Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **May/June 2016**

1 hour

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

* 5 0 0 0 7 4 3 7 6 4 *

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 organelles are found in both animal and plant cells?

1 cell membrane

2 cell wall

3 nucleus

4 sap vacuole

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

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

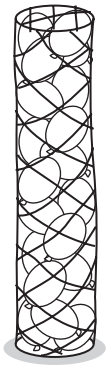
	active transport	diffusion	osmosis
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

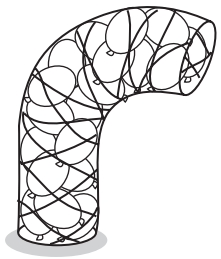
✓ = yes

✗ = no

3 The diagrams show a cylindrical net packed with rubber balloons full of air. The structure is used by a teacher to explain wilting.



all the balloons fully inflated



the same number of balloons with some of the air let out

What is represented by the parts of the structure shown?

	air	balloons	net	rubber
A	cells	cell sap	cell walls	epidermis
B	cell sap	cells	epidermis	cell walls
C	cell walls	epidermis	cell sap	cells
D	epidermis	cell walls	cells	cell sap

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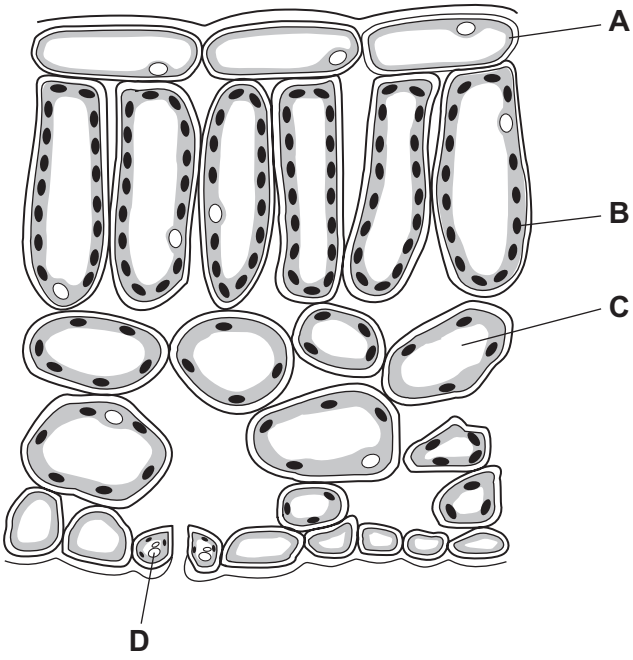
4 Amylase solution is tested with Benedict's solution, biuret solution and iodine solution.

Which colours are obtained?

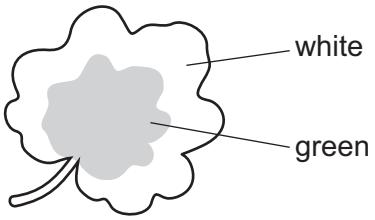
	Benedict's solution	biuret solution	iodine solution
A	blue	blue	blue-black
B	blue	blue	brown
C	blue	purple	brown
D	red	purple	blue-black

5 The diagram shows a magnified cross-section of part of a leaf.

Where does photosynthesis take place?

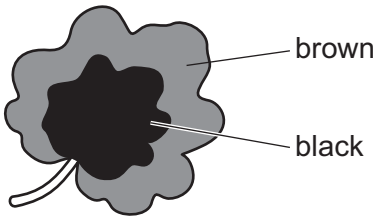


6 A leaf was picked from a plant that had been in sunlight for eight hours.

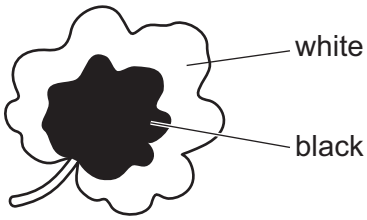


What does this leaf look like after it is tested with iodine solution?

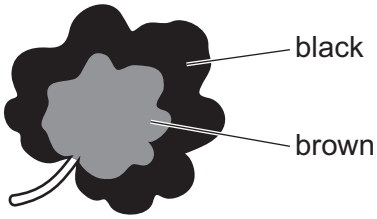
A



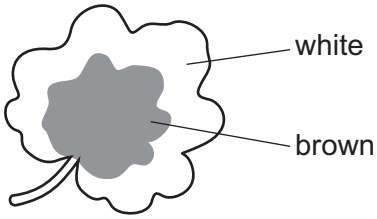
B



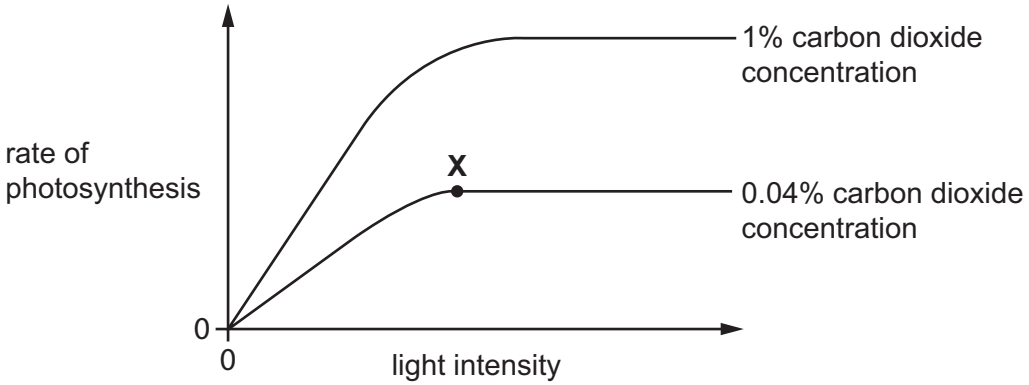
C



D



7 The graph shows how the rate of photosynthesis of a plant varies with light intensity at two different carbon dioxide concentrations. The temperature is kept constant at 20 °C.



Which factor is limiting the rate of photosynthesis at point **X**?

A availability of chlorophyll

B availability of water

C concentration of carbon dioxide

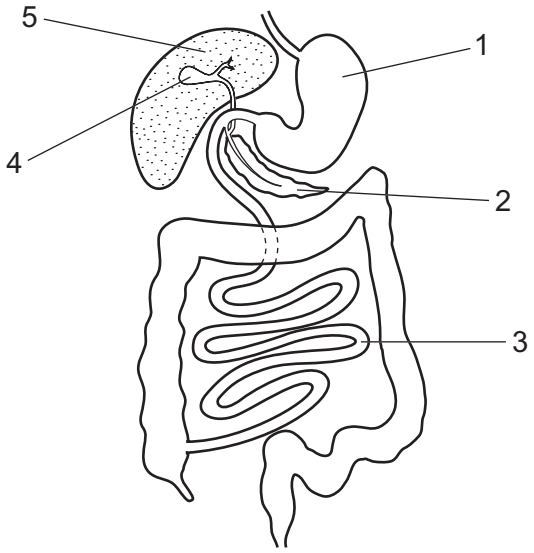
D intensity of light

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8 What is correct for the formation of urea?

	formed from	formed in
A	amino acids	kidney
B	amino acids	liver
C	carbohydrate	kidney
D	carbohydrate	liver

9 The diagram shows part of the alimentary canal and associated organs.



Which row correctly describes the functions of parts shown in the diagram?

	structure	function	structure	function
A	1	digestion of protein	3	absorption of the products of digestion
B	2	emulsifying fats	3	absorption of amino acids and glucose
C	4	production of bile	5	making digestive enzymes
D	4	storing digestive enzymes	2	making digestive enzymes

10 Which two foods would provide the best sources of carbohydrates, calcium, fibre (roughage) and vitamin C?

A fish and eggs

B green beans and cereal

C meat and milk

D yoghurt and cheese

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11 What shows how the rate of transpiration changes when conditions in the atmosphere change?

	reduced wind	increased humidity
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

12 What is the main cause of water moving up to the leaves in xylem vessels?

A active transport

B evaporation from the epidermis of the leaf

C evaporation from the walls of the mesophyll cells

D use of water in photosynthesis

13 Some factors associated with coronary heart disease are listed.

1 high blood pressure

2 high intake of fruit and vegetables

3 high intake of saturated fats

4 low blood cholesterol

5 low intake of processed foods

Which factors **decrease** the risk of coronary heart disease?

A 1, 2 and 3 **B** 1, 3 and 5 **C** 2, 3 and 4 **D** 2, 4 and 5

14 Which statements about arteries are correct?

1 All arteries carry oxygenated blood.

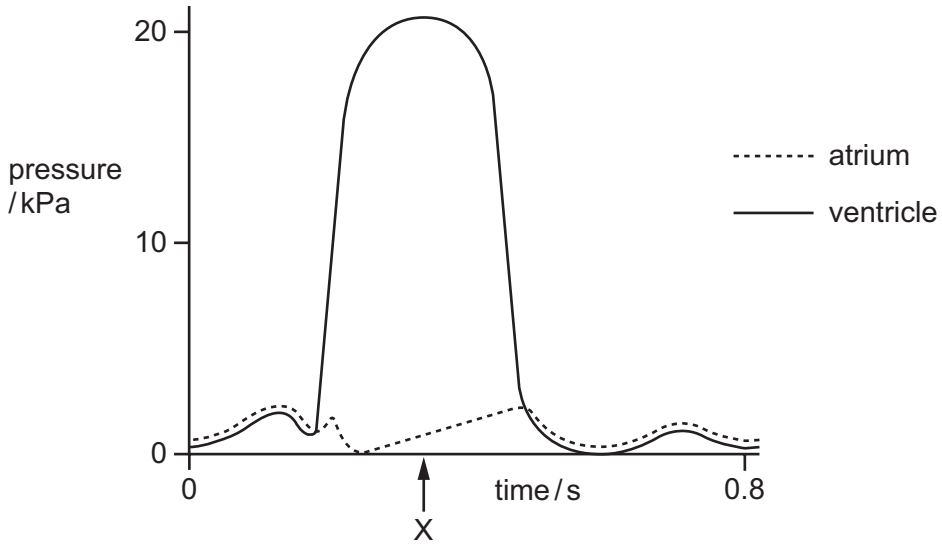
2 Arteries carry blood at high pressure.

3 All arteries carry blood away from the heart.

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

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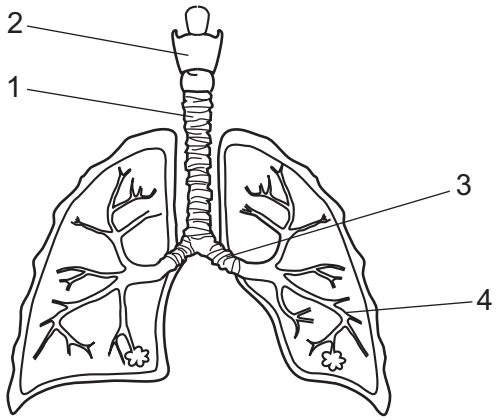
15 The graph shows pressure changes in the left atrium and in the left ventricle during one heartbeat.



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

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

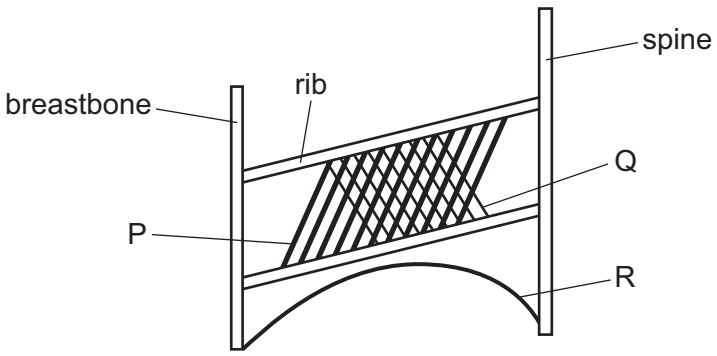
16 The diagram shows part of the human gas exchange system.



What are the labelled structures?

	larynx	trachea	bronchus	bronchiole
A	1	2	3	4
B	2	1	3	4
C	1	2	4	3
D	2	1	4	3

17 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

18 Which of these processes rely on respiration?

1 movement of water into cells

2 muscle contraction

3 protein synthesis

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

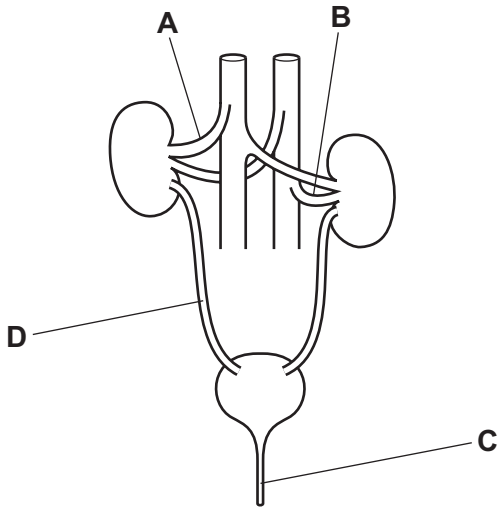
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19 How do the biceps and triceps muscles cause movement at the elbow joint?

	biceps		triceps	
	action	effect	action	effect
A	contracts	arm bends up	contracts	arm straightens
B	contracts	arm straightens	contracts	arm bends up
C	relaxes	arm bends up	relaxes	arm straightens
D	relaxes	arm straightens	relaxes	arm bends up

20 The diagram shows the human urinary system.

Which labelled structure is the ureter?



21 Which process is **not** a result of negative feedback?

A A decrease in the surrounding temperature leads to a decrease in respiration rate.

B A decrease in the surrounding temperature leads to a decrease in sweating.

C A decrease in the surrounding temperature leads to a decrease in blood flow through the skin surface.

D A decrease in the surrounding temperature leads to shivering.

22 What is an example of a reflex arc?

A retina → motor neurone → relay neurone → sensory neurone → iris muscle

B retina → motor neurone → sensory neurone → relay neurone → iris muscle

C retina → sensory neurone → motor neurone → relay neurone → iris muscle

D retina → sensory neurone → relay neurone → motor neurone → iris muscle

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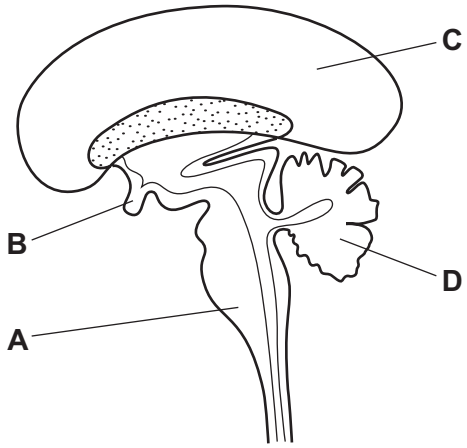
[Turn over

23 What is a role of adrenaline, and where is it destroyed in the body?

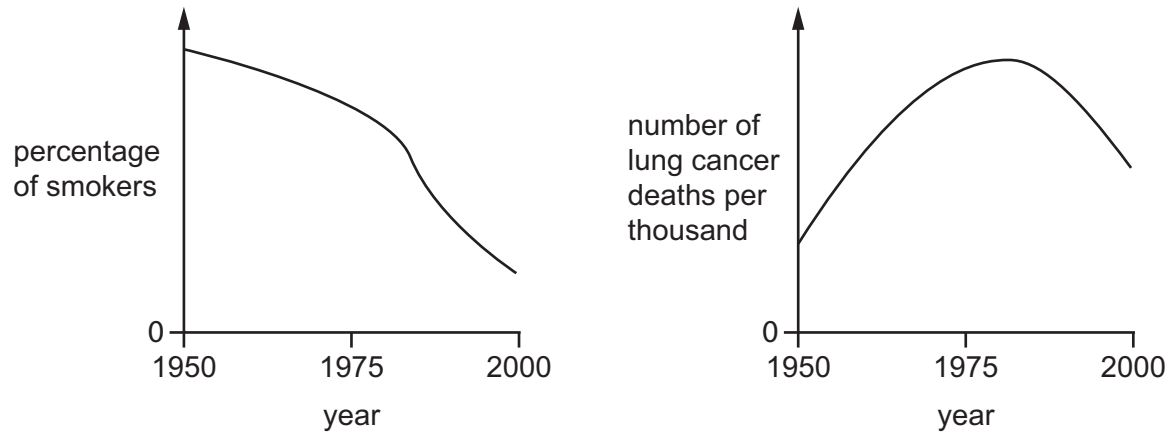
	role of adrenaline	destroyed by
A	glycerol changed to glucose	kidney
B	glycerol changed to glucose	liver
C	glycogen changed to glucose	kidney
D	glycogen changed to glucose	liver

24 The diagram shows a vertical section through the human brain.

Which structure controls balance and muscular coordination?



25 The graphs show changes in the percentage of smokers and number of lung cancer deaths in a country between 1950 and 2000.



What could have caused the change in the number of deaths from lung cancer between 1950 and 1975?

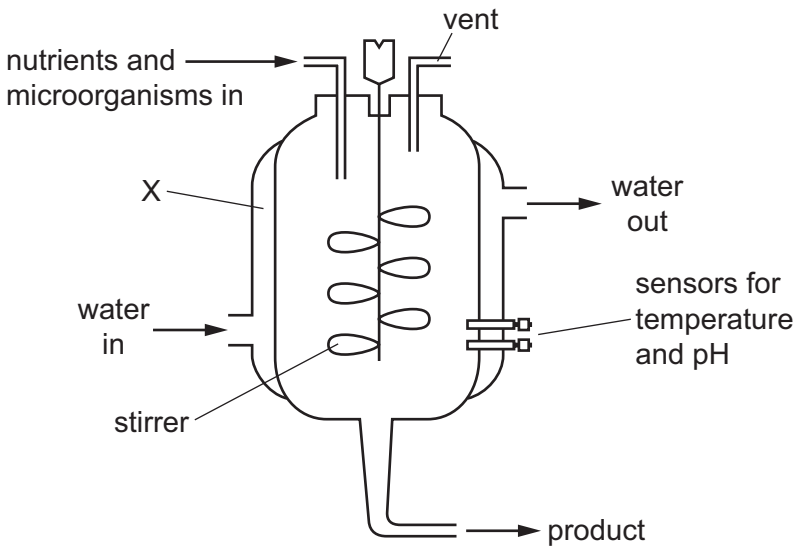
A higher percentage of smokers after 1950

B higher percentage of smokers before 1950

C lower percentage of smokers after 1950

D lower percentage of smokers before 1950

26 The diagram shows the equipment used in the industrial production of penicillin.



What is the purpose of the structure labelled X?

A to insulate the fermentation vessel

B to maintain the pressure of the fermentation vessel

C to monitor the temperature of the fermentation vessel

D to remove the heat produced by the fermentation process

27 During the production of alcohol, why must air be kept out of the fermenter?

A to allow production of carbon dioxide

B to inhibit the growth of yeast

C to prevent aerobic respiration

D to prevent anaerobic respiration

28 A farmer is growing wheat in a field. The farmer uses insecticides to kill insect pests and chemicals to kill weeds in the field.

Which statements about this field are correct?

1 Both the wheat and the weeds are producers.

2 Insects feed at the first trophic level.

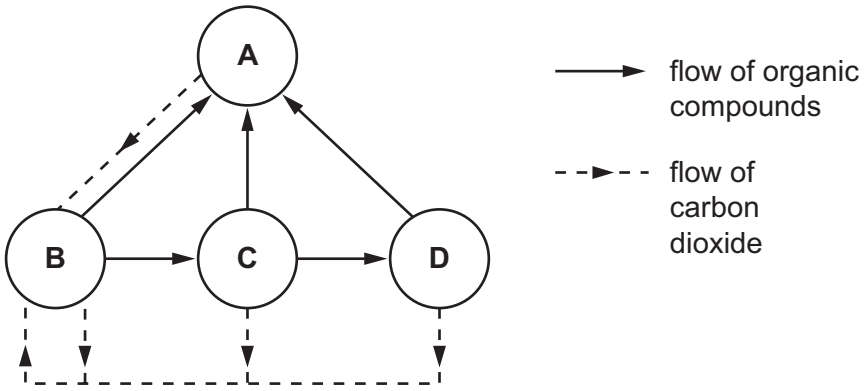
3 Weeds may use light, water and mineral ions that the wheat plants need.

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

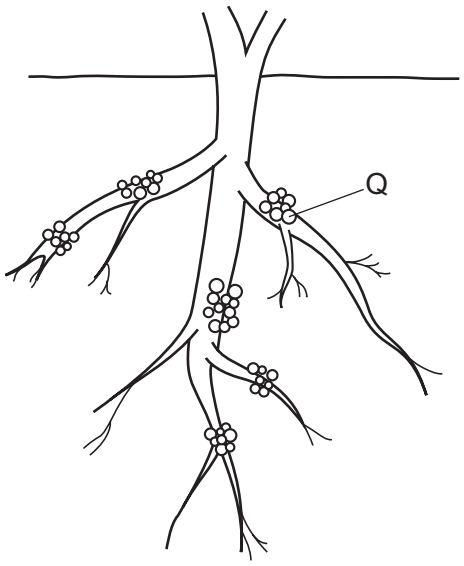
29 The diagram shows the flow of substances within an ecosystem.

The circles represent trophic levels.

Which circle represents herbivores?



30 The diagram shows some structures, Q, on the roots of a bean plant.



Which chemical change fixes nitrogen in these structures?

A ammonium salts to nitrates

B nitrogen to ammonium salts

C proteins to amino acids

D proteins to ammonium salts

31 How is malaria normally transmitted from person to person?

A airborne droplets

B contaminated needles

C infected mosquitoes

D sexual intercourse

32 Which greenhouse gas is released from factory chimneys and by herbivores?

A carbon dioxide

B nitrogen

C nitrogen dioxide

D sulfur dioxide

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[Turn over

33 Which process in a developing seedling needs light energy?

A breakdown of food reserves

B respiration

C synthesis of organic material

D uptake of salts and water

34 A number of new plants are growing from pieces of a plant that have become detached and have rooted in soil.

Which statement is correct about these new plants when they mature?

A The fruit they produce will all ripen at the same time.

B They will all grow to the same size.

C They will all have the same colour flowers.

D They will all produce the same number of fruit.

35 Where does the placenta allow the exchange of materials to take place between mother and fetus?

A oviduct wall

B umbilical cord

C uterus wall

D vagina wall

36 Compared with the few days before ovulation, which hormone is released in increased quantities three days **after** ovulation?

A FSH

B LH

C oestrogen

D progesterone

37 Which statements describe an allele?

	an alternative form of a gene	copied during cell division	part of a DNA molecule
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = yes

✗ = no

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38 Which statements about genetic engineering to produce human insulin are correct?

1 The human insulin gene is cut out of human DNA.

2 The insulin gene is inserted into bacterial DNA.

3 The genetically engineered bacteria are cultured in large numbers.

4 These cultured bacteria are used in injections for diabetics.

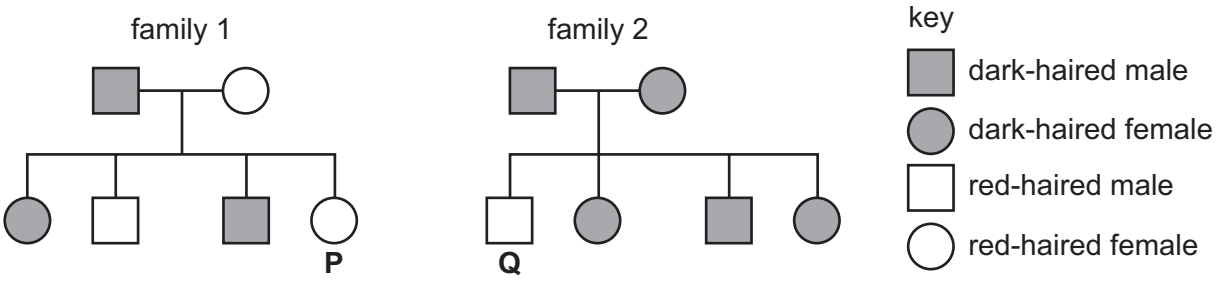
A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 2 and 4 only

D 2, 3 and 4 only

39 The diagram shows the pattern of inheritance of dark hair and red hair in two families.



If individuals **P** and **Q** have children together, which prediction can be made about the hair colour of these children?

A All the children will have dark hair.

B All the children will have red hair.

C Half the children will have dark hair.

D Three-quarters of the children will have dark hair.

40 Which statement is evidence that genes are copied and passed on to the next generation?

A Asexual reproduction produces genetically identical offspring.

B Different alleles of a gene can produce variation in phenotype.

C Each species of a plant or animal has a fixed number of chromosomes.

D Sexual reproduction produces genetically different offspring.

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