

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**BIOLOGY**

**5090/01**

Paper 1 Multiple Choice

May/June 2006

**1 hour**

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, highlighters, 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.

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.

This document consists of **16** printed pages.

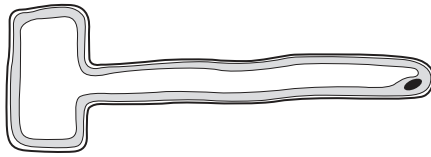


- 1 The concentration of nitrate ions in a root cell is higher than in the surrounding soil solution.

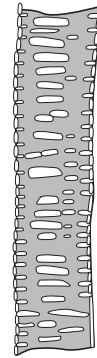
How do the nitrate ions move into the root cell?

- A active transport
- B diffusion
- C osmosis
- D transpiration

- 2 The diagram shows two plant cells.



cell X



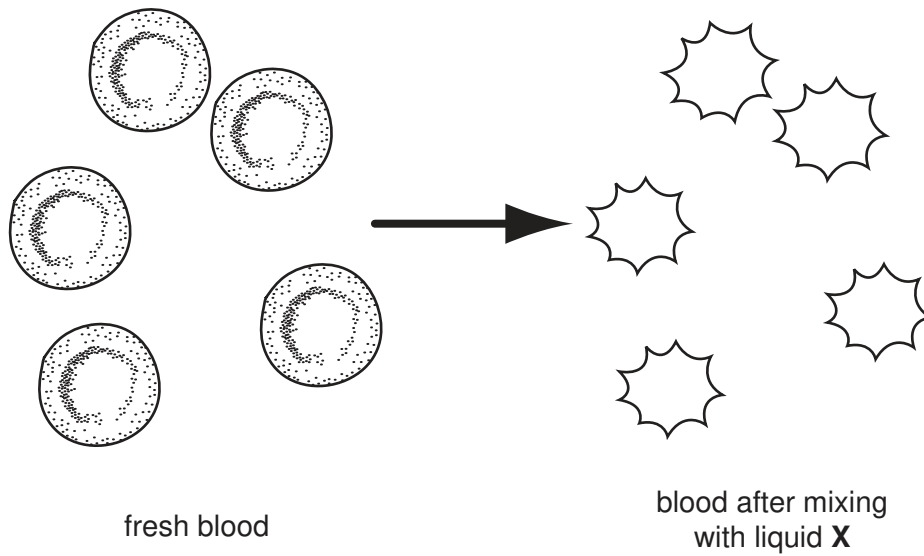
cell Y

Plant cells become turgid when they take up water by osmosis.

In which of these cells does being turgid provide support?

	cell X	cell Y
<b>A</b>	no	no
<b>B</b>	no	yes
<b>C</b>	yes	no
<b>D</b>	yes	yes

- 3 The diagram shows cells in fresh blood and the same cells after the blood has been mixed with liquid X.



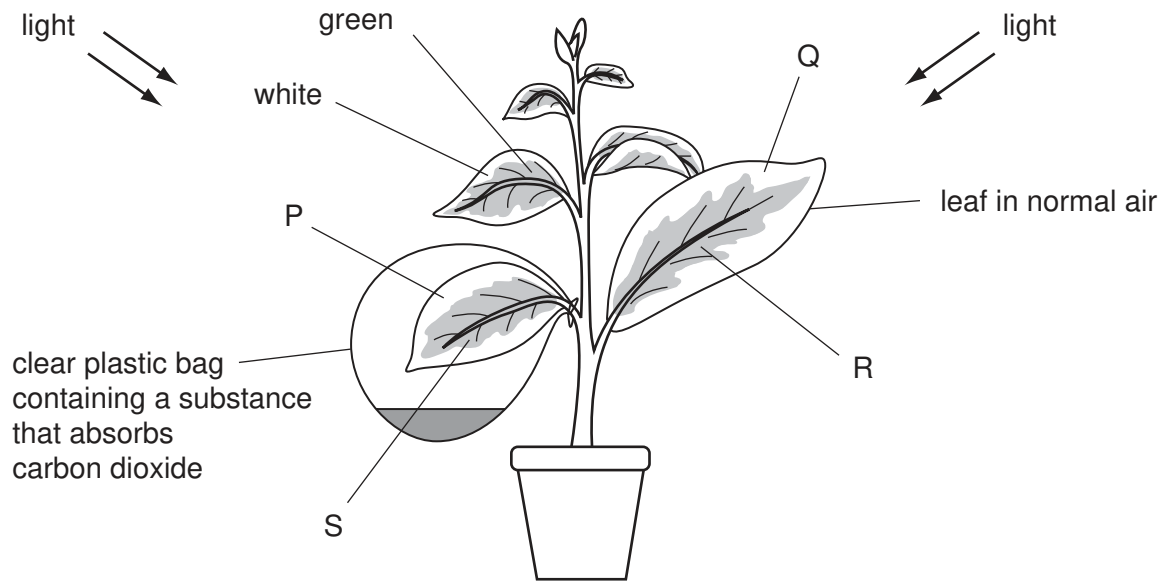
Which statement describes the water potential of liquid X?

- A It is equal to that of pure water.
  - B It is equal to that of the cell cytoplasm.
  - C It is higher than that of the cell cytoplasm.
  - D It is lower than that of the cell cytoplasm.
- 4 Starch is digested to maltose by the enzyme amylase.

According to the 'lock and key' hypothesis, which is the 'key' and which is the 'lock'?

	'key'	'lock'
<b>A</b>	amylase	maltose
<b>B</b>	amylase	starch
<b>C</b>	starch	amylase
<b>D</b>	starch	maltose

- 5 The diagram shows a photosynthesis investigation. The plant has leaves that are green in the middle and white round the edges.



Which leaf areas lack only **one** factor needed for photosynthesis?

- A P and Q  
 B P and R  
 C Q and S  
 D R and S
- 6 When is carbon dioxide absorbed and when is it released by an ecosystem, such as a tropical rainforest?

	daylight	darkness
A	absorbed	absorbed
B	absorbed	released
C	released	absorbed
D	released	released

- 7 What is the function of each type of plant cell?

	palisade cells	phloem cells	root hair cells
A	photosynthesis	sugar transport	ion uptake
B	photosynthesis	sugar transport	transpiration
C	transpiration	photosynthesis	ion uptake
D	transpiration	photosynthesis	sugar transport

8 The table shows the nutrients in different parts of a meal.

Which food would be most useful in preventing constipation?

	food	energy kJ	protein g	fat g	carbohydrate g	fibre g
<b>A</b>	apple juice	163	0.1	0	9.4	0
<b>B</b>	ripe banana	466	1.5	0.4	27	4.9
<b>C</b>	salad sandwich	1054	19	7.3	27	6.1
<b>D</b>	toffee bar	458	2.1	3.3	19	1.1

9 In which order do these events occur in human nutrition?

- A** digestion → ingestion → absorption → assimilation
- B** digestion → ingestion → assimilation → absorption
- C** ingestion → digestion → absorption → assimilation
- D** ingestion → digestion → assimilation → absorption

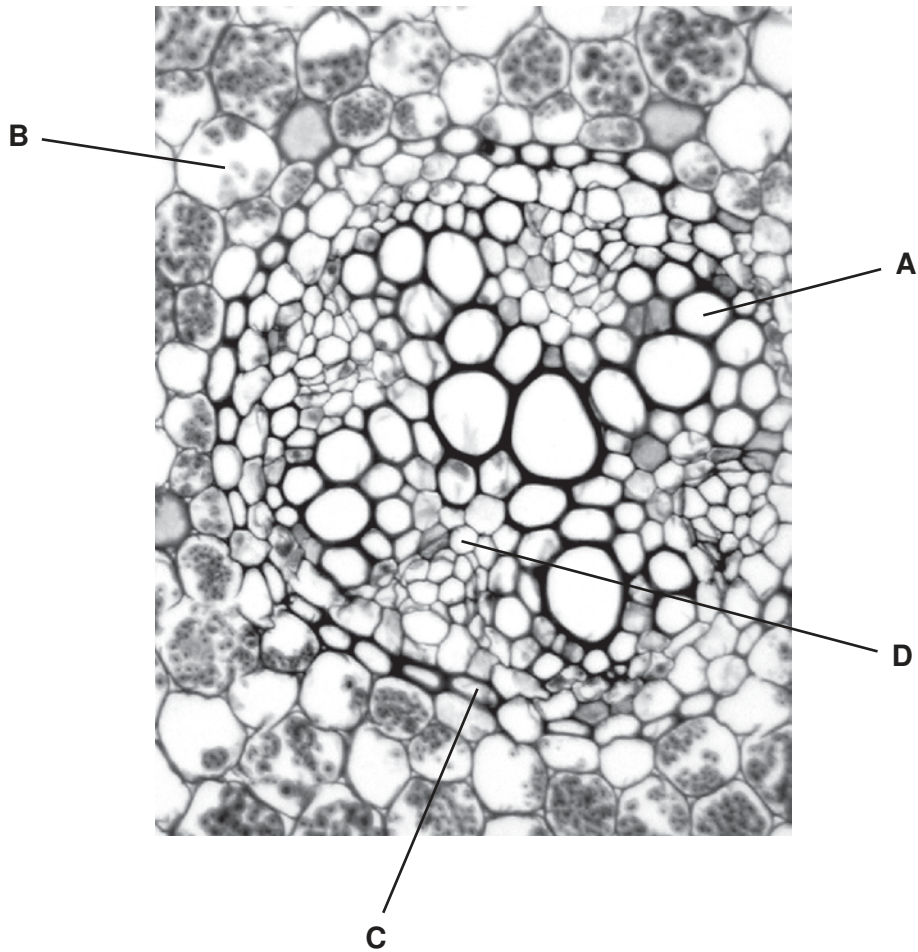
10 Tennis players often eat bananas during long matches.

Which nutrient in a banana is important during the match?

- A** carbohydrate
- B** fibre
- C** iron
- D** vitamin C

11 The photomicrograph shows a section of part of the root of a plant.

Through which tissue are sugars and amino acids transported?



12 During translocation in plants, what substance is moved from which organ to which organ?

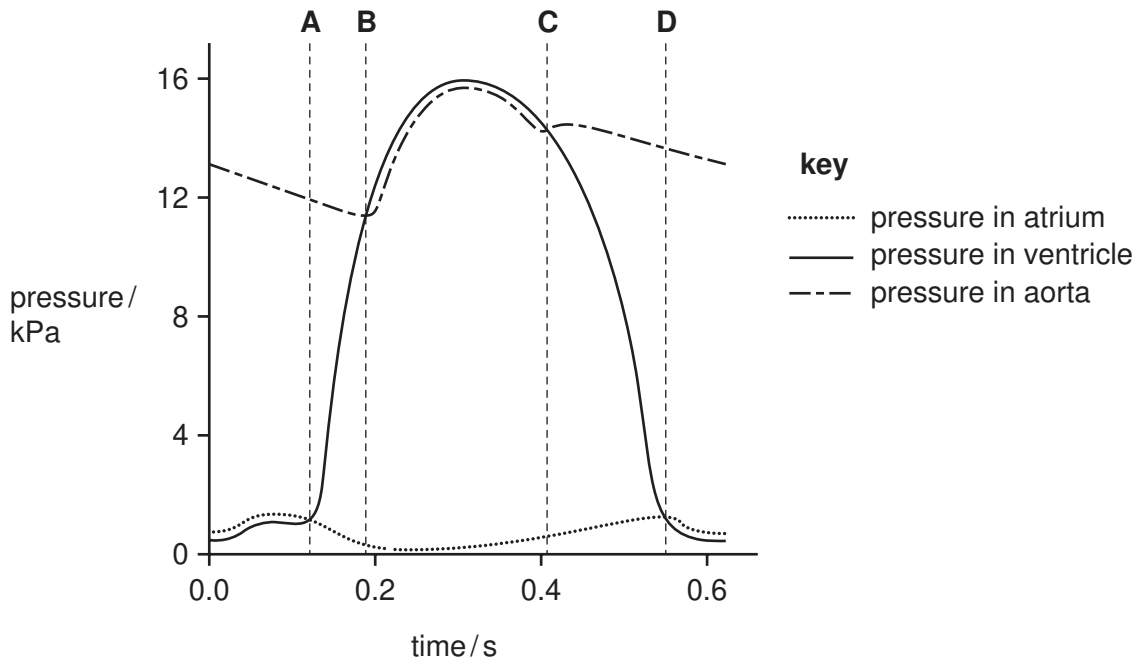
	substance	from	to
<b>A</b>	sucrose	anthers	stigmas
<b>B</b>	sucrose	leaves	roots
<b>C</b>	water	roots	leaves
<b>D</b>	water	soil	root hairs

13 Which chambers of the human heart contain oxygenated blood?

- A** left atrium and left ventricle
- B** left atrium and right ventricle
- C** right atrium and left ventricle
- D** right atrium and right ventricle

14 The graph shows pressure changes in the left side of the heart, during a single heart beat.

At which point does the semi-lunar valve open?



15 What causes the transfer of materials between capillaries and tissue fluid?

- A active transport
- B blood pressure
- C capillarity
- D osmosis

16 In the body of a human, which processes consume energy from respiration?

	absorption of water	cell division	protein synthesis
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

✓ = needs energy

x = does not need energy

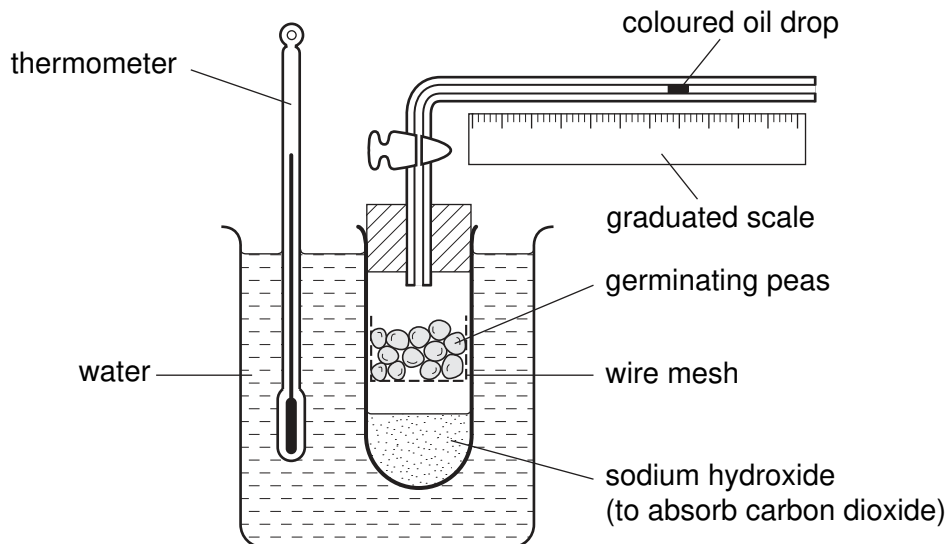
17 The table shows the percentage composition of a gas in inspired and in expired air.

% composition	
inspired air	expired air
21.0	16.0

What is the gas?

- A carbon dioxide
- B nitrogen
- C oxygen
- D water vapour

18 The diagram shows apparatus used to investigate respiration.



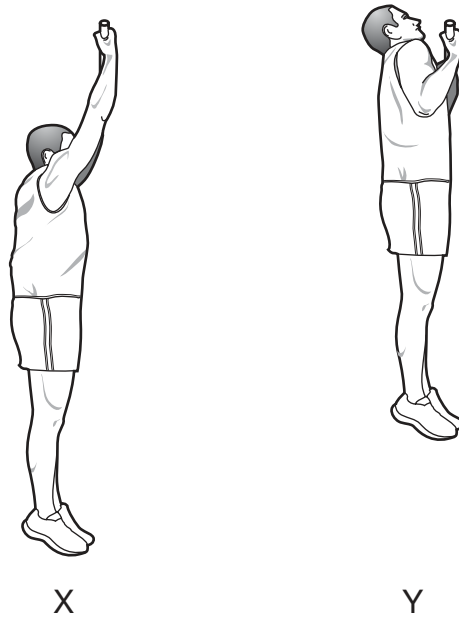
What change will be seen and what is the explanation?

	change	explanation
A	oil drop moves left	oxygen is used up by the peas
B	oil drop does not move	oxygen is used up as fast as carbon dioxide is released
C	oil drop does not move	carbon dioxide is absorbed
D	oil drop moves right	peas release carbon dioxide



- 19 Through which sequence does carbon dioxide pass as it leaves the lungs?
- A alveolar wall → in the alveoli → blood → capillary wall
  - B blood → capillary wall → alveolar wall → in the alveoli
  - C capillary wall → blood → in the alveoli → alveolar wall
  - D in the alveoli → alveolar wall → capillary wall → blood
- 20 What does the hypothalamus control?
- A adrenaline secretion
  - B body temperature
  - C heart beat
  - D memory
- 21 Which of these four mechanisms that lower the body temperature is the slowest to occur?
- A dilation of surface capillaries
  - B relaxation of hair erector muscles
  - C secretion of sweat
  - D thinning subcutaneous fat layer
- 22 When a person is frightened which responses will occur?
- |   |                     |                          |                            |
|---|---------------------|--------------------------|----------------------------|
| A | adrenaline released | heart beat increases     | eye pupils dilate          |
| B | adrenaline released | blood glucose increases  | urine production increases |
| C | insulin released    | breathing rate increases | peristalsis stops          |
| D | insulin released    | eye pupils dilate        | saliva secretion stops     |

23 The diagram shows a person doing 'pull ups' on a horizontal bar.



In moving from the lower position X to the upper position Y, which muscles and joint movements occur?

	biceps	triceps	ball and socket joint
<b>A</b>	contracts	relaxes	rotates
<b>B</b>	contracts	relaxes	extends
<b>C</b>	relaxes	contracts	rotates
<b>D</b>	relaxes	contracts	flexes

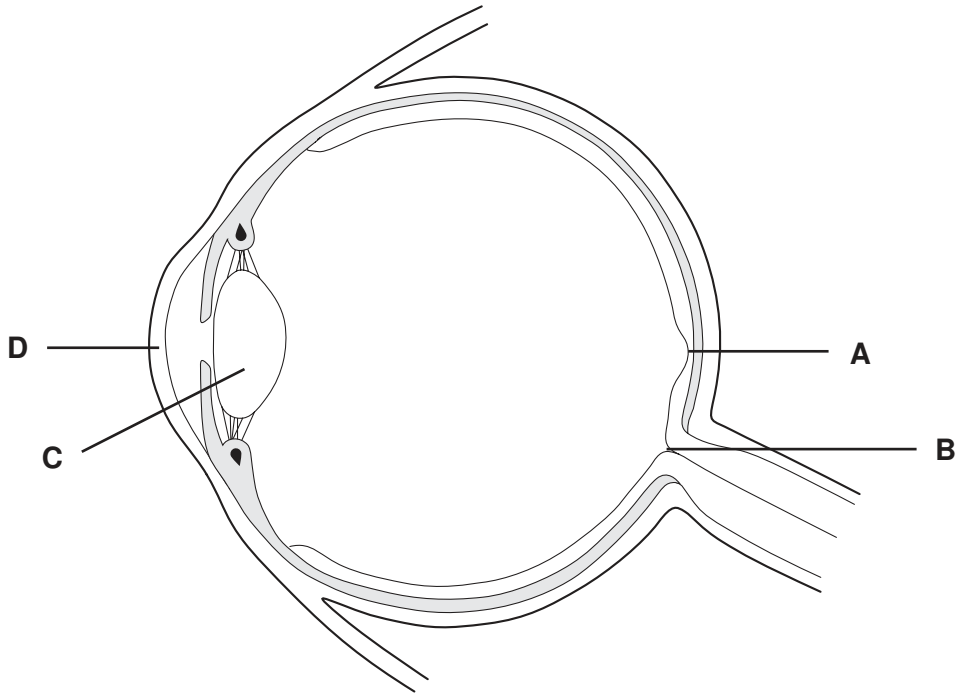
24 Which of these substances do **not** occur naturally in the human body?

adrenaline	heroin	nicotine	penicillin
1	2	3	4

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

25 The diagram shows a section through the human eye.

Where will an image be detected when a person looks at an object?



26 'This group of organisms have long thread like bodies. Their cells contain nuclei. Some of them produce antibiotics.'

Which group of organisms is being described?

- A bacteria
- B fungi
- C plants
- D viruses

27 Fermenters that are used to produce single cell protein may be closed (batch) or open (continuous).

Which set of fermenter properties is correct?

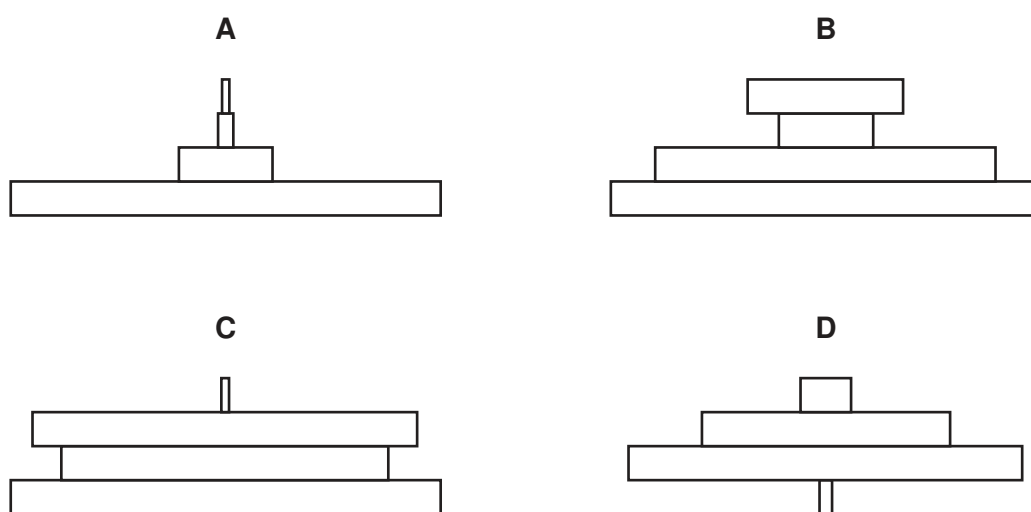
	closed	open
<b>A</b>	growth rate of culture remains at optimum	fermenting microorganisms must be added all the time
<b>B</b>	growth rate of culture remains at optimum	product can be removed all the time
<b>C</b>	vessel must be sterilised after each separate cycle	fermenting microorganisms must be added all the time
<b>D</b>	vessel must be sterilised after each separate cycle	product can be removed all the time

28 Which statement is **not** correct?

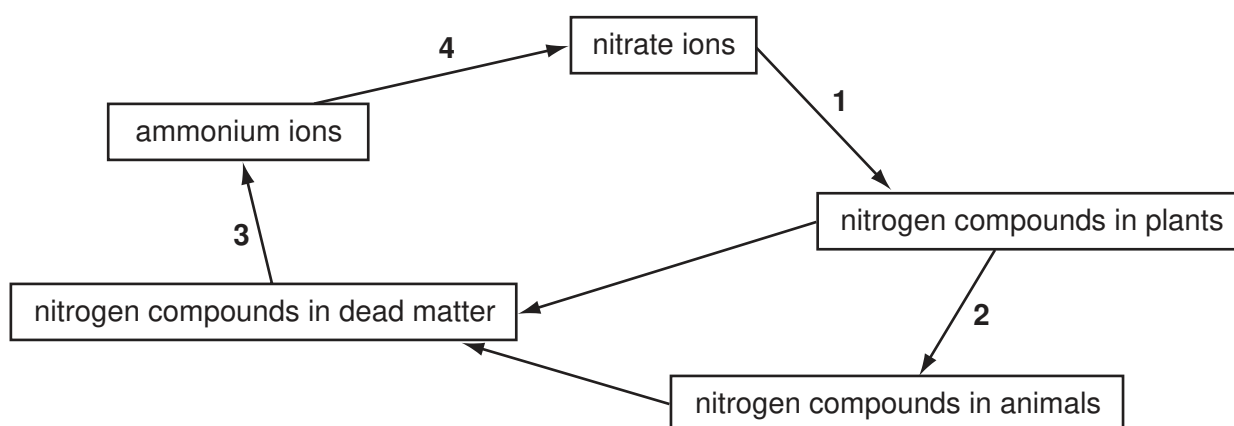
- A Anaerobic respiration releases less energy than aerobic respiration.
- B The sun is the principal source of energy input into biological systems.
- C Energy flowing through biological systems is recycled.
- D Active transport is an energy-consuming process.

29 A sparrowhawk eats small birds that feed on caterpillars. Caterpillars feed on plant leaves.

Which diagram shows the pyramid of biomass for this food chain?



30 The diagram shows part of the nitrogen cycle.



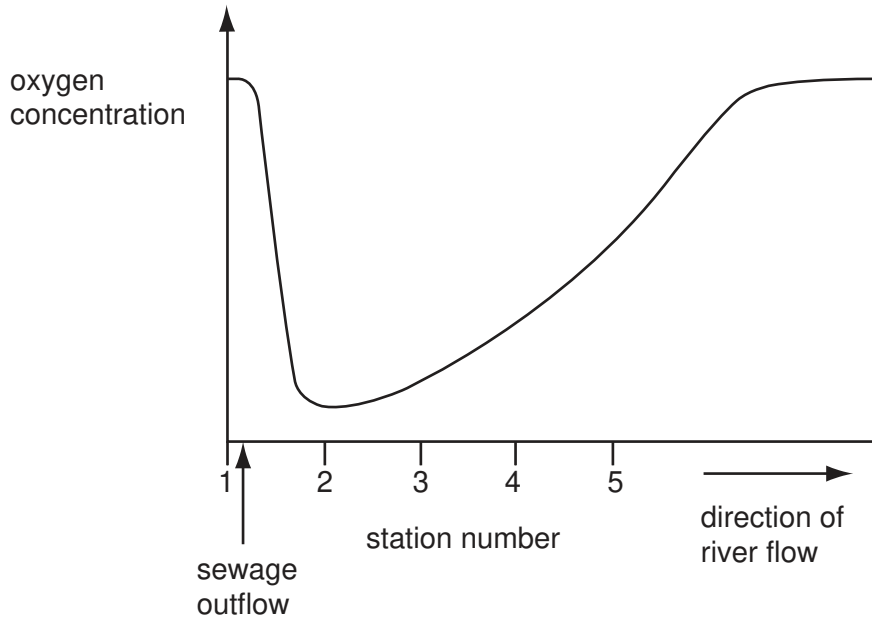
Which stages depend on the action of bacteria?

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

31 A mosquito transmits malaria and is therefore described as a

- A parasite.
- B pathogen.
- C vector.
- D virus.

32 The graph shows the concentration of oxygen in a river, measured at stations 1 to 5, each 100 m apart. There is a sewage outflow just after station 1.



At which stations are the concentrations of organic matter **lowest**?

- A 1 and 5
- B 2 and 3
- C 3 and 4
- D 4 and 5

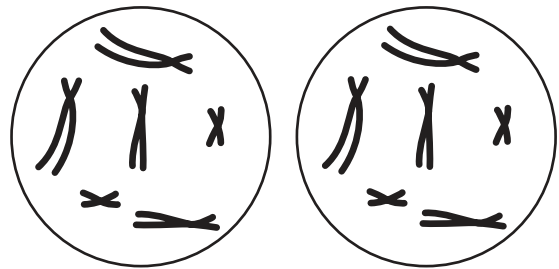
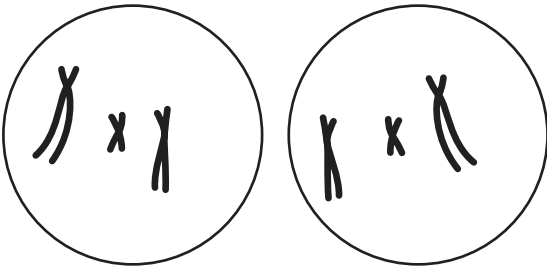
33 The diagram shows the chromosomes in a cell.



Which diagram shows the product of **one** division of the cell by mitosis?

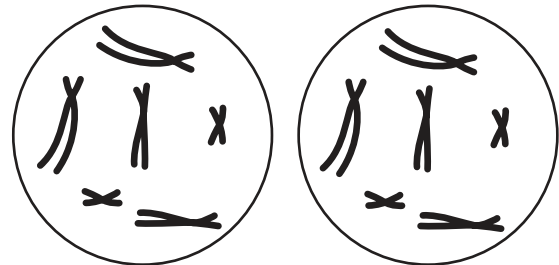
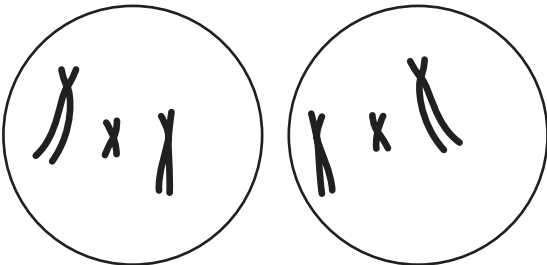
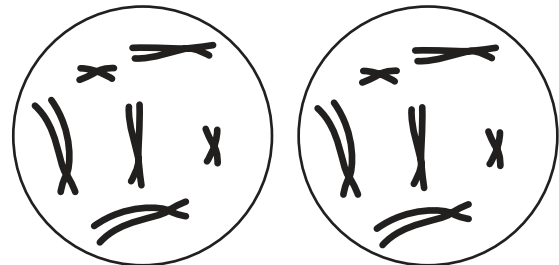
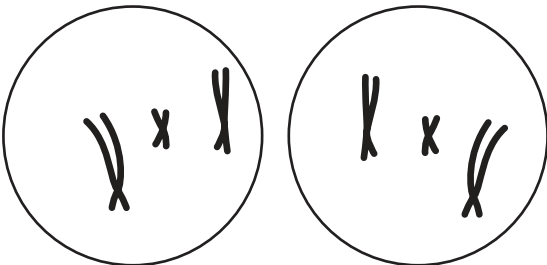
A

B



C

D



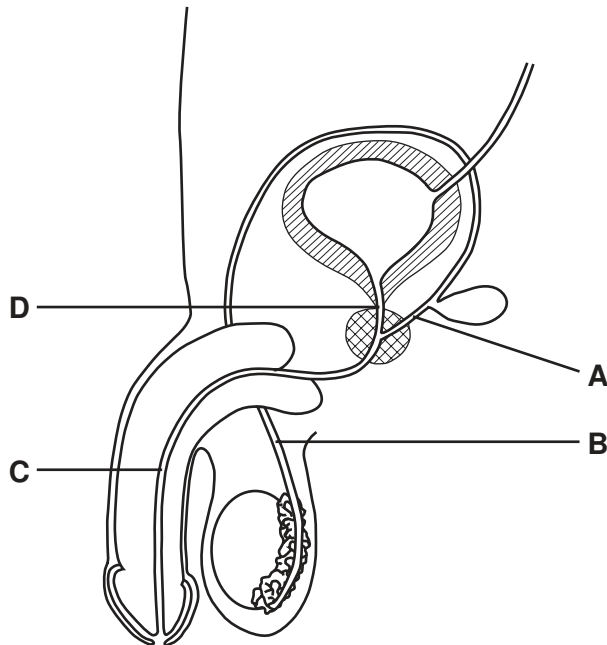
34 A germinating seed is soaked in blue dye, which becomes colourless in tissues that are actively respiring.

What will be the appearance of the cotyledons, plumule and radicle?

	cotyledons	plumule	radicle
<b>A</b>	blue	blue	blue
<b>B</b>	blue	blue	colourless
<b>C</b>	colourless	blue	colourless
<b>D</b>	colourless	colourless	colourless

35 A surgical method of birth control involves cutting some of the tubes through which sperm pass.

At which point does the surgeon make the cuts?



36 Which diseases can be cured with antibiotics?

	gonorrhoea	HIV infection	syphilis
<b>A</b>	✓	✓	✓
<b>B</b>	x	✓	x
<b>C</b>	✓	x	✓
<b>D</b>	x	x	✓

key

✓ = can be cured with antibiotics

x = cannot be cured with antibiotics

37 Which of these may be heterozygous?

- A a cell which is haploid
- B an allele of a gene
- C an organism with a dominant phenotype
- D an organism with a recessive genotype

38 Cells contain long thread-like structures that carry genetic information.

What are these structures called?

- A alleles
- B chromosomes
- C genes
- D nuclei

39 Farmers crossed two breeds of cattle, the Jersey from Europe and the Sahiwal from Africa. For many generations, the farmers picked out the offspring with the highest milk yields to breed the next generation.

Which phrase best describes this process?

- A artificial selection
- B discontinuous variation
- C evolution
- D natural selection

40 A textbook states that because human insulin is a single ...X..., its production is controlled by a single ...Y... .

What are X and Y?

	X	Y
<b>A</b>	carbohydrate	DNA molecule
<b>B</b>	carbohydrate	gene
<b>C</b>	protein	DNA molecule
<b>D</b>	protein	gene

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