruit

**C** meat

**D** rice

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**13** A young, active woman requires more of which constituent in her diet than a young, active man?

**A** fat

**B** iron

**C** protein

**D** vitamin C

**14** Which condition could be caused by a lack of iron?

**A** anaemia

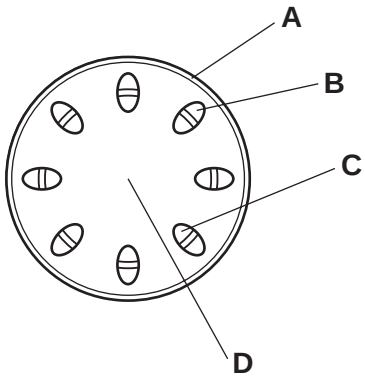
**B** cholera

**C** scurvy

**D** diabetes

**15** The diagram shows part of a section through a plant stem.

Which tissue transports water from the roots to the leaves?




**16** Petroleum jelly is waterproof and transparent.

Covering the underside of the leaves of a plant with a thin layer of petroleum jelly will slow down the rate of water loss from the plant.

Which statement explains this?

**A** Plants absorb nutrients from the petroleum jelly.

**B** Plants absorb water from the petroleum jelly.

**C** Stomata are blocked by the petroleum jelly.

**D** The petroleum jelly stops photosynthesis.

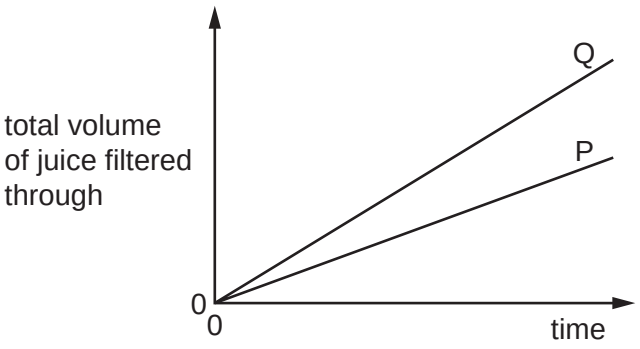
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**17** A student places two samples of crushed apple into two beakers, P and Q. The samples are of equal size. She adds 5 $cm^3$ of pectinase solution to beaker P and 5 $cm^3$ of water to beaker Q.

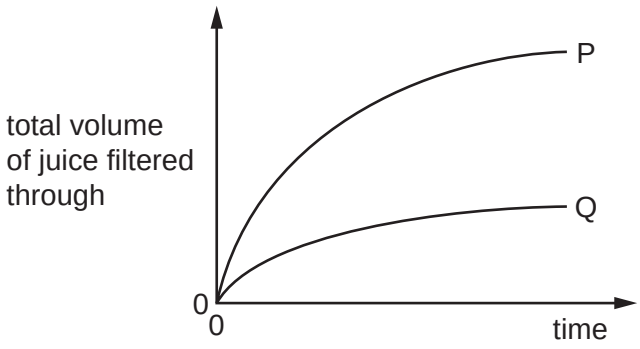
After five minutes, she places the samples of crushed apple into two different filter funnels, and measures the volume of juice filtering through from each sample over a period of 10 minutes.

Which graph shows her results?

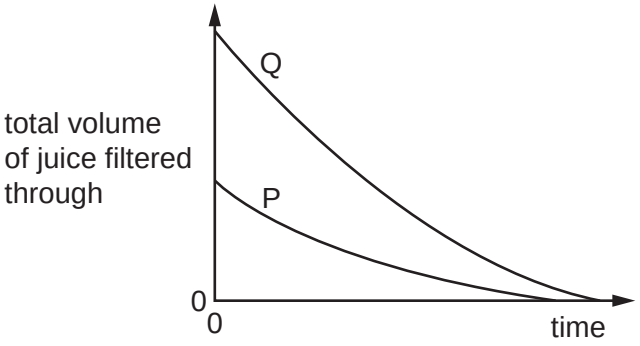
**A**



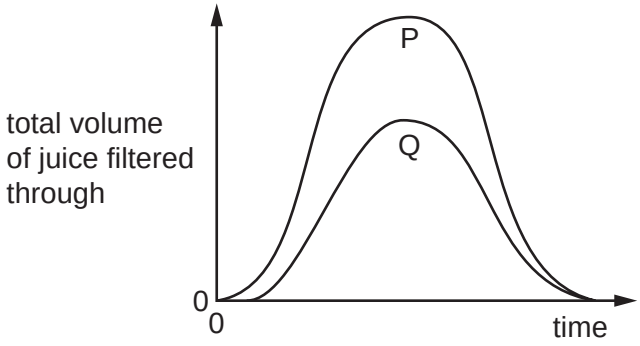

**B**




**C**




**D**




**18** During the process of blood clotting, damage to blood vessels stimulates L, and M is converted to N.

What are L, M and N?

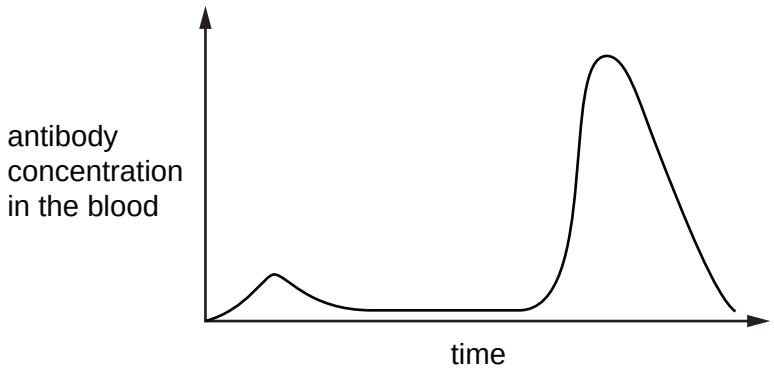
| | L | M | N |
|---|---|---|---|
| **A** | fibrin | platelets | fibrinogen |
| **B** | fibrinogen | platelets | fibrin |
| **C** | platelets | fibrin | fibrinogen |
| **D** | platelets | fibrinogen | fibrin |

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**[Turn over**

**19** A child is vaccinated against measles. After a period of time the child is infected with the measles virus.

The graph shows the concentration of measles antibodies in the child's bloodstream during this time.




Which statement is consistent with the information in the graph?

**A** After the vaccination, the child produced memory cells.

**B** The child had passive immunity against measles.

**C** The measles virus contains antibodies.

**D** The vaccination failed to protect the child against measles.

**20** Muscles are responsible for the ventilation of the lungs during breathing.

Which row describes their action during the inspiration of air?

| | diaphragm muscles | external intercostal muscles | internal intercostal muscles |
|---|---|---|---|
| **A** | contract | contract | relax |
| **B** | contract | relax | contract |
| **C** | relax | contract | relax |
| **D** | relax | relax | contract |

**21** Yeast is able to respire both aerobically and anaerobically.

Which statement describes the waste products of yeast respiration?

**A** Aerobic respiration produces alcohol as one of its waste products.

**B** Aerobic respiration produces three times as much carbon dioxide as anaerobic respiration from one molecule of glucose.

**C** Anaerobic respiration and aerobic respiration both produce the same amount of carbon dioxide from one molecule of glucose.

**D** Anaerobic respiration produces three times as much carbon dioxide as aerobic respiration from one molecule of glucose.

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**22** The table shows the presence or absence of chemicals in solution in different parts of a healthy kidney.

Which row is correct?

| | chemical | blood plasma in glomerulus | fluid entering kidney tubule | fluid in ureter |
|---|---|---|---|---|
| **A** | glucose | ✓ | ✗ | ✗ |
| **B** | protein | ✓ | ✓ | ✓ |
| **C** | salts | ✓ | ✗ | ✗ |
| **D** | urea | ✓ | ✓ | ✓ |

key

✓ = present

✗ = absent

**23** Four processes occur when impulses cross a synapse.

P neurotransmitter diffuses across the gap

Q neurotransmitter binds with receptors

R impulse stimulates vesicles

S release of neurotransmitter

What is the correct sequence for these processes?

**A** P → R → Q → S

**B** R → P → Q → S

**C** R → S → P → Q

**D** S → Q → R → P

**24** Which hormone is involved in the conversion of glucose to glycogen?

**A** adrenaline

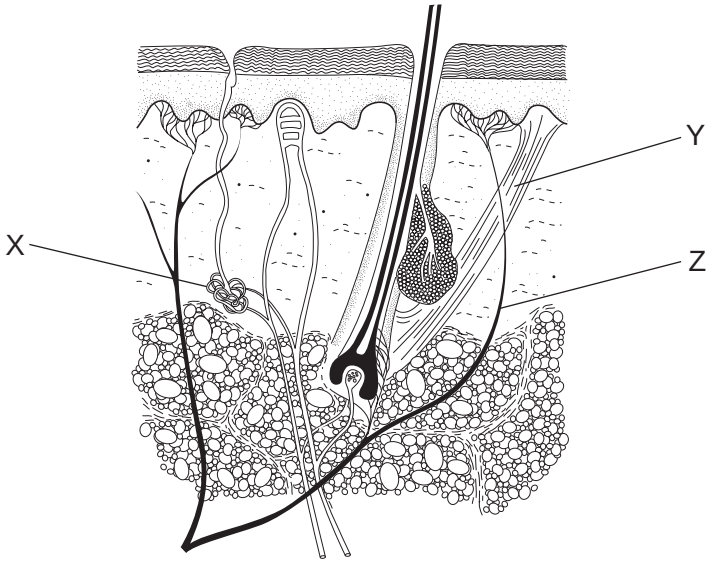
**B** insulin

**C** oestrogen

**D** testosterone

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**25** The diagram shows the structure of human skin.




What are X, Y and Z?

| | X | Y | Z |
|---|---|---|---|
| **A** | receptor | sensory neurone | sweat gland |
| **B** | sensory neurone | hair erector muscle | receptor |
| **C** | sweat gland | hair erector muscle | sensory neurone |
| **D** | sweat gland | receptor | blood vessel |

**26** A seedling was placed in a horizontal position.

Which diagram shows the result of the gravitropic responses in the seedling?

**A**




**B**




**C**




**D**



**27** Which hormone may be used to improve sporting performance?

**A** FSH

**B** LH

**C** oestrogen

**D** testosterone

**28** Specific grape varieties are maintained using stem cuttings from mature plants that are then planted and cultivated to produce grapes. This is an example of artificial asexual reproduction.

What is a disadvantage of using asexual reproduction to produce fruit?

**A** An outbreak of disease will affect the whole crop in the same way.

**B** Genetically identical fruit is produced relatively quickly.

**C** No pollination or pollinators are required.

**D** The characteristics of the grapes will vary between plants.

**29** Which two statements are correct for the process of cross-pollination in plants?

1 increases potential for variation in offspring

2 pollen is transferred to a different flower on the same plant

3 reduces potential to respond to environmental change

4 pollen is transferred to a flower on a different plant of the same species

**A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

**30** What is a function of the mitochondria in a sperm cell?

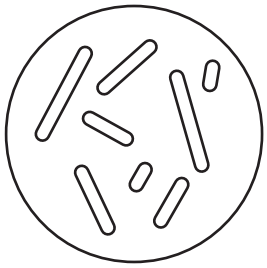
**A** penetrating the surface of the egg cell

**B** propelling the sperm towards the egg

**C** storing food energy

**D** supplying the energy for movement

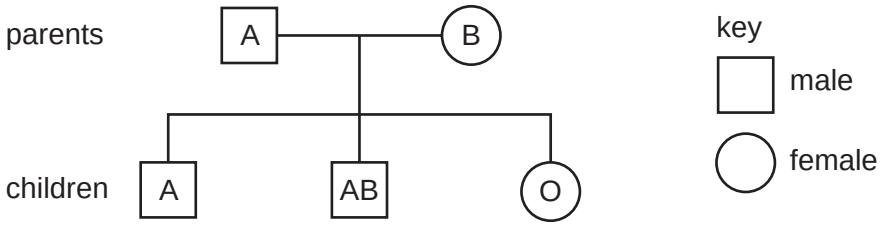
**31** The diagram shows the chromosomes in the nucleus of a body cell in an adult fruit fly.



What are the diploid and haploid number of chromosomes in the fruit fly?

| | diploid | haploid |
|---|---|---|
| **A** | 4 | 8 |
| **B** | 8 | 4 |
| **C** | 8 | 16 |
| **D** | 16 | 8 |

**32** The diagram shows the phenotypes for blood groups in a family.




Which statement about the genotypes of the parents is correct?

**A** Both parents have alleles for blood group A and B.

**B** Both parents have the allele for blood group O.

**C** Only the father has the allele for blood group O.

**D** Only the mother has the allele for blood group O.

**33** Sickle-cell anaemia is a genetic disorder which results in severe illness in homozygous individuals. In some human populations being heterozygous can be beneficial.

What could be the reason for this?

**A** Heterozygous individuals are not affected by the disorder.

**B** Heterozygous individuals are more resistant to malaria.

**C** It is caused by a dominant allele.

**D** The disorder is sex-linked.

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**34** Which statement describes the relationship between evolution and natural selection?

**A** A change in the adaptive features of a population over time causes evolution, resulting in natural selection.

**B** Evolution causes a change in the adaptive features of a population over time, resulting in natural selection.

**C** Evolution causes natural selection, resulting in a change in the adaptive features of a population over time.

**D** Evolution is the change in the adaptive features of a population over time as a result of natural selection.

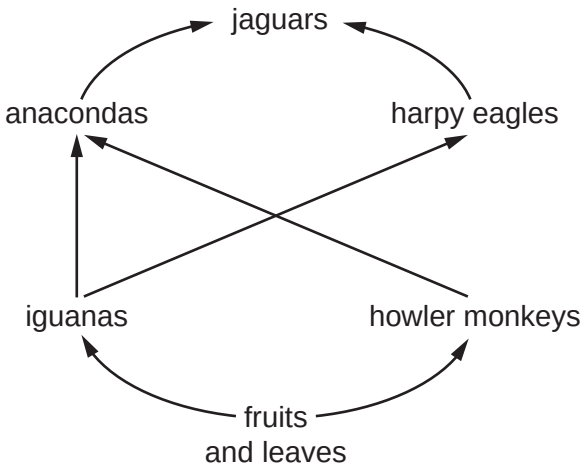
**35** The diagram shows a food chain.

| maize | → | locusts | → | lizards | → | snakes |
|---|---|---|---|---|---|---|
| 10 000 kJ | | 1000 kJ | | 100 kJ | | 10 kJ |

What is the efficiency of energy transfer between the maize and the lizards in this food chain?

**A** 0.01% **B** 0.1% **C** 1% **D** 10%

**36** The diagram shows part of a food web from a rainforest.




In this food web, at which trophic level are the anacondas?

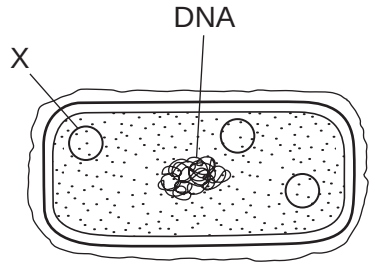
**A** primary consumers

**B** secondary consumers

**C** tertiary consumers

**D** quaternary consumers

**37** The diagram shows the structure of a bacterial cell.




The presence of structure X in the bacterial cell is one reason why bacteria are used in genetic engineering.

What is structure X?

**A** endoplasmic reticulum

**B** mitochondria

**C** plasmid

**D** ribosome

**38** What does *Penicillium* need to grow in a fermenter?

| | amino acids | carbohydrates | oxygen |
|---|---|---|---|
| **A** | ✓ | ✓ | ✓ |
| **B** | ✓ | ✓ | ✗ |
| **C** | ✓ | ✗ | ✓ |
| **D** | ✗ | ✓ | ✓ |

**39** Deforestation can have a negative impact on the environment.

Which statement about the negative impact of deforestation is correct?

**A** decreases the levels of carbon dioxide which can lead to reduced rates of photosynthesis

**B** decreases the amount of water flowing in local rivers so there is less flooding

**C** leads to soil loss so there is less fertile soil for the growth of crops in the area

**D** provides less land for the extraction of natural resources

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**40** When nitrates enter a lake they cause rapid growth of algae on the surface of the water. This causes the following changes in the lake:

1 a decrease in the concentration of dissolved oxygen in the water

2 fish and other aquatic animals die

3 an increase in aerobic respiration by decomposers

4 producers die and decomposition increases

In which order do these changes occur?

**A** $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

**B** $3 \rightarrow 1 \rightarrow 2 \rightarrow 4$

**C** $4 \rightarrow 2 \rightarrow 3 \rightarrow 1$

**D** $4 \rightarrow 3 \rightarrow 1 \rightarrow 2$

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