Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2016**

1 hour

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

* 8 8 9 5 9 6 0 4 2 2 *

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.

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1 Which row correctly shows the function of a cell structure and its location?

	cell structure	function	location
A	cell membrane	controls the passage of substances into and out of cells	both plant and animal cells
B	cell membrane	maintains turgor	both plant and animal cells
C	cell wall	controls the passage of substances into and out of cells	plant cells only
D	cell wall	maintains turgor	animal cells only

2 Which row describes diffusion into a cell?

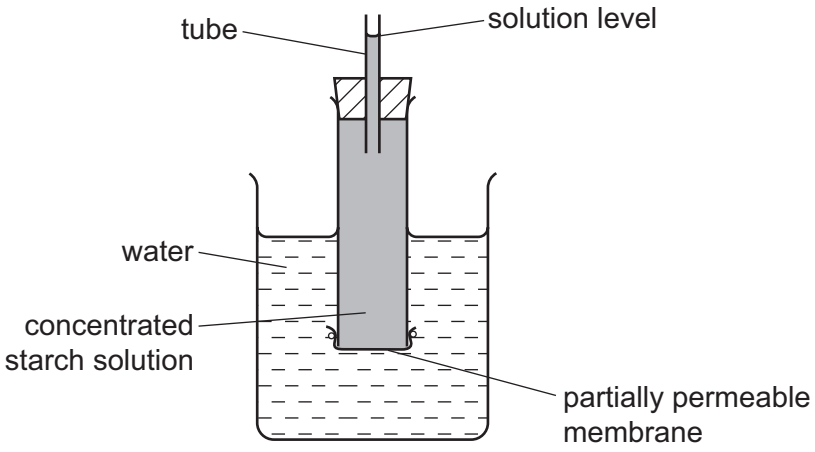
	energy required from the cell	particles move down a concentration gradient
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

3 The diagram represents apparatus used to investigate osmosis.



Which molecules will move across the partially permeable membrane and which change will occur in the solution level?

	molecules	solution level
A	starch	fall
B	starch	rise
C	water	fall
D	water	rise

4 The diagram represents an enzyme molecule.



What could be substrates for this enzyme?



A W only **B** W or X **C** Y only **D** Y or Z

5 How do carbon dioxide and water enter a leaf?

	carbon dioxide	water
A	diffusion	active transport
B	diffusion	transpiration
C	osmosis	diffusion
D	osmosis	transpiration

6 A lack of magnesium in plants leads to yellowing of the leaves.

This is because magnesium is needed for

A carbohydrate synthesis.

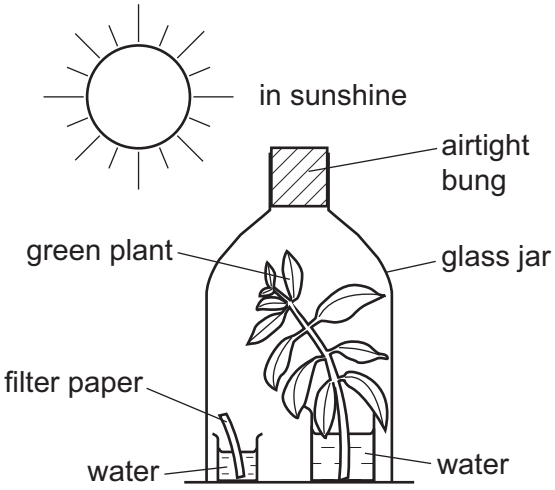
B chlorophyll synthesis.

C protein synthesis.

D respiration.

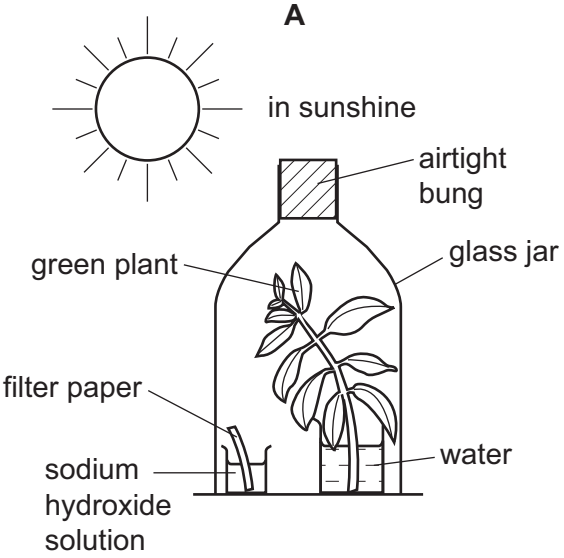
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7 The diagram shows a green shoot photosynthesising under a glass jar. This was used as a control experiment in a laboratory investigation.

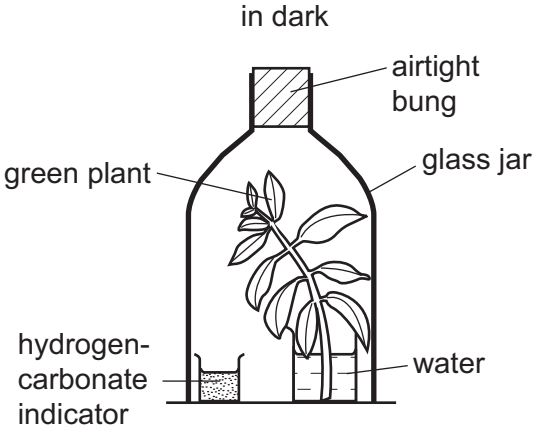


Which diagram shows the experiment carried out to investigate the need for carbon dioxide in photosynthesis?

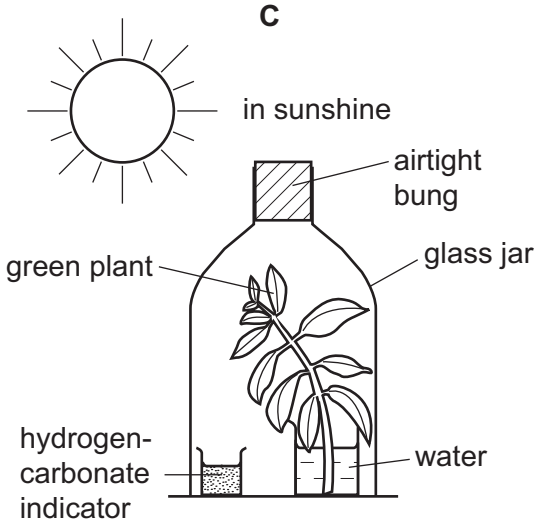
A



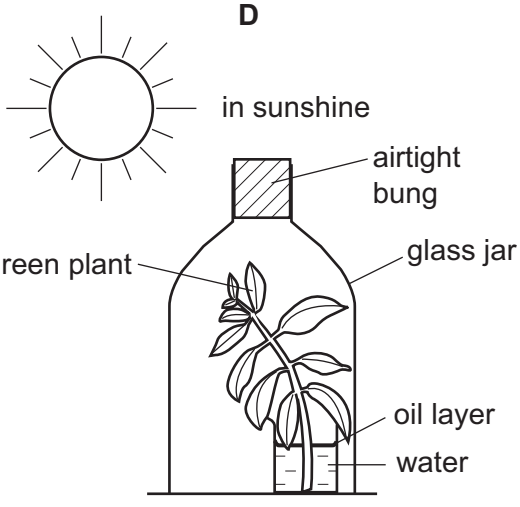
B



C



D



8 Which function is **not** carried out by the liver?

A breakdown of alcohol

B conversion of glycogen to glucose

C formation of urea

D secretion of digestive enzymes

9 Which row shows substances mainly absorbed into capillaries and substances mainly absorbed into lacteals, in the villi of the small intestine?

	mainly absorbed into capillaries	mainly absorbed into lacteals
A	amino acids	lipids
B	emulsified fat	glucose
C	glucose	amino acids
D	lipids	emulsified fat

10 Which of these food substances increases the risk of obesity?

1 fruit and vegetables

2 processed food

3 salt

4 saturated fat

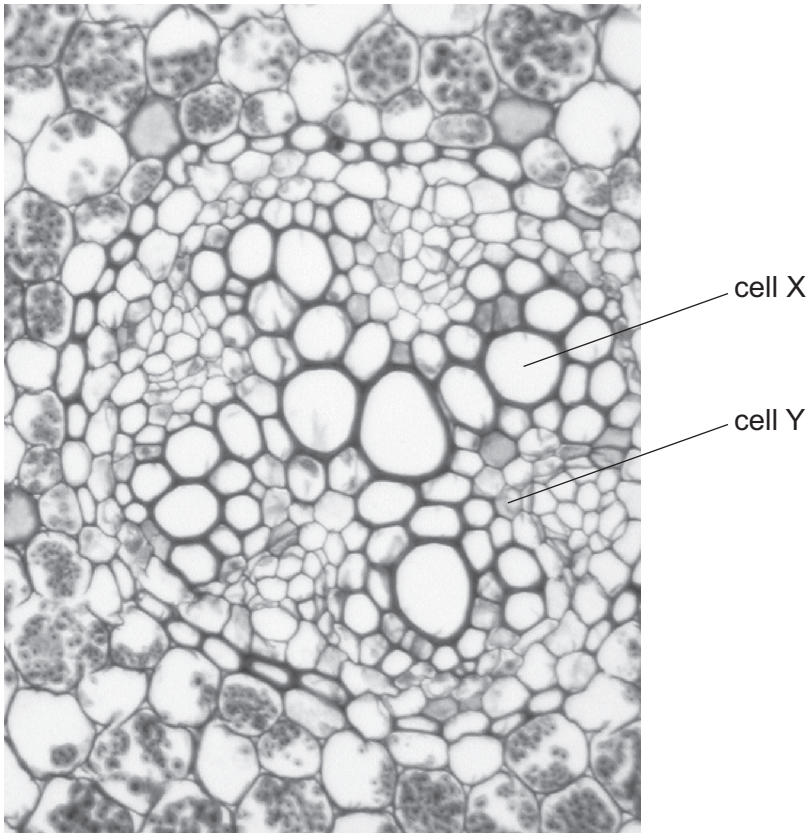
A 1, 2 and 3 **B** 1, 2 and 4 **C** 1 and 3 only **D** 2 and 4 only

11 In which direction do water molecules move in the phloem and in the xylem of a plant stem?

	phloem	xylem
A	down only	up only
B	up only	down only
C	up only	both up and down
D	both up and down	up only

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12 The photomicrograph shows part of a section through a root.



The contents of cell X and the contents of cell Y are each tested with Benedict's solution and with iodine solution.

Which results are expected?

	cell X		cell Y	
	Benedict's solution	iodine solution	Benedict's solution	iodine solution
A	+	+	–	–
B	+	–	+	+
C	–	+	–	+
D	–	–	+	–

key

+ = positive result

– = negative result

13 Which states the sequence of contractions in one heart beat?

A left atrium and left ventricle together, pause, right atrium and right ventricle together

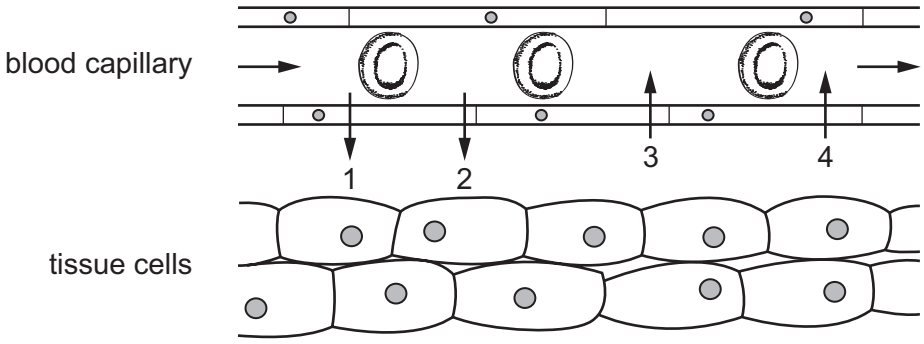
B left atrium, left ventricle, right atrium, right ventricle, pause

C right atrium and left atrium together, right ventricle and left ventricle together, pause

D right atrium, right ventricle, left atrium, left ventricle, pause

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14 The diagram shows the transfer of materials between capillaries and tissue fluid.

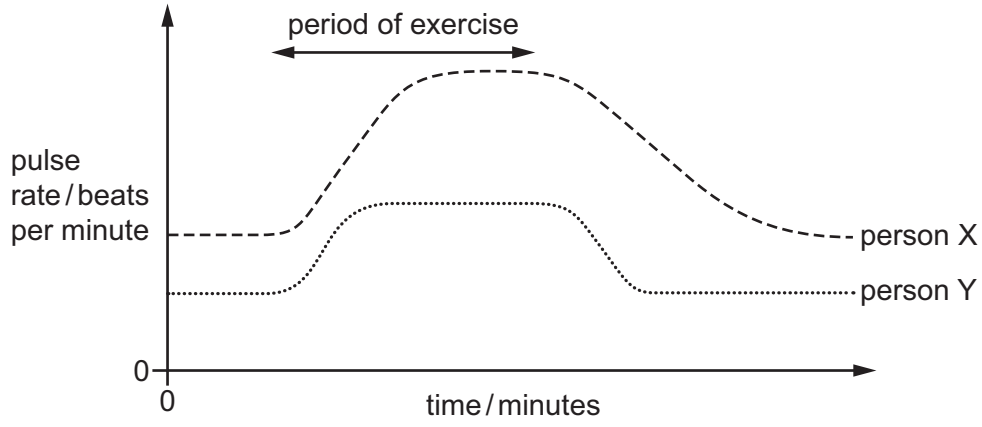


What could the numbered substances be?

	1	2	3	4
A	carbon dioxide	oxygen	urea	glucose
B	carbon dioxide	urea	oxygen	glucose
C	oxygen	glucose	carbon dioxide	urea
D	oxygen	urea	carbon dioxide	glucose

15 Two people carried out a short period of exercise on a treadmill. Each of the two people ran on the treadmill for the same amount of time and at the same speed.

The graph shows the pulse rates of these two people before, during and after the period of exercise.



Which interpretation of the graph is correct?

A Person X is fitter, and their heart rate increases more during exercise.

B Person X is fitter, and their heart rate recovers more quickly after exercise.

C Person Y is fitter, and their heart rate increases more during exercise.

D Person Y is fitter, and their heart rate recovers more quickly after exercise.

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16 What are the products of aerobic respiration in animals and plants?

A carbon dioxide and glucose

B carbon dioxide and water

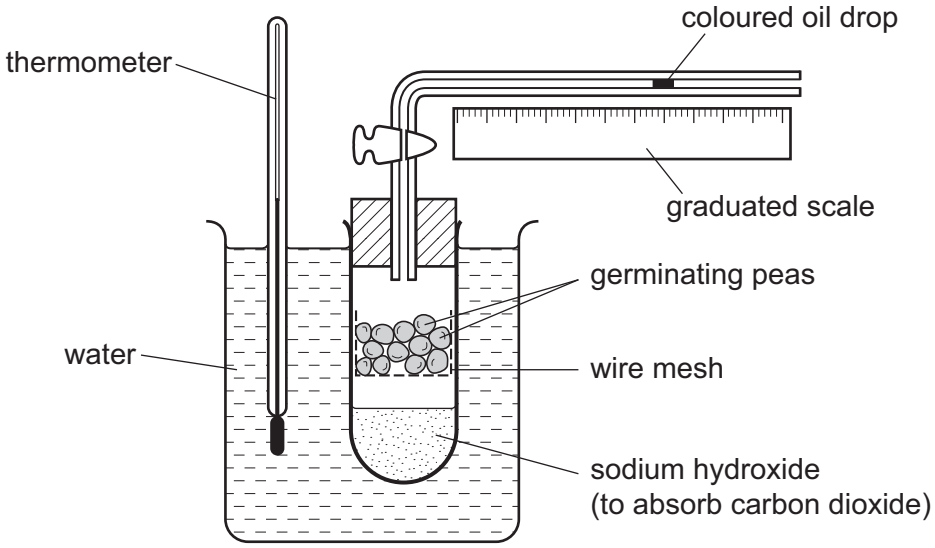
C glucose and oxygen

D lactic acid

17 What is the approximate composition of inspired air?

	composition			
	CO_2	O_2	N_2	water vapour
A	0.04%	16%	78%	saturated
B	0.04%	21%	78%	variable
C	4%	16%	78%	saturated
D	4%	21%	78%	variable

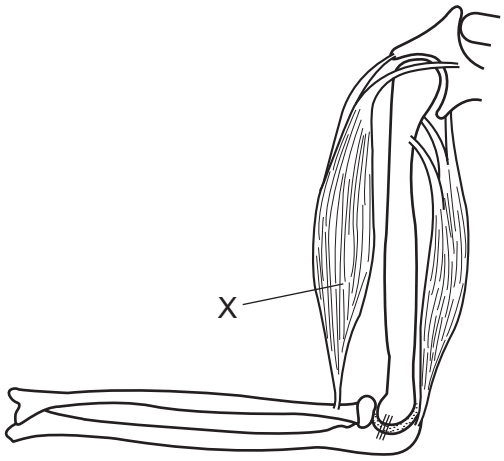
18 The diagram shows apparatus used to investigate respiration.



Which 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 The diagram shows the bones and muscles of the elbow joint.



What describes the type of muscle at X, and the action of the muscle when the arm is being bent?

	type of muscle	action of the muscle
A	extensor	contracts
B	extensor	relaxes
C	flexor	contracts
D	flexor	relaxes

20 What is a function of a part of the urinary system?

A Ureter carries urine from the bladder.

B Ureter carries urine from the kidneys.

C Urethra carries urine to the bladder.

D Urethra carries urine to the kidneys.

21 Which part of the skin has a major role in insulating the human body?

A blood vessels

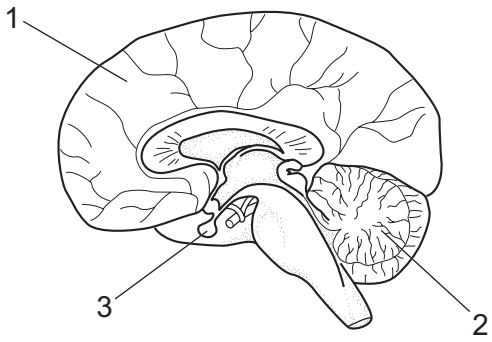
B fatty tissue

C hair follicles

D sweat glands

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22 The diagram shows a section of the human brain.



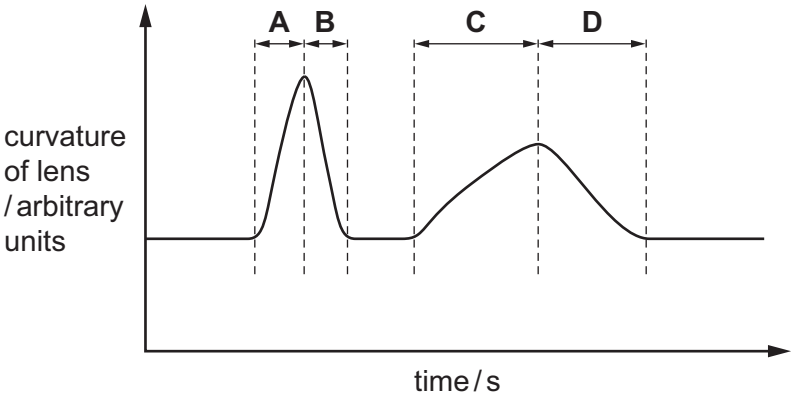
What are the numbered structures?

	1	2	3
A	cerebrum	cerebellum	pituitary gland
B	cerebrum	hypothalamus	medulla
C	cerebellum	cerebrum	pituitary gland
D	cerebellum	hypothalamus	medulla

23 The diagram shows the curvature of the lens in a person's eye.

The shape of the lens changes as the person watches two motorbikes go past at different speeds.

During which period was a motorbike moving towards the person at the higher speed?



24 Nerve impulses in neurones can travel

1 away from the central nervous system

2 towards the central nervous system

3 within the central nervous system

In which direction do impulses in sensory and relay neurones travel?

	sensory neurone	relay neurone
A	1	2
B	1	3
C	2	1
D	2	3

25 What are the effects on the body of drinking a large amount of alcohol?

	effect on brain	reaction time
A	depressed	decreases
B	depressed	increases
C	stimulated	decreases
D	stimulated	increases

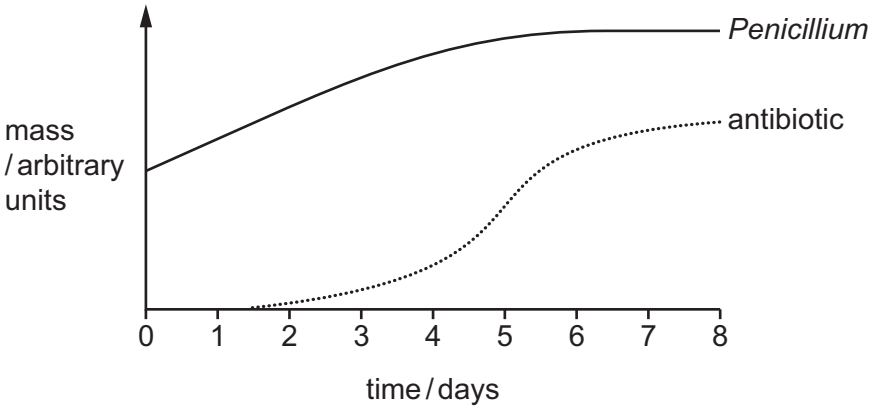
26 A new organism is discovered. It contains DNA in a cellular structure.

To which group of organisms could it belong and to which group could it **not** belong?

	could belong to	could **not** belong to
A	bacteria	fungi
B	bacteria	viruses
C	fungi	bacteria
D	viruses	bacteria

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27 The graph shows the mass of *Penicillium* grown in a fermenter and the mass of antibiotic produced.



When is the *Penicillium* producing antibiotic most rapidly?

A day 1 **B** day 3 **C** day 5 **D** day 8

28 The diagram shows a food chain.

mahogany tree → caterpillar → songbird → hawk

What is **not** recycled from the hawk to the mahogany tree?

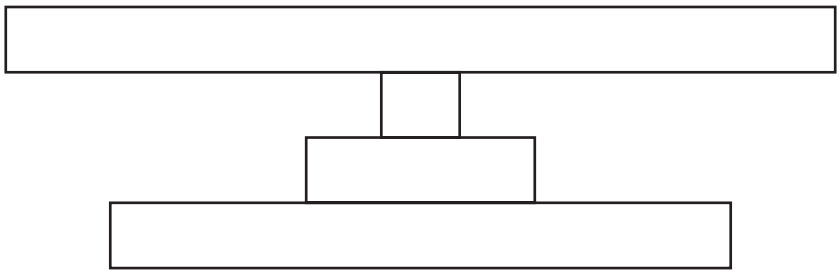
A carbon dioxide

B energy

C nitrogen atoms

D water

29 The diagram shows a pyramid of numbers.



Which food chain is represented by this pyramid of numbers?

A grass → antelope → lion → flea

B mahogany tree → caterpillar → finch → hawk

C microscopic plants → microscopic animals → small fish → shark

D pond plant → snail → large beetle → fish

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30 Which processes occur in the carbon cycle?

A assimilation, decomposition, fixation and nitrification

B combustion, decomposition, nitrification and photosynthesis

C combustion, decomposition, photosynthesis and respiration

D condensation, evaporation and precipitation

31 How many times must an uninfected mosquito feed on human blood to transmit the malarial parasite in the human population?

A only once

B at least twice

C at least three times

D more than three times

32 Which of the following, when disposed of, affects a river ecosystem for the shortest time?

A fertilisers

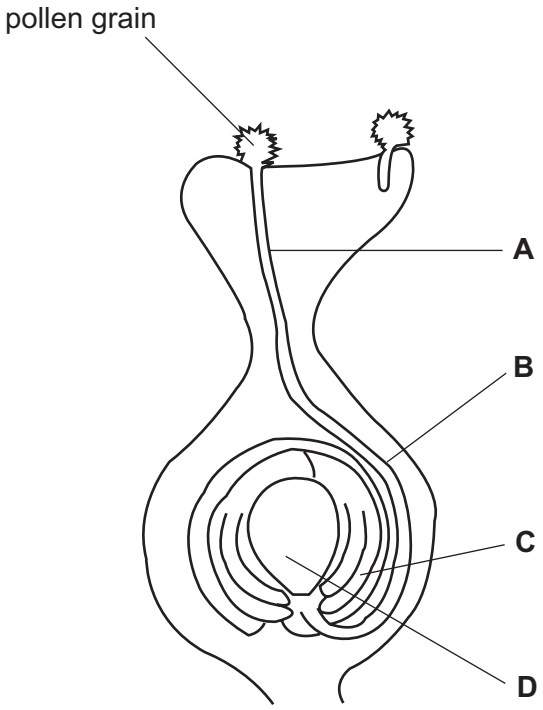
B hot water

C insecticides

D sewage

33 The diagram shows the development of a pollen tube and its entry into the ovule.

Which part develops into the testa after fertilisation?



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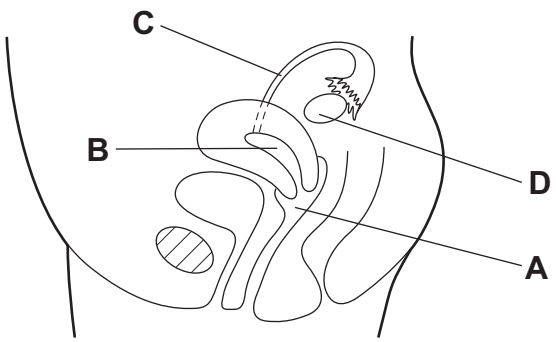
34 Small pieces of root tissue are taken from an oil palm tree and placed in a nutrient medium. Each small piece produces a new oil palm tree.

Which type of reproduction is this and how do the genotypes of the new trees compare with that of the parent tree?

	type of reproduction	genotype
A	asexual	different
B	asexual	identical
C	sexual	different
D	sexual	identical

35 The diagram shows the human female reproductive system.

At which point is a surgical method of contraception usually carried out?



36 What is an advantage of human breast milk compared with bottle milk?

A It contains antibodies from the mother.

B It contains fats that cannot be digested.

C It contains red blood cells from the mother.

D It has a higher iron content.

37 Which process is used to produce insulin commercially?

A extracting glycogen from the liver to stimulate production of insulin

B extracting insulin from the pancreas of human volunteers

C inserting a bacterial gene into a person's pancreas cells

D inserting the human insulin gene into a bacterium

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[Turn over

38 The inheritance of the ABO blood groups depends on three alleles I^A, I^B and I^O.

What are the possible genotypes for a person of blood group A?

A I^AI^A only

B I^AI^A, and I^AI^B only

C I^AI^A, and I^AI^O only

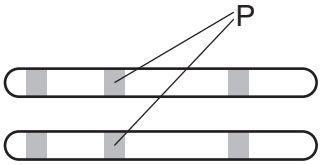
D I^AI^A, I^AI^O and I^AI^B

39 Two heterozygous individuals are crossed. Some of the offspring show the recessive characteristic.

What is the probability that one of these offspring that shows the recessive characteristic is homozygous?

A 0.00 **B** 0.25 **C** 0.50 **D** 1.00

40 The diagram shows a pair of chromosomes from the same cell.



What do the lines labelled P point to?

A the site of alleles made up of two or more genes which are always the same

B the site of alleles made up of two or more genes which might be different

C the site of genes made up of two or more alleles which are always the same

D the site of genes made up of two or more alleles which might be different

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