UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **October/November 2013**

1 hour

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

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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.
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.

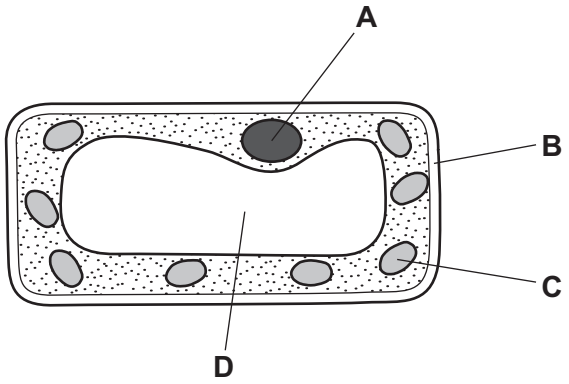
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

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

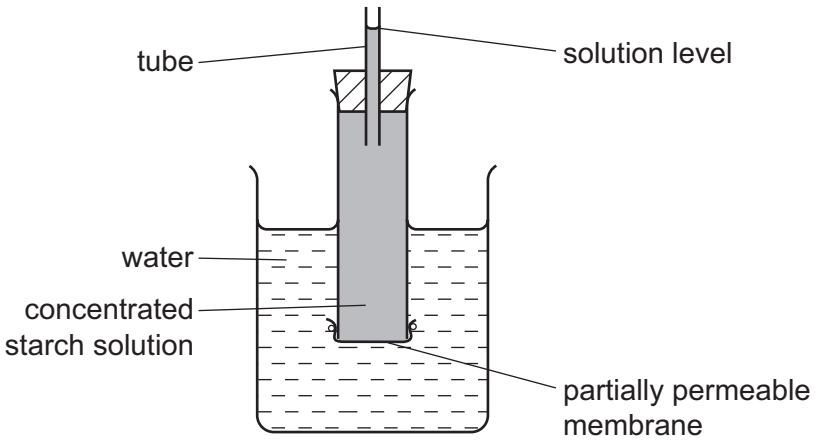
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1 A plant is grown in bright sunlight. The diagram shows what is seen when a cell from this leaf is placed under a microscope. After a few hours, a leaf from this plant is stained with iodine solution.

What will be stained blue / black?



2 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

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3 The small intestine of a person contains a lower concentration of glucose than is present in the blood.

The cells of the villi absorb glucose.

By which process is the glucose absorbed?

A by active transport against the concentration gradient

B by active transport with the concentration gradient

C by diffusion against the concentration gradient

D by diffusion with the concentration gradient

4 In an enzyme action, where is the active site and where are the lock and the key?

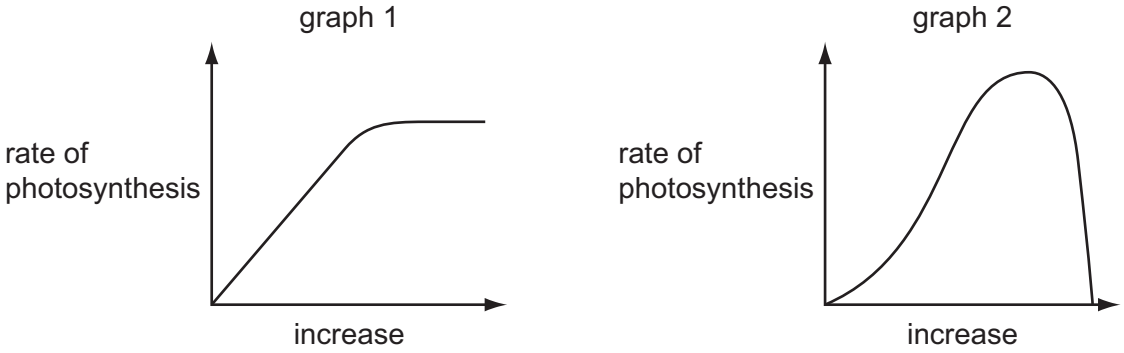
	active site	key	lock
A	on the enzyme	on the substrate	on the enzyme
B	on the enzyme	on the enzyme	on the substrate
C	on the substrate	on the enzyme	on the substrate
D	on the substrate	on the substrate	on the enzyme

5 In photosynthesis, which substances are used up, which are produced and which are necessary but remain unchanged after the reaction?

	used up	produced	remain
A	carbon dioxide	water	oxygen
B	chlorophyll	carbon dioxide	water
C	oxygen	starch	cellulose
D	water	oxygen	chlorophyll

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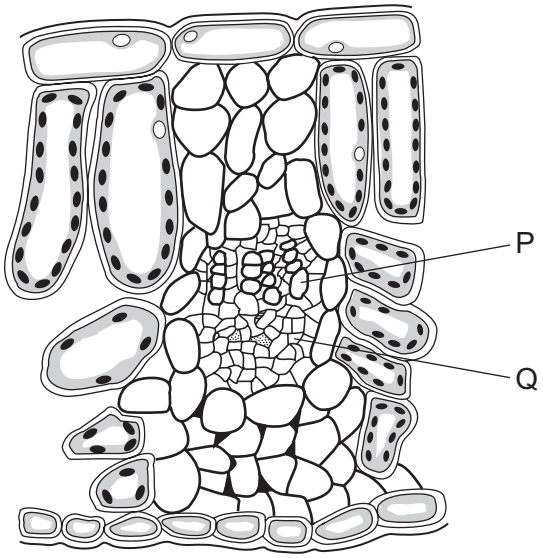
6 The graphs show how two different conditions affect the rate of photosynthesis.



Which conditions are being altered in graphs 1 and 2?

	graph 1	graph 2
A	carbon dioxide concentration	light intensity
B	carbon dioxide concentration	temperature
C	temperature	carbon dioxide
D	temperature	light intensity

7 The diagram represents a section through part of a leaf.

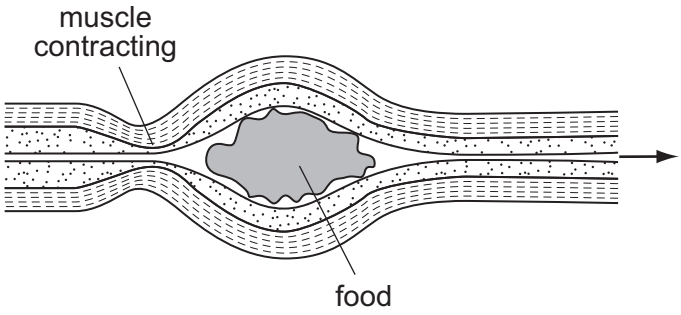


How do carbon dioxide and water enter the leaf?

	carbon dioxide	water
A	active transport	through tissue P
B	active transport	through tissue Q
C	diffusion	through tissue P
D	diffusion	through tissue Q

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8 The diagram shows some food moving through the digestive system.



Which process is shown?

A diffusion

B digestion

C ingestion

D peristalsis

9 What are the substrate and end-products of digestion by the enzyme lipase?

	substrate	end product
A	carbohydrate	glucose
B	fat	amino acid
C	fat	fatty acids and glycerol
D	protein	fatty acids and glycerol

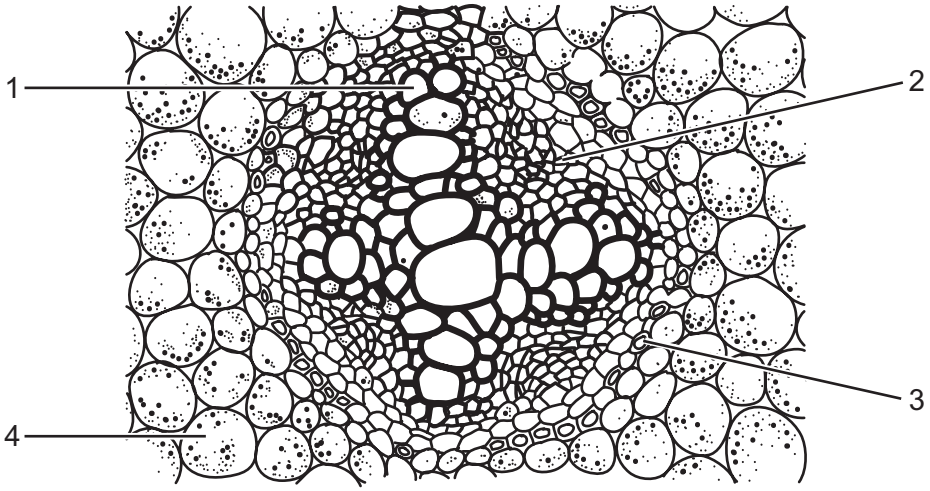
10 The products of digested food are present in the ileum.

Which substances enter a blood capillary and a lacteal in a villus?

	blood capillary	lacteal
A	amino acids and glucose	fatty acids and glycerol
B	amino acids and glycerol	fatty acids and glucose
C	fatty acids and glucose	amino acids and glycerol
D	fatty acids and glycerol	amino acids and glucose

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11 The diagram shows a transverse section of the central portion of a root in a dicotyledonous plant.



Which tissues transport amino acids and sugars?

	amino acids	sugars
A	1	3
B	2	2
C	3	4
D	4	1

12 Four similar leafy shoots are exposed to different conditions. The rates of water uptake and the rates of water loss are measured.

The results are shown in the table.

Which shoot is most likely to wilt?

	water uptake / mm^3 per min	water loss / mm^3 per min
A	14	13
B	10	12
C	5	5
D	4	2

13 What is the correct route for blood flow in a human?

A left atrium → left ventricle → lungs → right ventricle → right atrium

B left atrium → left ventricle → right ventricle → right atrium → lungs

C right atrium → right ventricle → left ventricle → left atrium → lungs

D right atrium → right ventricle → lungs → left atrium → left ventricle

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14 Which row describes the functions of the blood components?

	plasma	platelets	white blood cells
A	antibody formation	clotting	transport of nutrients
B	clotting	transport of nutrients	antibody formation
C	clotting	antibody formation	transport of nutrients
D	transport of nutrients	clotting	antibody formation

15 In the liver, which substances are present in higher concentration in the hepatic vein than in the hepatic artery?

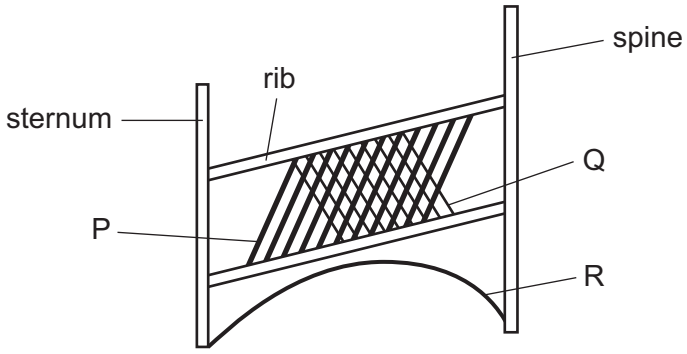
A carbon dioxide and protein

B carbon dioxide and urea

C oxygen and protein

D oxygen and urea

16 The diagram represents some of the muscles involved with breathing.



Which muscles are contracting during breathing in?

A P and Q **B** Q and R **C** P and R **D** P, Q and R

17 Which process does **not** result in an overall loss of energy from the organism?

A a boy running a hundred metres

B photosynthesis in a green plant

C respiration in an animal

D the germination of a seed of a flowering plant

18 Which substances are produced by anaerobic respiration in yeast?

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

key
✓ = produced
✗ = not produced

19 Which parts of the skin are involved in the control of body temperature?

	sweat glands	temperature receptors	blood vessels
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

20 How is the shape of the lens changed when the eye focuses on a distant object?

	ciliary muscles	suspensory ligaments	lens
A	contract	pulled tight	pulled thin
B	contract	slackened	allowed to bulge
C	relax	pulled tight	pulled thin
D	relax	slackened	allowed to bulge

21 In a kidney dialysis machine, which substance **will not** diffuse from the patient's blood into the dialysis fluid?

A protein

B salts

C urea

D water

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22 Which structure in the brain registers changes in the blood concentration?

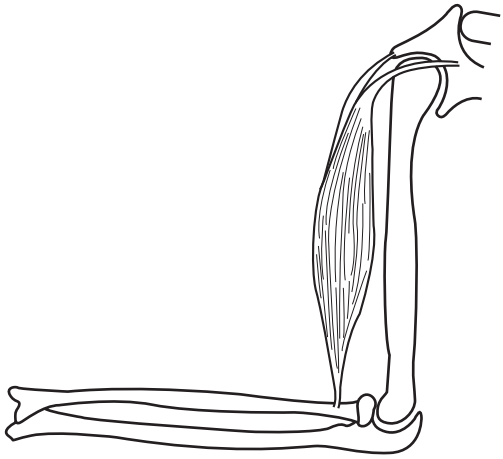
A cerebellum

B hypothalamus

C medulla

D pituitary gland

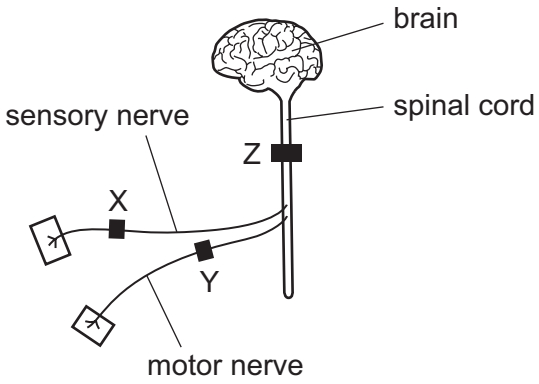
23 The diagram shows the position of a muscle in the forelimb of a human.



To which bones is the muscle attached?

	origin (bone **not** moved)	extensor or flexor
A	humerus	radius
B	radius	ulna
C	scapula	radius
D	scapula	ulna

24 A local anaesthetic is a drug used to block nerve impulses. The diagram represents part of the nervous system. X,Y, and Z show sites where the anaesthetic can be injected.



In an experiment, one person can feel a pin prick their leg but cannot move their leg.

Where was the anaesthetic injected in this person?

A at X

B at Y

C at Z

D at X and at Y

25 Chemicals in tobacco smoke lead to the breakdown of the elastic tissue in the walls of the alveoli.

What is the name of this condition?

A bronchitis

B emphysema

C lung cancer

D pneumonia

26 The table shows the characteristics of four microorganisms.

Which one could be a virus?

	contains DNA	contains one or more cells	contains one or more cell nuclei	produces spores
A	✗	✗	✗	✗
B	✓	✓	✗	✗
C	✓	✓	✓	✗
D	✓	✓	✓	✓

key
✓ = true
✗ = false

27 When cheese is being made, which organisms are used and what is their function?

	organisms	function
A	bacteria	to lower the pH
B	bacteria	to raise the pH
C	fungi	to break down milk sugar
D	fungi	to release carbon dioxide

28 Which organisms **always** obtain their energy from dead organic matter?

A consumers

B decomposers

C fungi

D producers

29 What eventually happens to all the energy in an ecosystem?

A It is lost from the system as heat.

B It is recycled by decomposers.

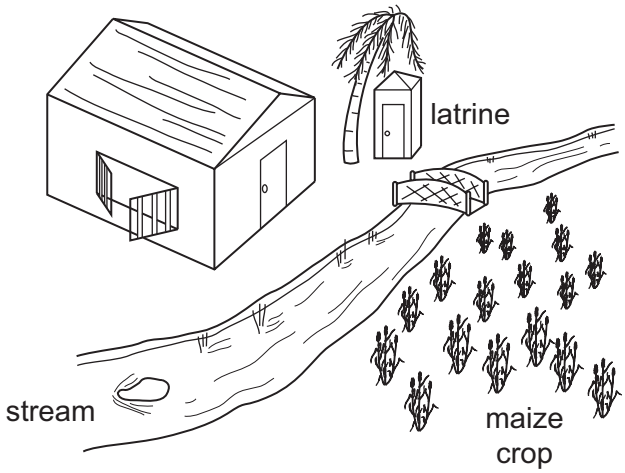
C It is used by the producers.

D It is used by the top carnivore.

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[Turn over

30 The diagram shows a building in a tropical country.



What would be the most effective way of preventing a person who sleeps in the building from catching malaria?

A Divert the stream away from the house since mosquitoes breed in water.

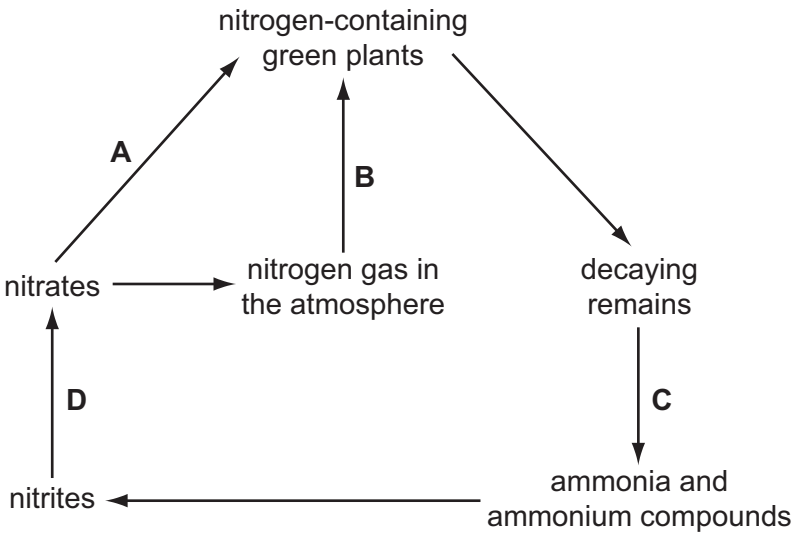
B Move the latrines further away from the building since sewage attracts mosquitoes.

C Put netting over the door and window to prevent the entry of mosquitoes.

D Spray insecticide on the maize crop to kill mosquitoes.

31 The diagram shows parts of the nitrogen cycle.

Which arrow represents the action of the root nodule bacteria of leguminous plants?



32 Which plants are most likely to adapt successfully to a climatic change in their environment?

A plants that are cross-pollinated

B plants that do not rely on wind-pollination

C plants that grow rapidly

D plants that reproduce asexually

33 What is pollination?

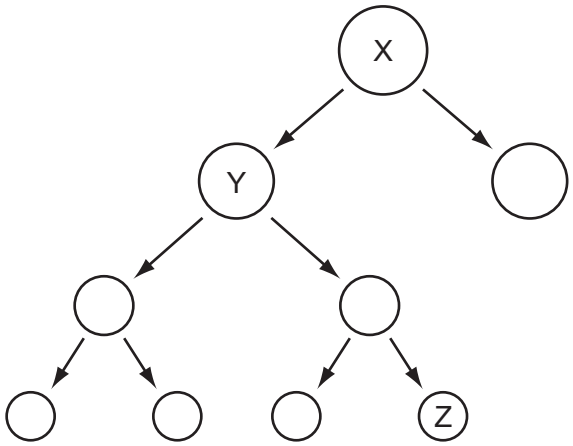
A fusion of a pollen gain with an ovule

B fusion of a pollen grain with an ovum

C transfer of pollen from an anther to a stigma

D transfer of pollen from a stigma to an anther

34 Cell X first divides by mitosis and then cell Y divides by meiosis.



How does cell Z compare to cell X?

	cell Z	
	same number of chromosomes as cell X	genetically identical to cell X
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = true

✗ = false

35 What is the result of cutting both sperm ducts in a man?

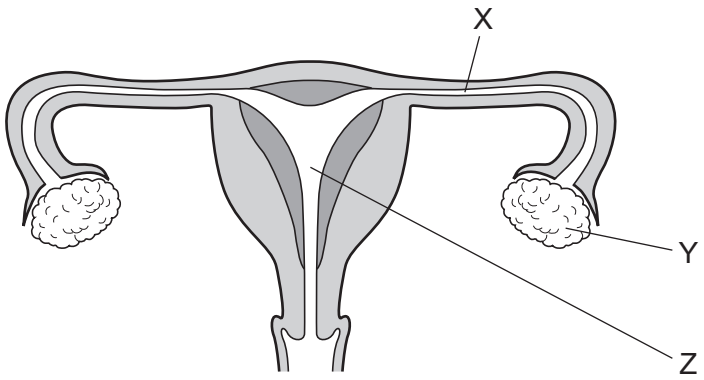
A He is unable to develop sperms.

B He is unable to pass urine.

C Male sex hormones no longer circulate in his blood.

D Sperm are not emitted from the urethra.

36 The diagram shows a section through the female reproductive system.



During pregnancy, where does mitosis occur in the cells of the embryo?

	X	Y	Z
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✗	✓

key

✓ = takes place

✗ = does not take place

37 Two parents both have blood group A. Their first child has blood group O.

What is the probability that their second child will also have blood group O?

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

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38 The table shows the genotypes and phenotypes for hair colour for the members of a family, but **one** phenotype is shown incorrectly.

	genotype		phenotype
family member	allele 1	allele 2	hair colour
mother	a	A	brown
father	A	A	brown
son 1	a	A	blonde
daughter 1	a	a	blonde
son 2	A	A	brown
daughter 2	A	a	brown

Which family member has the **incorrect** phenotype?

A daughter 1

B daughter 2

C son 1

D son 2

39 A gene is a unit of inheritance that controls the production of

A a chromosome.

B an allele.

C a protein.

D DNA.

40 What is a result of natural selection?

A dogs that are friendly to humans

B grapes that contain no seeds

C mosquitoes that are resistant to insecticides

D onion crops that have a pleasant taste

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