UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **May/June 2012**

1 hour

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

9652551610

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 **17** printed pages and **3** blank pages.

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1 Some structures found in cells are listed.

1 cell wall

2 cell membrane

3 chloroplast

4 cytoplasm

5 nucleus

Which structures are found in both animal cells and plant cells?

A 1 2 4

B 1 2 3

C 2 3 5

D 2 4 5

2 Which processes can **only** occur through a membrane?

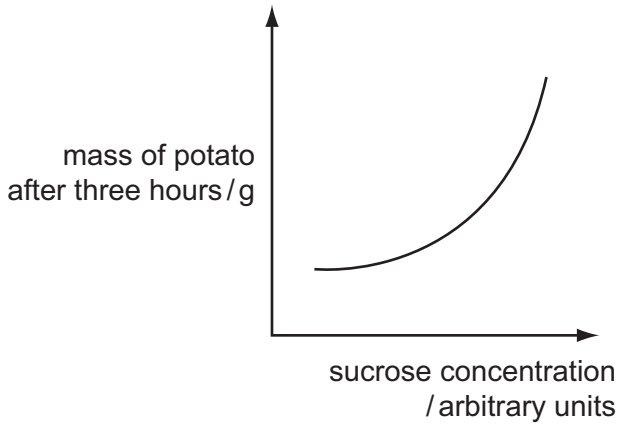
	active transport	diffusion	osmosis
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

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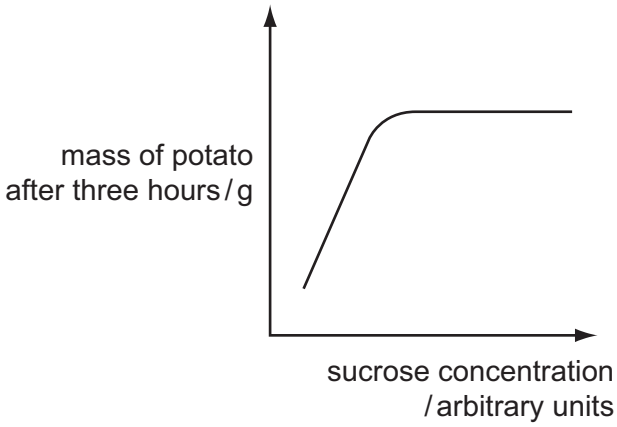
3 Identical pieces of potato are placed in sucrose solutions of different concentrations. After three hours, the mass of each potato piece is measured.

Which graph shows the results of this experiment?

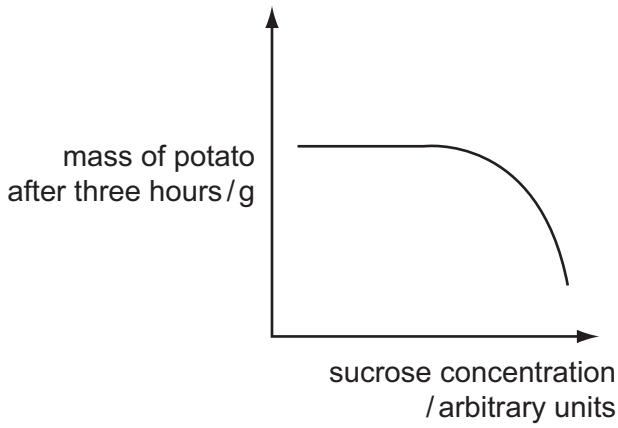
A



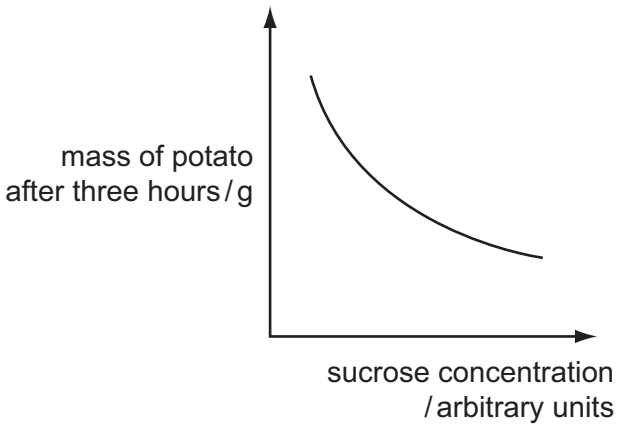
B



C



D



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'
A	amylase	maltose
B	amylase	starch
C	starch	amylase
D	starch	maltose

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5 If a condition is a limiting factor for photosynthesis, what does this mean?

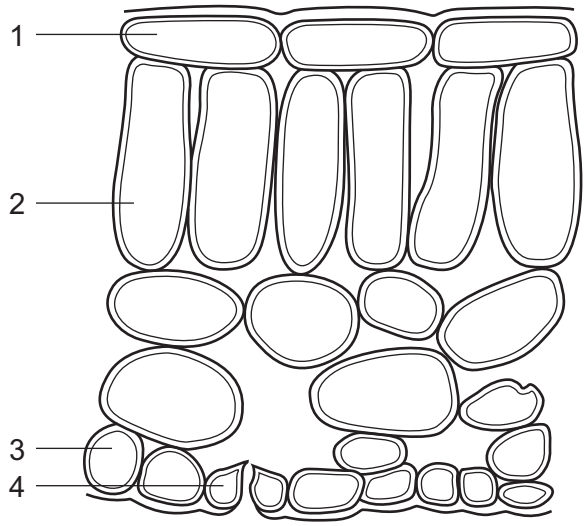
A Changing the condition may either increase or decrease the rate of photosynthesis.

B Changing the condition will only increase the rate of photosynthesis.

C Changing the condition will only decrease the rate of photosynthesis.

D Changing the condition will not affect the rate of photosynthesis.

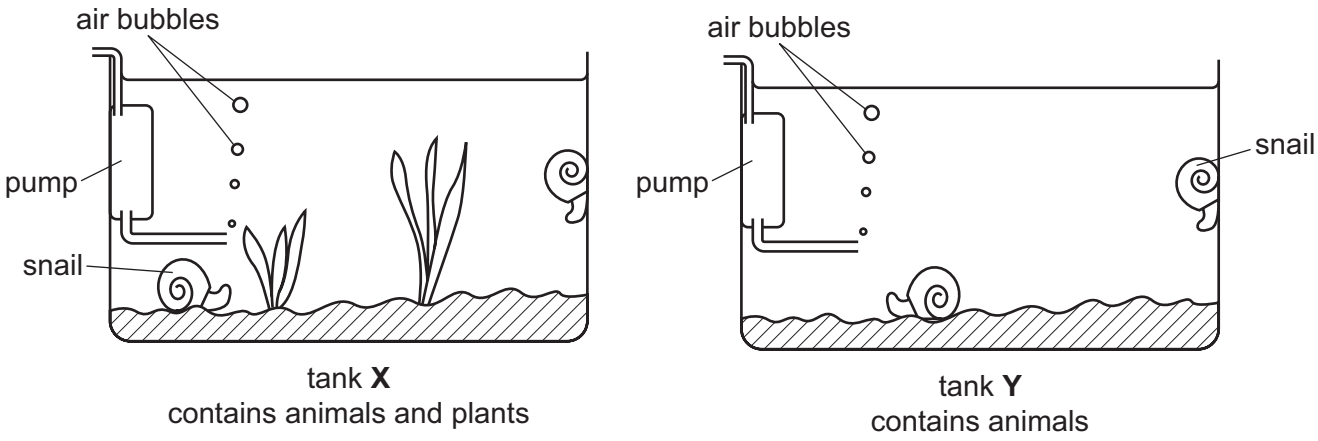
6 The diagram shows cells in a section through a leaf of a green plant.
(No cell contents are shown.)



Which cells contain chloroplasts?

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

7 Two aquarium tanks are set up as shown.



After a week, all the animals in tank **Y** show signs of distress.

This is because the animals have run out of

A carbon dioxide.

B food.

C nitrate.

D oxygen.

8 Which process is stimulated by adrenaline in the cells of the liver?

A breakdown of glycogen, increasing the blood glucose level

B breakdown of excess amino acids, forming urea

C breakdown of proteins, releasing amino acids into the blood

D conversion of excess blood glucose to glycogen

9 Which fact about proteins makes them essential components of the human diet?

A They are an energy source.

B They are used in synthesising hormones.

C They can be stored as a food reserve.

D They provide amino acids for cell growth.

10 Transpiration increases when conditions become

A less humid and less windy.

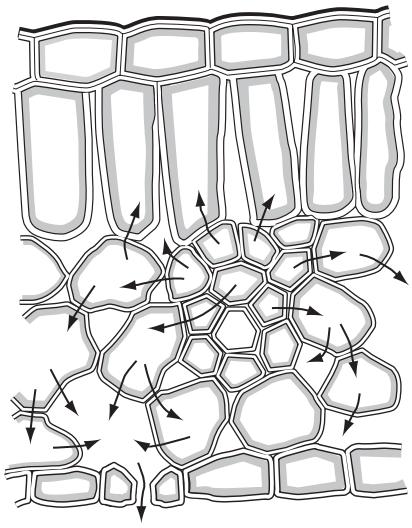
B less humid and more windy.

C more humid and less windy.

D more humid and more windy.

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11 The diagram shows a section through a green leaf.



The arrows represent the movement of

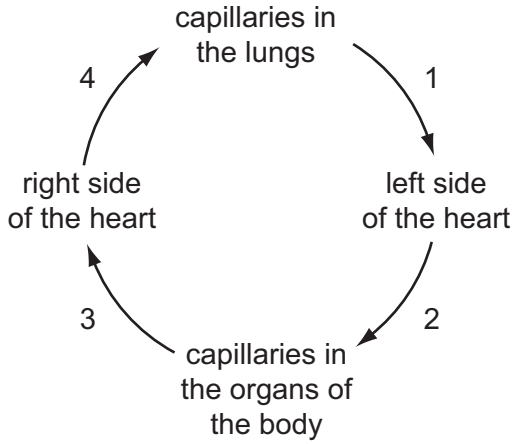
A carbon dioxide during respiration.

B oxygen during photosynthesis.

C sugars during translocation.

D water during transpiration.

12 The diagram shows the direction of blood flow in the human body.

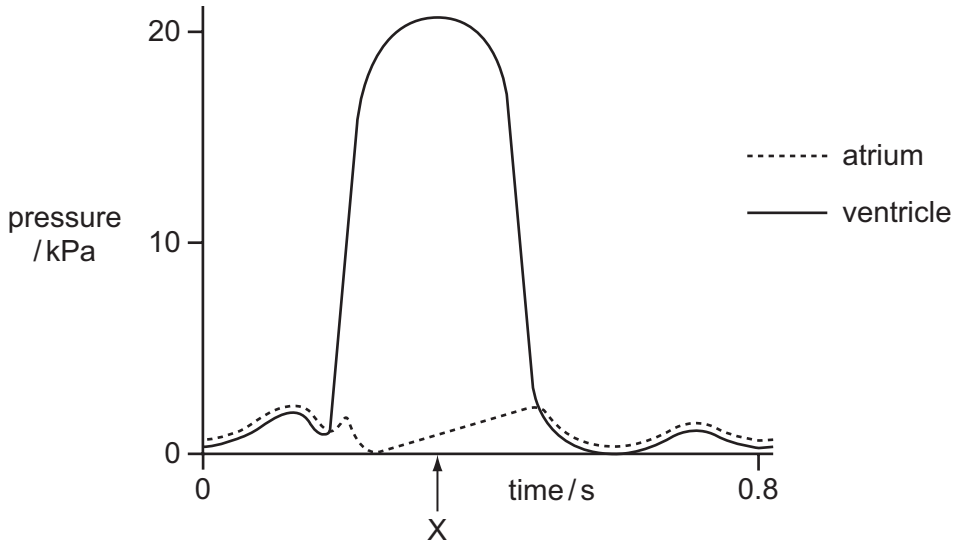


Which numbered stages have blood containing the most oxygen?

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

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13 The graph shows pressure changes in the left atrium and in the left ventricle during one heartbeat.



What is the state of the valves in the heart at time X?

	atrio-ventricular valve (bicuspid)	semi-lunar valve (in aorta)
A	closed	closed
B	closed	open
C	open	closed
D	open	open

14 What is a difference between plasma and tissue fluid?

	plasma	tissue fluid
A	less dissolved glucose	more dissolved glucose
B	dissolved glucose	no dissolved glucose
C	more protein molecules	fewer protein molecules
D	no white blood cells	white blood cells

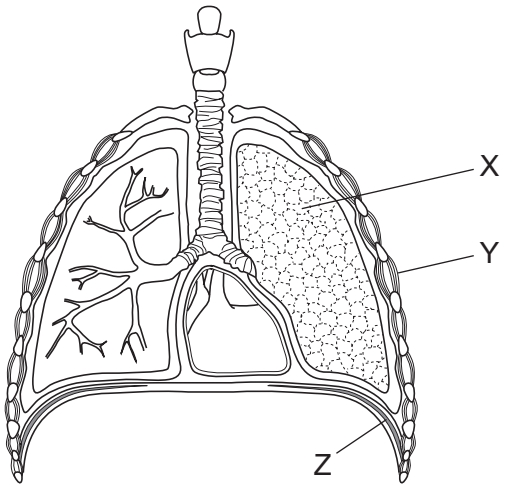
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[Turn over

15 What are the products of aerobic respiration in yeast?

	alcohol	carbon dioxide	lactic acid	water
A	✓	✗	✓	✗
B	✓	✓	✗	✓
C	✗	✓	✗	✓
D	✗	✗	✓	✓

16 The diagram represents the human respiratory system.



Which structures contain muscles that contract when breathing in?

A X only

B X and Y only

C Y and Z only

D X, Y and Z

17 Which substance builds up in a muscle as a result of anaerobic respiration?

A carbon dioxide

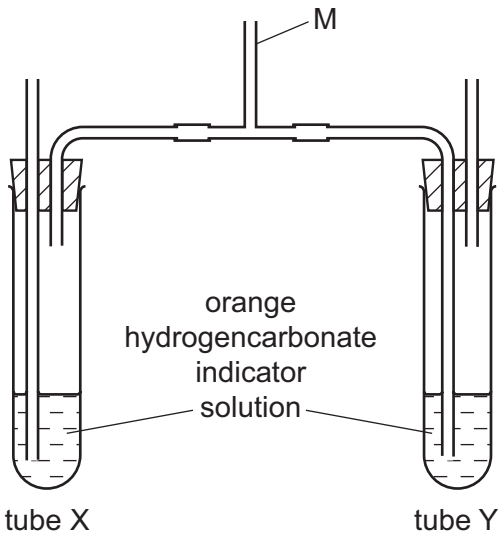
B ethanol

C lactic acid

D oxygen

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18 The diagram shows apparatus used to investigate breathing.



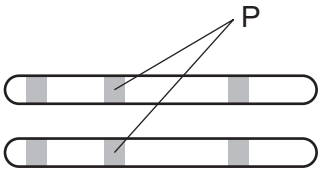
At the start, both tubes contain orange hydrogencarbonate indicator solution.

The solution is orange when atmospheric air passes through it.
The solution changes to red when air with less carbon dioxide passes through it.
The solution changes to yellow when air with more carbon dioxide passes through it.

Which changes occur to the hydrogencarbonate indicator solution in tubes X and Y when a person breathes in and out through the tube M?

	solution in tube X	solution in tube Y
A	becomes red	becomes yellow
B	becomes yellow	becomes red
C	stays orange	becomes red
D	stays orange	becomes yellow

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



What do the lines labelled P point to?

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

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

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

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

20 Which substances can be removed from the blood by kidney machines?

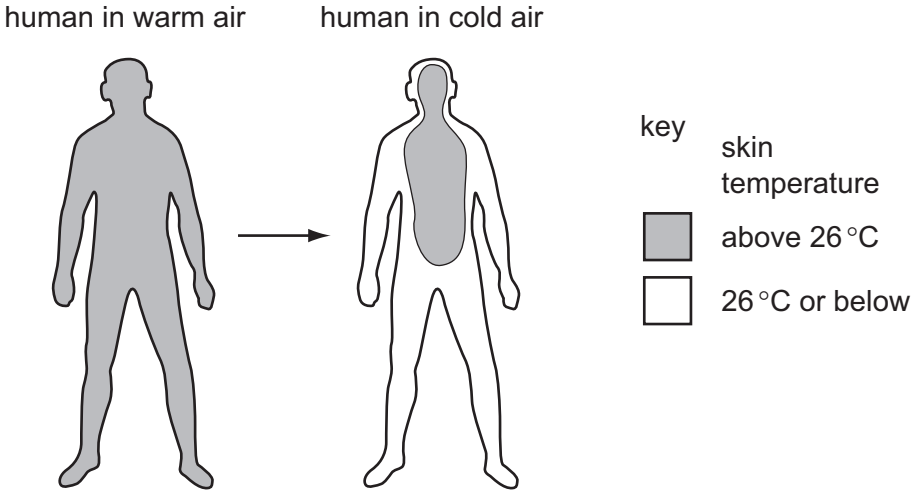
A glucose, glycogen and proteins

B glucose, proteins and urea

C glycogen, urea and some salts

D urea and some salts only

21 The diagram shows skin temperature of a human when exposed to warm air and then exposed to cold air.



What causes the observed change in skin temperature on exposure to cold air?

A less blood flowing just below the skin

B less blood going to the heart and lungs

C more blood flowing just below the skin

D more blood going to the heart and lungs

22 A child is frightened by a loud noise and shouts for help.

In which order are the different types of neurone involved in this response?

	involved first	→	involved last
A	motor neurone	relay neurone	sensory neurone
B	motor neurone	sensory neurone	relay neurone
C	sensory neurone	motor neurone	relay neurone
D	sensory neurone	relay neurone	motor neurone

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23 Which of these is a sign of diabetes mellitus?

A lack of haemoglobin

B raised blood glucose levels

C reduced urine production

D too much insulin

24 How many planes of movement are possible at the elbow and shoulder?

	elbow	shoulder
A	one	two
B	one	three
C	two	three
D	two	two

25 Which listed substances are **all** broken down by the liver?

A alcohol, drugs and progesterone

B drugs, adrenaline and urea

C oestrogen, water and drugs

D urea, alcohol and drugs

26 An ocean is polluted by an oil spill. Which is **least** likely to speed up the rate of decomposition of oil by microorganisms?

A aerobic conditions

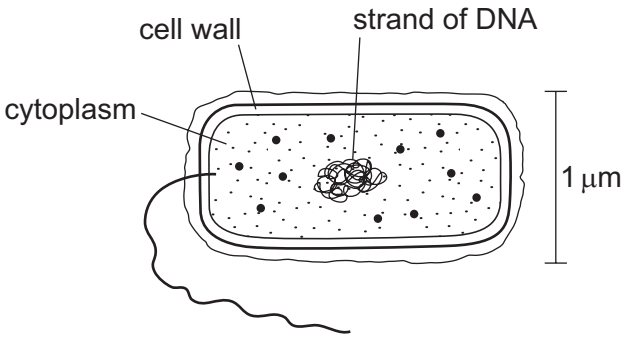
B mixing by wave action

C presence of salt water

D spraying surface of sea with hot water

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27 The diagram shows a cell.



To which group of organisms does the cell belong?

A bacteria

B fungi

C plants

D viruses

28 By which process do producers obtain energy?

A digestion

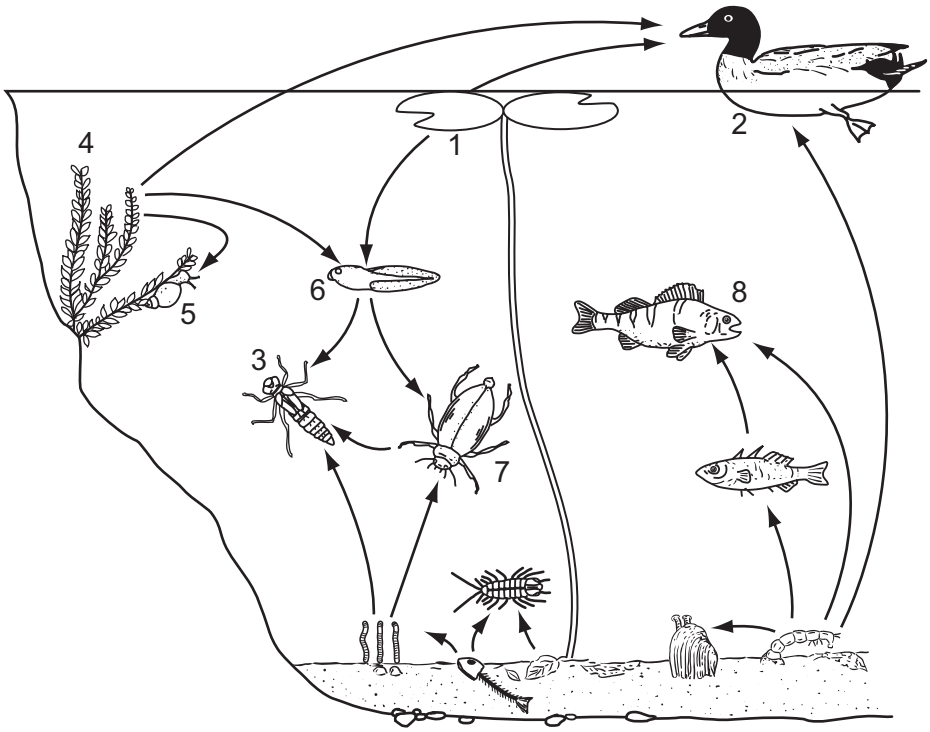
B photosynthesis

C translocation

D transpiration

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29 The diagram shows a food web in a pond.

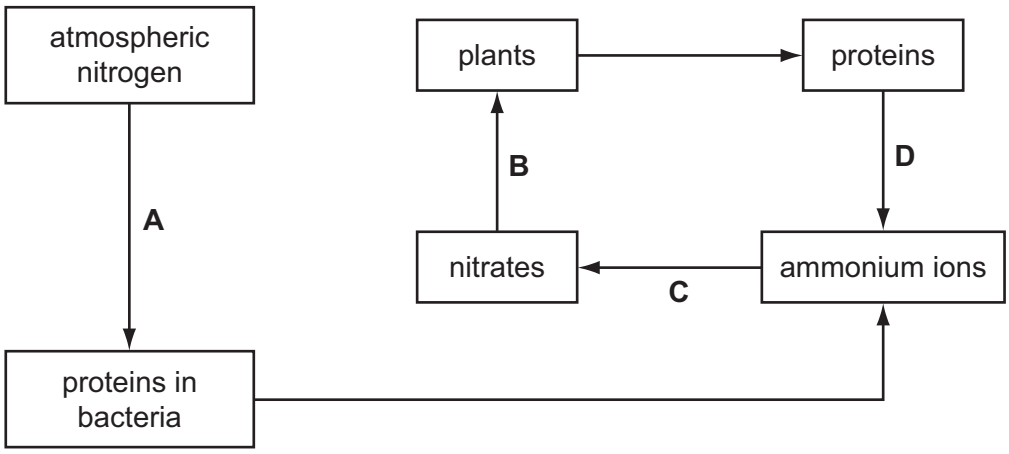


Which of the organisms is a carnivore, which is a herbivore and which is a producer?

	carnivore	herbivore	producer
A	3	8	1
B	7	6	1
C	8	3	4
D	5	2	4

30 The diagram shows part of the nitrogen cycle.

Which process is carried out by decomposing bacteria?



31 Which method of control would **not** be effective against the spread of the malarial parasite?

A drainage of swamps and marshes

B safe disposal of sewage solids

C sleeping under a mosquito net

D spraying walls of houses with insecticide

32 A farmer spread inorganic fertiliser on his fields in a valley bordering a river. During heavy rainfall the fertiliser leached into the river. Several days later the fish in the river started to die.

Which sequence of events led to the death of the fish?

	plant growth in the river	number of dead plants	number of bacteria	amount of oxygen
A	+	+	+	–
B	+	+	–	–
C	–	–	+	+
D	–	–	–	+

key

+ = increases

– = decreases

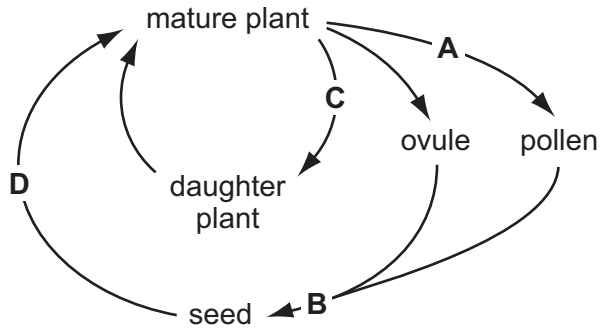
33 An insect carries pollen from one flower to another flower on the same plant.

What is the type of reproduction and what is the type of pollination in this plant?

	reproduction	type of pollination
A	asexual	cross-pollination
B	asexual	self-pollination
C	sexual	cross-pollination
D	sexual	self-pollination

34 The diagram shows the life cycle of a species of plant.

During which stage does meiosis (reduction division) occur?



35 Pregnant women are advised to eat a diet with enough protein, calcium and iron for the developing baby.

Which needs are supplied by these constituents of food for the baby's bones, growing tissues and red blood cells?

	bones	growing tissues	red blood cells
A	calcium	protein	iron
B	carbohydrate	calcium	protein
C	iron	carbohydrate	calcium
D	protein	iron	carbohydrate

36 How are sperm cells different from egg cells in size and in number?

	size of sperm cell	number of sperm cells
A	larger	fewer
B	larger	more
C	smaller	fewer
D	smaller	more

37 The grids show the alleles and offspring of four pairs of parents.

Which grid shows codominance amongst the offspring?

A

♂ \ ♀	I^A	I^O
I^A	I^AI^A	I^AI^O
I^A	I^AI^A	I^AI^O

B

♂ \ ♀	I^A	I^O
I^A	I^AI^A	I^AI^O
I^O	I^AI^O	I^OI^O

C

♂ \ ♀	I^O	I^O
I^A	I^AI^O	I^AI^O
I^B	I^BI^O	I^BI^O

D

♂ \ ♀	I^A	I^B
I^A	I^AI^A	I^AI^B
I^O	I^AI^O	I^BI^O

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38 What is the primary function of DNA?

A controls the absorption of nutrients

B controls the production of protein

C controls the rate of reproduction

D controls the rate of mutation

39 Two individuals are heterozygous for a particular gene.

Which statements about their offspring are correct?

1 Their offspring may show two phenotypes as a result of this gene.

2 Offspring with the recessive phenotype will be homozygous for this gene.

3 Their offspring have a 50 % chance of being heterozygous for this gene.

A 1, 2 and 3

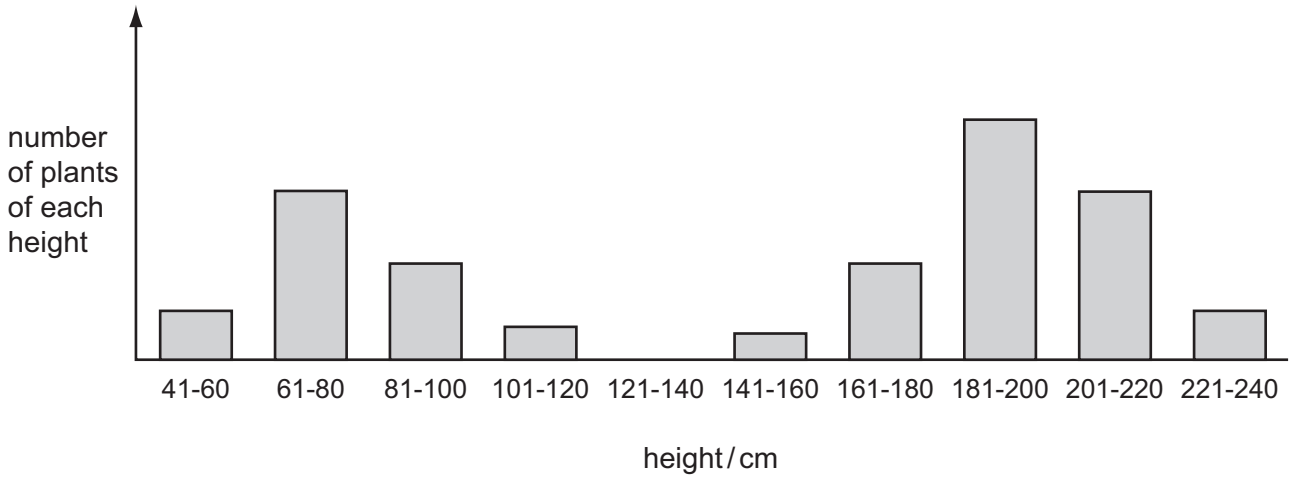
B 1 and 2 only

C 1 and 3 only

D 2 and 3 only

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40 The heights of 500 pea plants of the same age were measured to the nearest 20 cm. The results are shown in the chart below.



Variation in height of these pea plants shows

A continuous variation only.

B discontinuous variation only.

C both continuous and discontinuous variation.

D neither continuous nor discontinuous variation.

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