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

**BIOLOGY** **0610/22**

Paper 2 Multiple Choice (Extended) **February/March 2019**

**45 minutes**

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



**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 regulated 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.

**1** A living organism, X, can make its own food, get rid of toxic materials and detect and respond to stimuli.

What **other** four processes must organism X carry out to stay alive?

**A** excretion, growth, movement, sensitivity

**B** excretion, growth, nutrition, respiration

**C** growth, movement, reproduction, respiration

**D** movement, reproduction, respiration, sensitivity

**2** What is a correct way of naming a species using the binomial system?

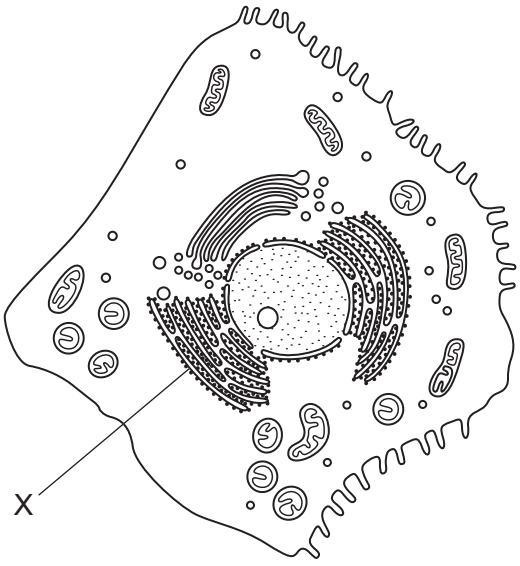
**A** *Homo sapiens*

**B** *Homo Sapiens*

**C** human being

**D** sapiens

**3** The drawing is of a magnified human liver cell.




What is structure X?

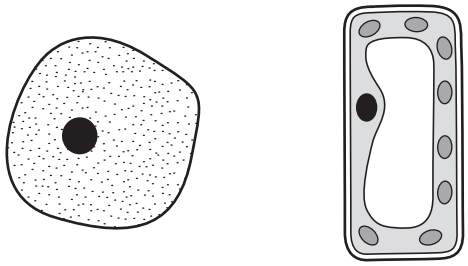
**A** cytoplasm

**B** mitochondrion

**C** nucleus

**D** rough endoplasmic reticulum

**4** The diagram shows two cells.



Which process can be carried out by only one of these cells?

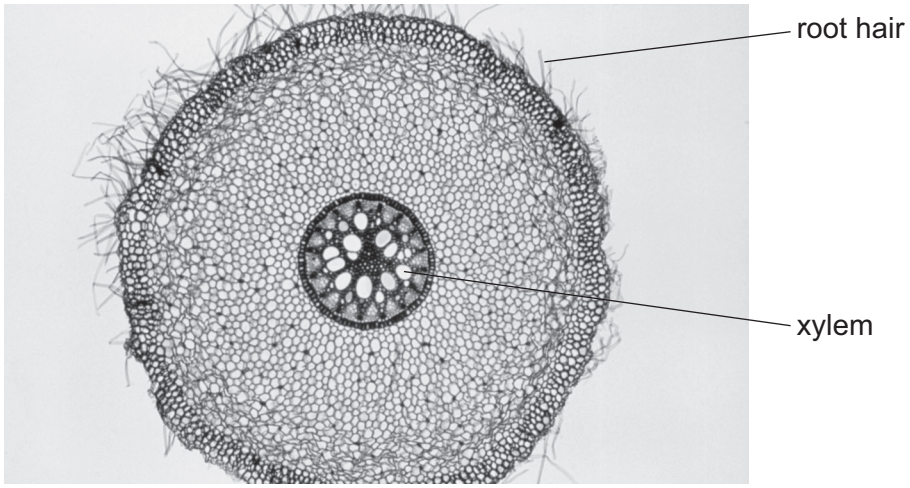
**A** controlling the chemical reactions in the cell

**B** controlling the movement of substances into the cell

**C** making starch inside the cell

**D** using glucose inside the cell

**5** The photograph shows a cross-section of a root.




The root hair and the xylem are part of the same

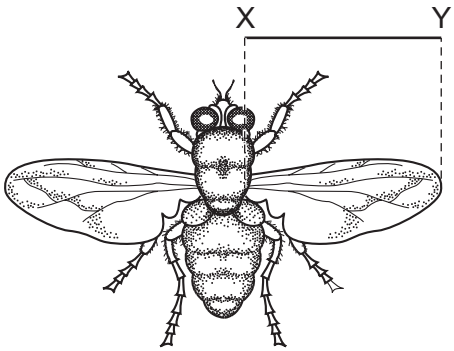
**A** cell and organism.

**B** cell and tissue.

**C** organ and organism.

**D** tissue and organ.

**6** The diagram shows a fly.




The line XY represents the length of the wing.

The length of line XY is 26 mm.

The actual size of the wing between XY is 4 mm.

What is the magnification of the image?

**A** ×0.15 **B** ×6.5 **C** ×22 **D** ×104

**7** A frog is an animal. A frog's skin is permeable to oxygen and carbon dioxide.

When a frog is swimming in pond water, in which directions will there be a net diffusion of oxygen and carbon dioxide?

| | from the frog into the water | from the water into the frog |
|---|---|---|
| **A** | carbon dioxide | oxygen |
| **B** | carbon dioxide and oxygen | no movement |
| **C** | oxygen | carbon dioxide |
| **D** | no movement | carbon dioxide and oxygen |

**8** Which process only involves the movement of water through the partially permeable membrane of a cell?

**A** absorption

**B** evaporation

**C** osmosis

**D** transpiration

**9** Which statement about biological molecules is correct?

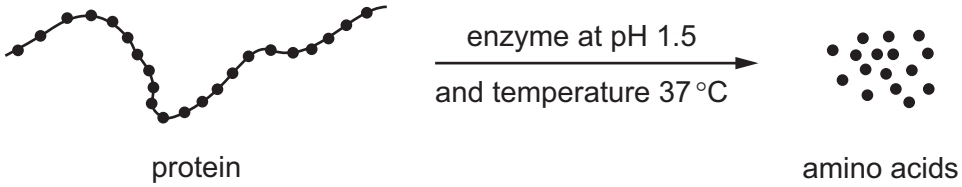
**A** DNA contains the bases A, C, G and T.

**B** Glycogen is made from glycerol molecules.

**C** Oils are made from amino acids and glucose.

**D** Proteins are made from fatty acids.

**10** The diagram shows the effect of an enzyme working in the human digestive system.




What would **reduce** the rate of production of amino acids?

**A** removing the amino acids as they are formed

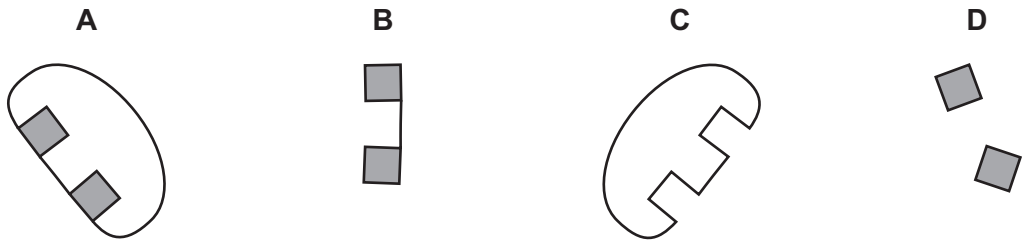
**B** increasing the amount of protein

**C** raising the temperature to 37.1 °C

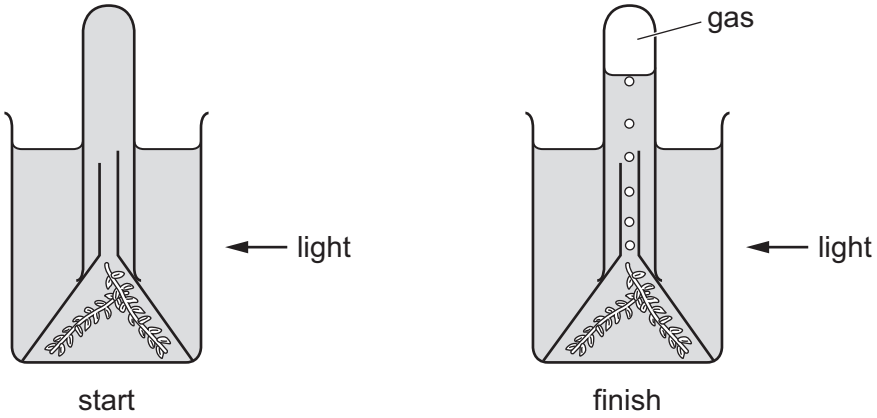
**D** raising the pH to 7.5

**11** The diagrams show molecules involved in the action of a digestive enzyme such as maltase.

Which is the substrate?



**12** The diagram shows an experiment to investigate photosynthesis.




What is the most abundant gas present at the top of the tube at the end of the experiment?

**A** carbon dioxide

**B** methane

**C** sulfur dioxide

**D** oxygen

**13** What will happen to a green plant grown in soil that is deficient in nitrate ions?

**A** It will have large leaves and good root growth.

**B** It will have purple leaves and poor root growth.

**C** It will have small leaves and a thin stem.

**D** It will have white leaves and a thick stem.

**14** What is meant by chemical digestion?

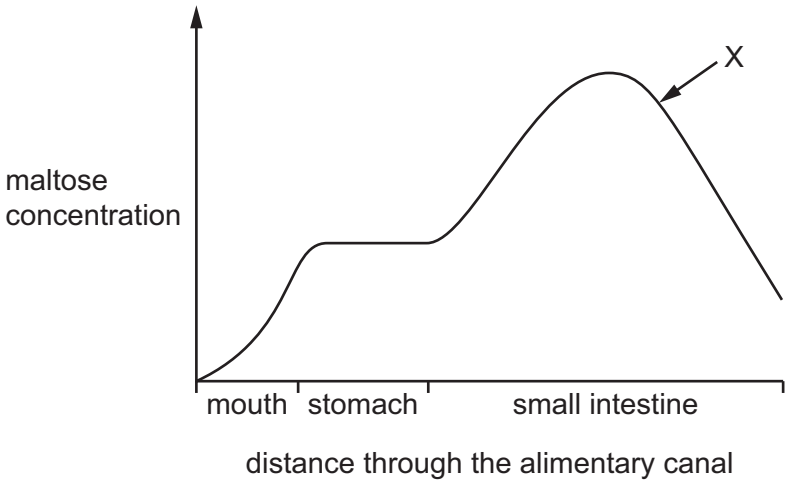
**A** Large insoluble molecules are broken down into small soluble molecules.

**B** Large soluble molecules are broken down into small insoluble molecules.

**C** Small insoluble molecules are built up into large soluble molecules.

**D** Small soluble molecules are built up into large insoluble molecules.

**15** The graph shows the concentration of maltose in different parts of the alimentary canal.




What causes the change in concentration at X?

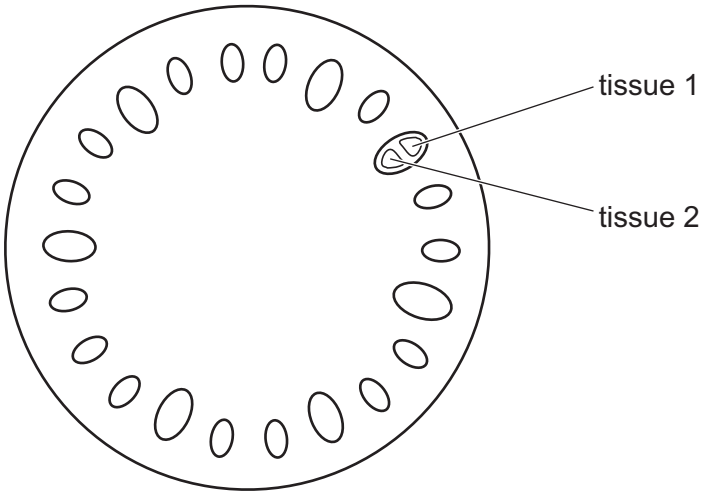
**A** absorption of maltose

**B** action of amylase

**C** action of maltase

**D** assimilation of maltose

**16** The diagram shows a cross-section through a plant stem.

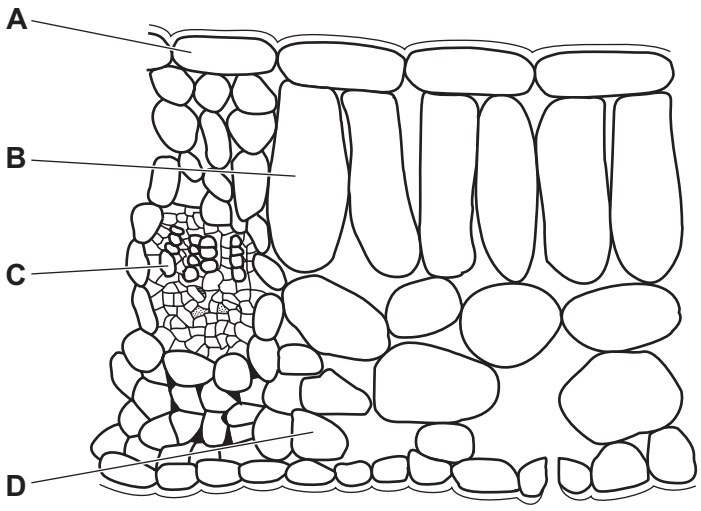



What are the functions of the two labelled tissues?

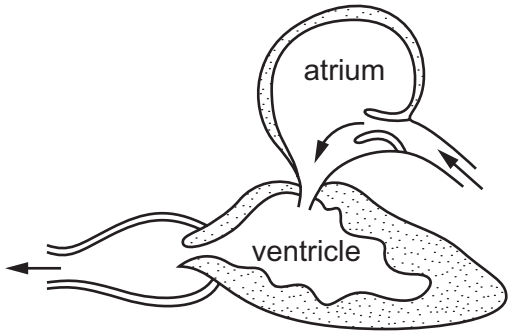
| | tissue 1 | tissue 2 |
|---|---|---|
| **A** | transport only | support only |
| **B** | transport only | transport and support |
| **C** | transport and support | transport only |
| **D** | support only | transport only |

**17** A leafy shoot is placed in a solution of a red dye.

After 30 minutes, which part of a leaf from this shoot will contain the red dye?




**18** The diagram shows a section through a fish heart and the direction of blood flow.




After leaving the heart, where will the blood flow to next?

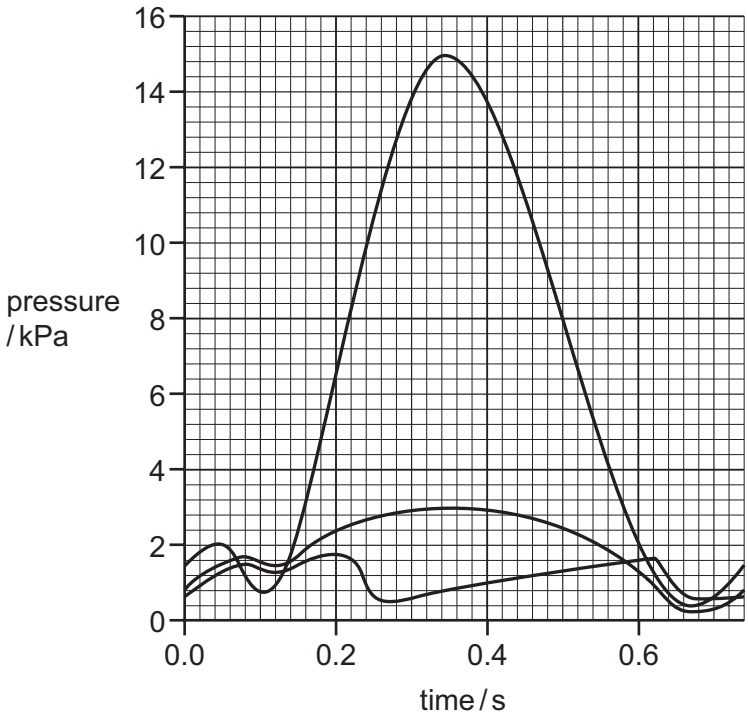
**A** eyes

**B** fins

**C** gills

**D** tail muscle

**19** The graph shows pressure changes that take place in the right atrium, right ventricle and left ventricle of a human heart when the muscle walls contract and relax.




What is the pressure in the right ventricle when the left ventricle is at its maximum pressure?

**A** 0.4 kPa **B** 2.0 kPa **C** 3.0 kPa **D** 15.0 kPa

**20** The body has different types of defences against pathogens.

1 antibodies

2 hairs in the nose

3 mucus

4 skin

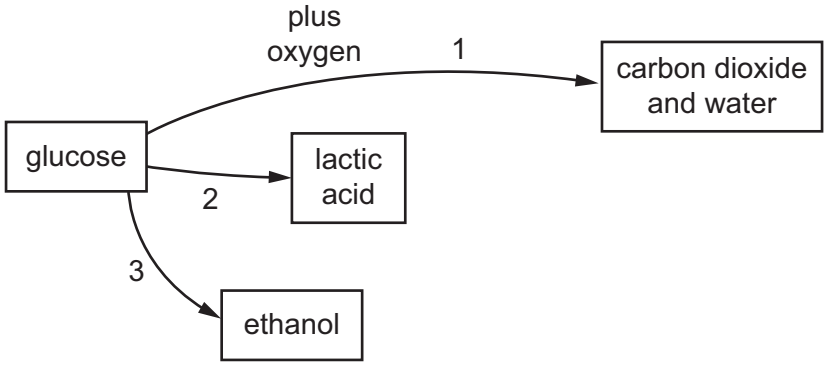
Which defences help to prevent pathogens reaching the alveoli when breathing in?

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

**21** What are the approximate percentages of oxygen and carbon dioxide in inspired air?

| | percentage of oxygen | percentage of carbon dioxide |
|---|---|---|
| **A** | 16 | 4.00 |
| **B** | 16 | 8.00 |
| **C** | 20 | 0.04 |
| **D** | 20 | 4.00 |

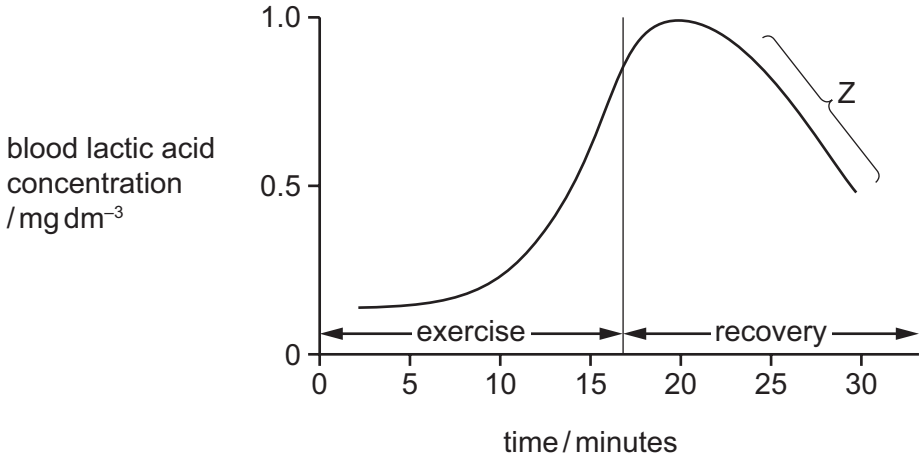
**22** The flow diagram summarises three different ways that glucose can be broken down to release energy.




Which routes involve the action of enzymes?

**A** 1 only **B** 1 and 2 only **C** 2 and 3 only **D** 1, 2 and 3

**23** The graph shows the lactic acid concentration in blood during and after exercise.




Which process accounts for the shape of the graph at Z?

**A** aerobic respiration of lactic acid in the kidney

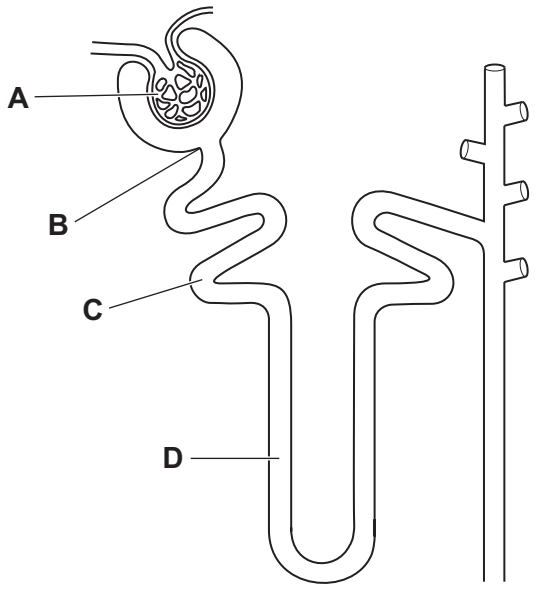
**B** aerobic respiration of lactic acid in the liver

**C** anaerobic respiration of lactic acid in the kidney

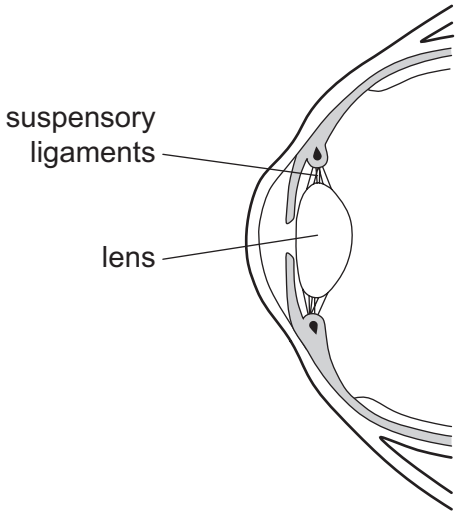
**D** anaerobic respiration of lactic acid in the liver

**24** The diagram shows the structure of a kidney tubule.

Where does filtration occur?




**25** The diagram shows a section through part of the human eye.




What takes place when a person looks at an object which is far away from their eye?

| | suspensory ligaments | lens |
|---|---|---|
| **A** | slacken | becomes fatter |
| **B** | slacken | becomes thinner |
| **C** | tighten | becomes fatter |
| **D** | tighten | becomes thinner |

**26** Which statement about adrenaline is correct?

**A** Adrenaline causes the pupils to narrow.

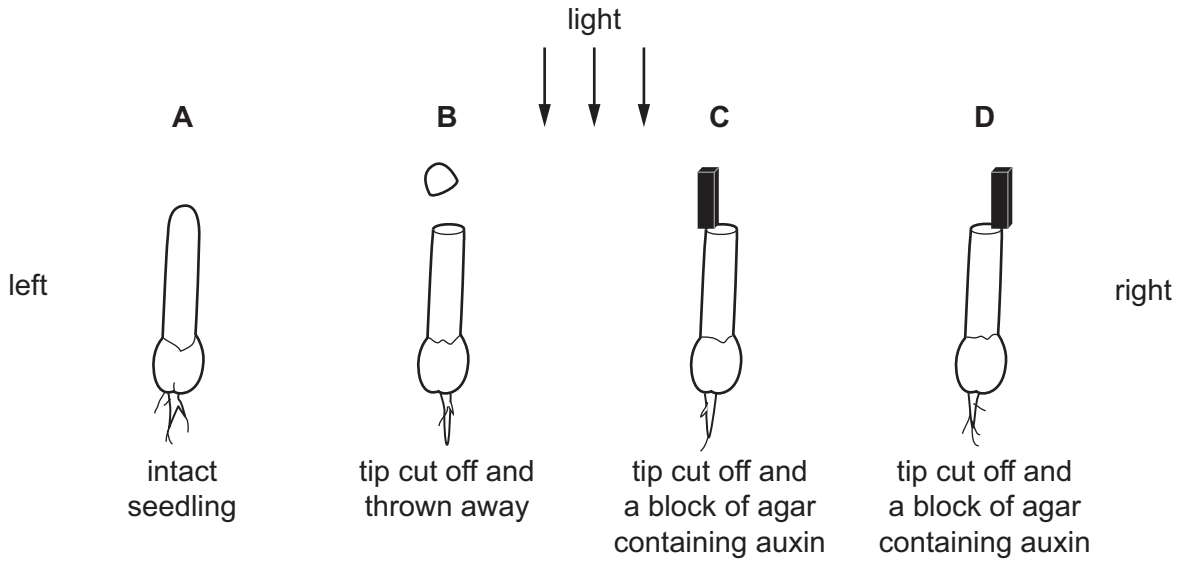
**B** Adrenaline increases blood glucose concentration.

**C** Adrenaline secretion increases when at rest.

**D** Adrenaline slows down the pulse rate.

**27** The diagram shows an experiment on oat seedlings. All the seedlings are exposed to light from directly above.

Which seedling will grow to the left?




**28** What type of organism is MRSA?

**A** bacterium

**B** fungus

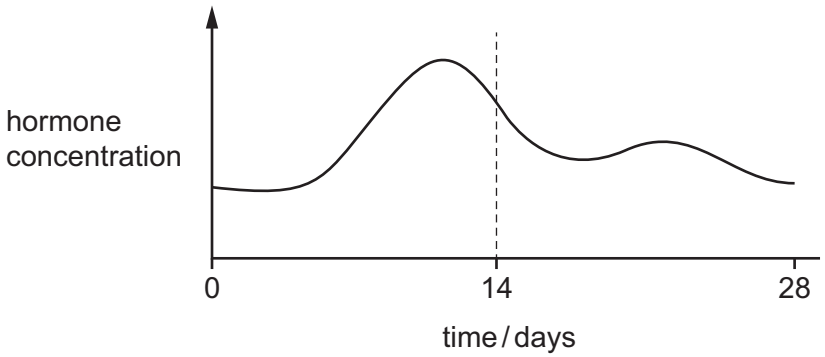
**C** protoctist

**D** virus

**29** What describes the nuclei in human reproduction?

| | egg | sperm | zygote |
|---|---|---|---|
| **A** | diploid | diploid | diploid |
| **B** | diploid | diploid | haploid |
| **C** | haploid | haploid | diploid |
| **D** | haploid | haploid | haploid |

**30** The graph shows a hormone that is involved in controlling the menstrual cycle.




What is the hormone?

**A** FSH

**B** LH

**C** oestrogen

**D** progesterone

**31** What happens as a result of mitosis?

| | genetically identical cells produced | chromosome number is halved |
|---|---|---|
| **A** | ✓ | ✓ |
| **B** | ✓ | ✗ |
| **C** | ✗ | ✓ |
| **D** | ✗ | ✗ |

key
✓ = yes
✗ = no

**32** Which parents could produce offspring with blood group O?

**A** heterozygous father with blood group A and heterozygous mother with blood group B

**B** heterozygous father with blood group A and homozygous mother with blood group B

**C** homozygous father with blood group A and heterozygous mother with blood group B

**D** homozygous father with blood group A and homozygous mother with blood group O

**33** The development of antibiotic resistant bacteria is an example of

**A** artificial selection.

**B** genetic engineering.

**C** humans developing immunity to antibiotics.

**D** natural selection.



**[Turn over**

**34** What is the correct definition of a gene mutation?

**A** a change in the base sequence of DNA

**B** a change in the gene or chromosome

**C** a change in the number of amino acids

**D** a change in the number of chromosomes

**35** Energy flows through a food chain.

In which form does the energy first enter the food chain?

**A** chemical

**B** heat

**C** kinetic

**D** light

**36** Which organisms are responsible for removing nitrate ions from soil?

**A** denitrifying bacteria and nitrogen-fixing bacteria in root nodules

**B** denitrifying bacteria and plants

**C** nitrifying bacteria and plants

**D** nitrogen-fixing bacteria in root nodules

**37** What are **all** reasons why bacteria are useful in genetic engineering?

**A** They are very small. They do not need large containers. They have no mitochondria.

**B** They reproduce asexually. They can double their numbers in twenty minutes in good conditions. They have cell walls.

**C** They have the same genetic code as other organisms. They have plasmids. There is a lack of ethical concern about their use.

**D** Their DNA is not in a nucleus. They have a cell membrane. They have a large surface area to volume ratio.

**38** Which statement describes the role of DNA ligase in genetic engineering?

**A** cuts open a bacterial plasmid

**B** joins the human gene to the plasmid

**C** inserts plasmid back into bacterium

**D** isolates a human gene

**39** What must always be available to allow seeds to germinate?

**A** carbon dioxide

**B** light

**C** mineral salts

**D** water

**40** Which list correctly describes the sequence of events in the eutrophication of a river or lake?

| **A** | **B** |
|---|---|
| 1 decreased growth of plants | 1 increased growth of plants |
| 2 dead plants decompose | 2 dead plants decompose |
| 3 increase in anaerobic bacteria | 3 increase in aerobic bacteria |
| 4 decrease in dissolved oxygen | 4 decrease in dissolved oxygen |

| **C** | **D** |
|---|---|
| 1 decreased growth of plants | 1 plants die |
| 2 dead plants decompose | 2 dead plants decompose |
| 3 decrease in anaerobic bacteria | 3 decrease in aerobic bacteria |
| 4 increase in dissolved oxygen | 4 increase in dissolved oxygen |

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