

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY

5090/01

Paper 1 Multiple Choice

October/November 2004

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.

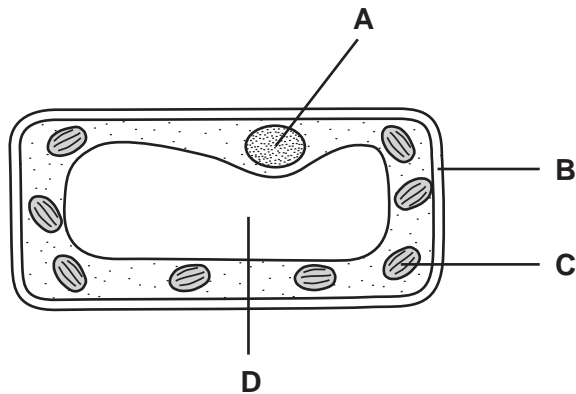
Any rough working should be done in this booklet.

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



- 1 A plant is grown in bright sunshine. After a few hours, a leaf is stained with iodine solution. The diagram shows what is seen when the leaf is placed under a microscope.

Which structure will be stained blue/black?



- 2 The small intestine contains a low concentration of glucose produced from the digestion of starch.

Glucose is taken up by the cells of the villi.

How does the glucose move?

- 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
- 3 A human red blood cell is placed in a strong salt solution.

In which direction does water move and what is the effect on the cell?

	movement of water	effect on cell
A	into the cell	slight increase in size
B	into the cell	cell bursts
C	out of the cell	slight decrease in size
D	out of the cell	no change in cell volume

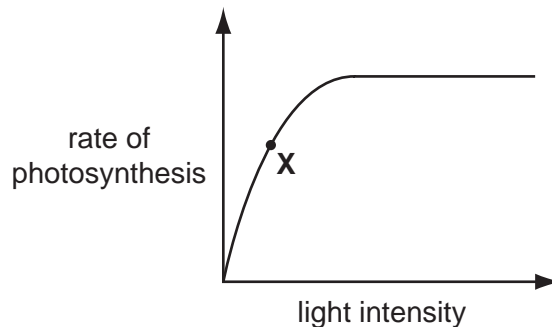
- 4 According to the lock and key hypothesis, which is the lock and which is the key for the enzyme lipase?

	key	lock
A	fatty acids	lipids
B	lipase	lipids
C	lipase	fatty acids
D	lipids	lipase

- 5 What is the function of chlorophyll?

- A** to convert light energy to chemical energy
- B** to release energy from carbohydrates
- C** to store magnesium ions
- D** to store raw materials for photosynthesis

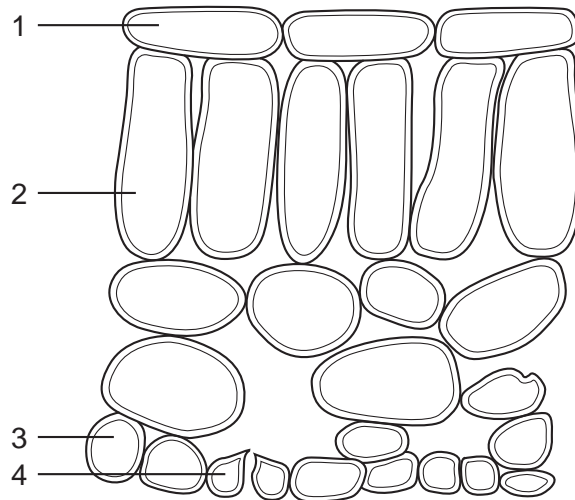
- 6 The graph shows the results of an experiment measuring the rate of photosynthesis in a pond plant at differing light intensities.



At point **X** on the graph, what is the limiting factor in this experiment?

- A** carbon dioxide
- B** light intensity
- C** temperature
- D** water

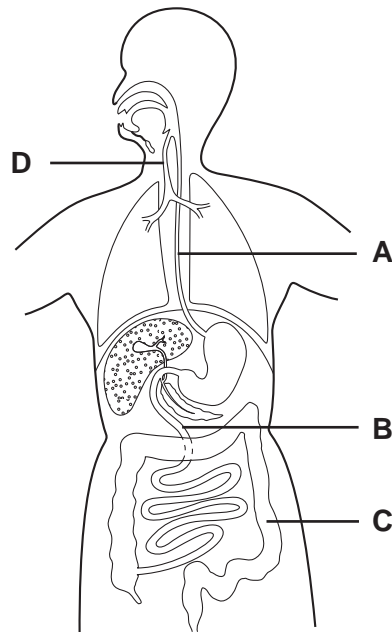
- 7 The diagram shows the arrangement of cells inside the leaf of a green plant. (No cell contents are shown.)



Which cells normally contain chloroplasts?

- A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4
- 8 The diagram shows some organs of the human body.

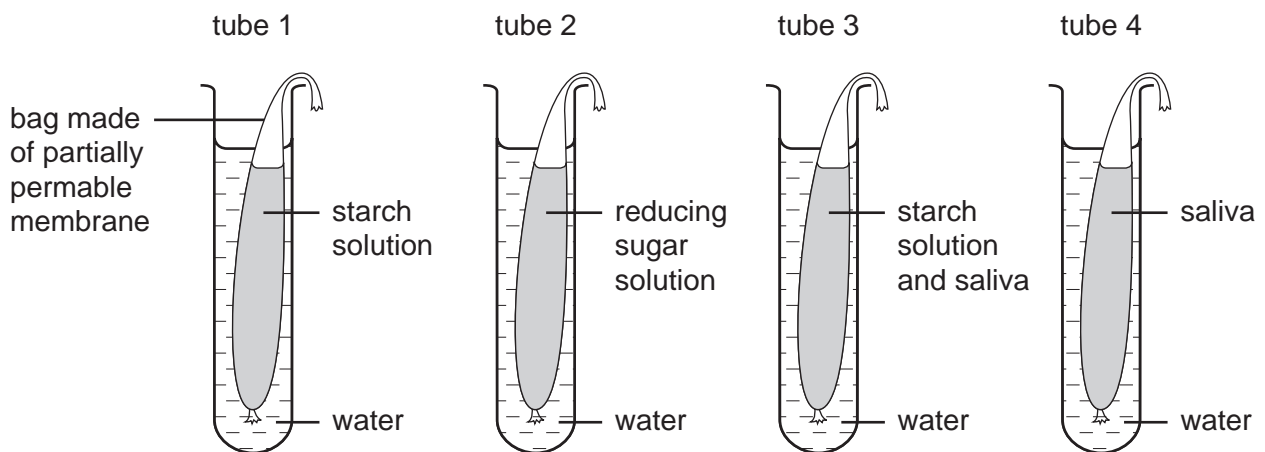
Which structure does **not** move its contents by peristalsis?



9 Which element in the molecule of urea shows that it is formed from amino acids and not from glucose?

- A carbon
- B hydrogen
- C nitrogen
- D oxygen

10 Four bags made of partially permeable membrane are placed in tubes as shown in the diagram.

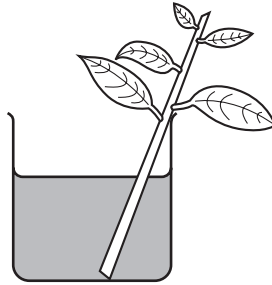


After 20 minutes at 35 °C a sample of water from each tube, outside the bag, is boiled with Benedict's solution.

What are the results?

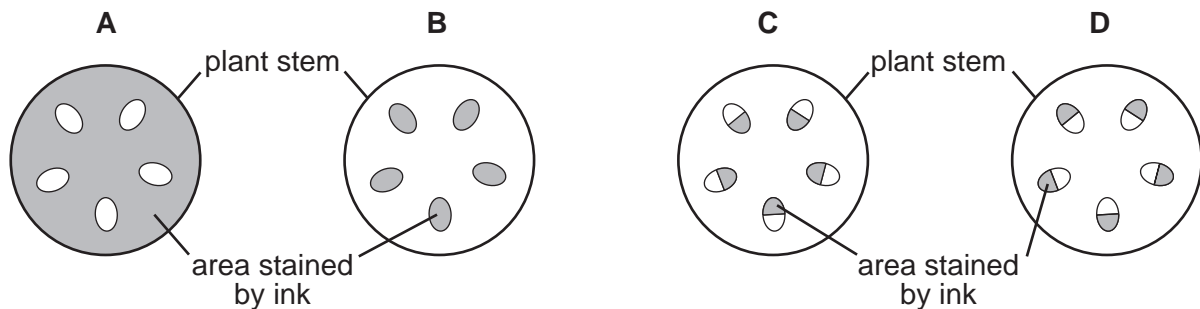
	tube 1	tube 2	tube 3	tube 4
A	blue	orange	blue	orange
B	blue	orange	orange	blue
C	orange	blue	orange	blue
D	orange	orange	blue	orange

11 A plant shoot is left in ink solution for several hours.



A section is cut through the stem.

What would you see?



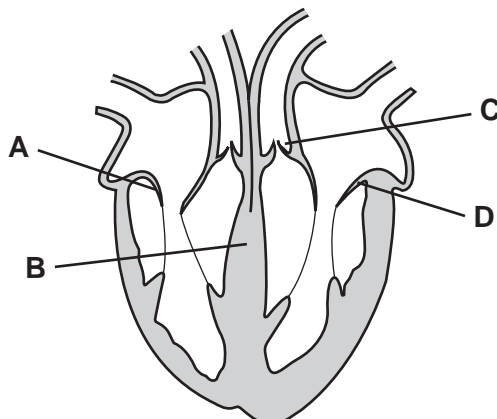
12 A plant is exposed to different temperatures and humidities.

Which set of conditions cause the plant to lose most water?

	temperature / °C	humidity / %
A	15	30
B	15	60
C	25	30
D	25	60

13 The diagram shows a vertical section through the human heart.

Which structure separates oxygenated blood from deoxygenated blood?



14 The coronary arteries carry blood to the

- A brain tissue.
- B heart muscle.
- C liver cells.
- D walls of alveolus.

15 What is the shortest route that can be taken by the blood travelling from a leg to an arm in the human body?

- A leg → heart → lungs → heart → arm
- B leg → heart → lungs → liver → arm
- C leg → liver → heart → lungs → arm
- D leg → liver → stomach → heart → arm

16 Which changes occur when a person breathes in deeply?

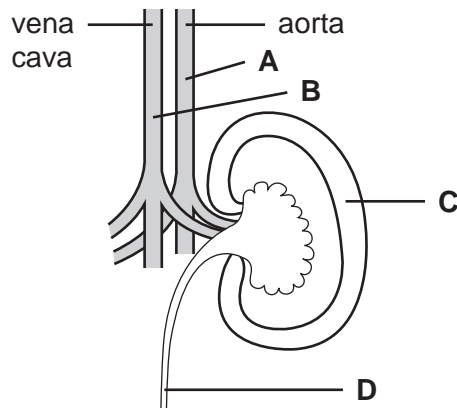
	diaphragm muscle	external intercostal muscles
A	contracts	contract
B	contracts	no change
C	relaxes	contract
D	relaxes	relax

17 When yeast cells respire anaerobically, what substance is used and what substances are produced?

	substance used	substances produced
A	alcohol	carbon dioxide and water
B	alcohol	lactic acid and water
C	sugar	alcohol and carbon dioxide
D	sugar	carbon dioxide and water

18 The diagram shows part of the human urinary system.

Where is urea **most** concentrated?



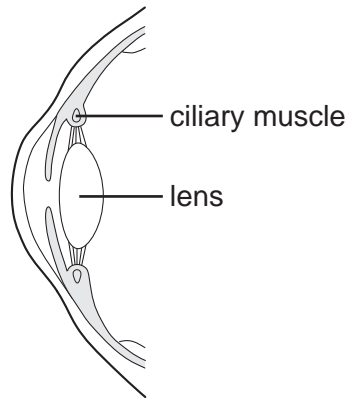
19 What is an example of excretion?

- A release of adrenalin from the adrenal glands
- B release of sweat from the sweat glands
- C removal of carbon dioxide from the lungs
- D removal of faeces from the alimentary canal

20 On a hot day how would these skin structures respond to help maintain a constant body temperature?

	sweat gland	surface blood vessels
A	decreased sweat production	contract
B	decreased sweat production	dilate (get wider)
C	increased sweat production	contract
D	increased sweat production	dilate (get wider)

21 The diagram shows the front part of an eye.



Which changes take place in the eye when a person looks up from reading a book to view a distant object?

	ciliary muscle	lens
A	contracts	becomes thicker
B	contracts	becomes thinner
C	relaxes	becomes thicker
D	relaxes	becomes thinner

22 A finger that touches a hot object is quickly taken away from the source of heat.

What is the role of relay neurones in this response?

- A** to carry nerve impulses within the spinal cord
- B** to generate impulses in the receptors of the finger
- C** to link the sense organs to the sensory neurones
- D** to pass nerve impulses out to the neurones

23 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** heart disease
- D** lung cancer

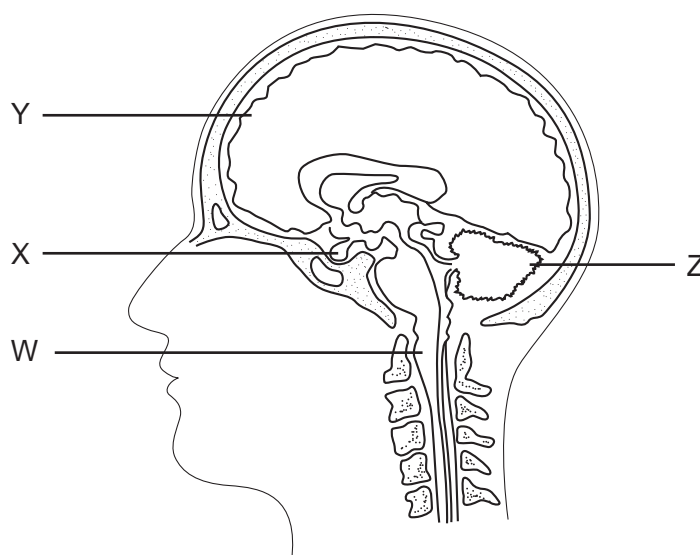
24 Which condition can be treated with antibiotics?

- A AIDS
- B constipation
- C diabetes mellitus
- D syphilis

25 Which two bones form a ball and socket joint?

- A humerus and ulna
- B radius and scapula
- C radius and ulna
- D scapula and humerus

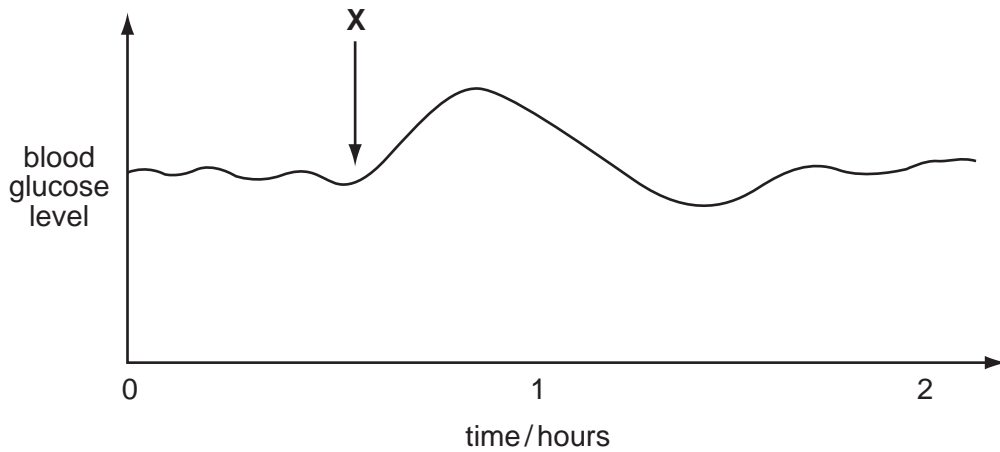
26 The diagram shows a section through the head showing the brain and part of the spinal cord.



Which structures carry out the functions below?

	conscious thought and memory	control of balance and posture
A	X	W
B	W	X
C	Y	Z
D	Z	Y

27 The graph shows changes in the glucose concentration in the blood of a person during two hours.



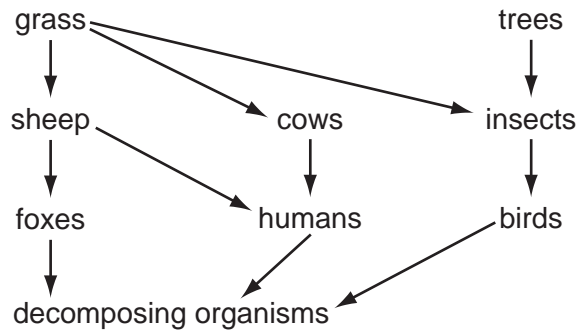
What explains the shape of the graph after **X**?

- A** The person has eaten a sugary sweet meal.
- B** The person has had an insulin injection.
- C** The person is suffering from diabetes mellitus.
- D** The person starts some hard physical exercise.

28 What do microorganisms make and release during the manufacture of bread and cheese?

	bread	cheese
A	acid	acid
B	acid	alcohol
C	alcohol	acid
D	alcohol	alcohol

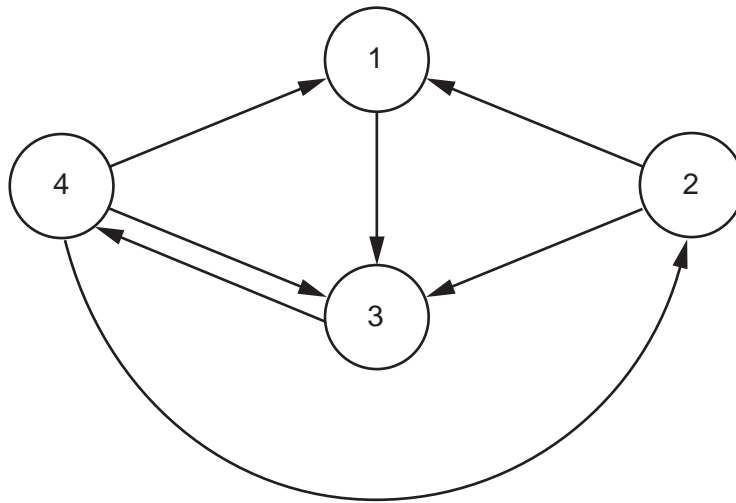
29 The diagram shows part of a food web.



What is the source of energy that enters this food web?

- A decomposing organisms
- B heat
- C oxygen
- D sunlight

30 In the diagram, arrows represent the movements of carbon compounds in the carbon cycle. The circles represent carbon compounds in animals, decomposers, plants and the atmosphere.



What is represented by each circle?

	1	2	3	4
A	animals	decomposers	plants	atmosphere
B	atmosphere	plants	decomposers	animals
C	decomposers	animals	atmosphere	plants
D	plants	atmosphere	animals	decomposers

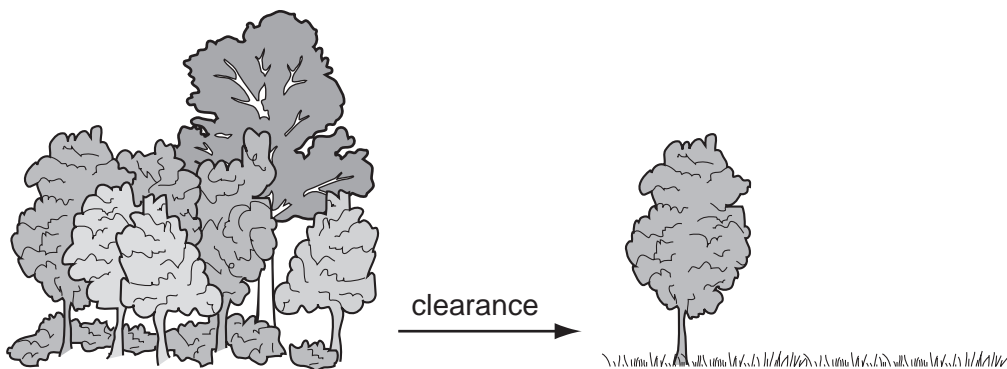
31 Which control measure would **not** prevent the spread of malaria?

- A boiling drinking water
- B covering windows with netting
- C draining swamps
- D spraying insecticides onto stagnant water

32 Which statement is true of asexual reproduction in plants?

- A Insects are needed to transfer pollen.
- B New plants grow from seeds.
- C Offspring are genetically identical to their parents.
- D Two types of gamete are involved.

33 The diagram shows a tropical forest before and after clearing for agricultural use.



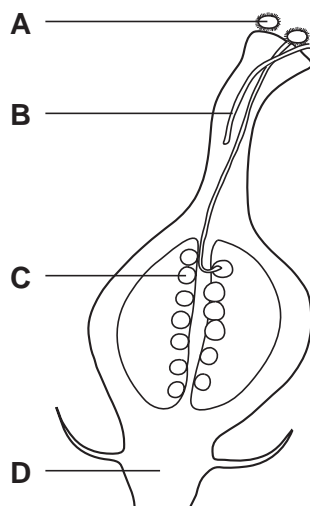
Which of the effects of deforestation causes soil erosion?

- A Less photosynthesis occurs.
- B Rainfall is reduced.
- C Roots of trees die.
- D Salt concentration in the soil decreases.

- 34 New plants may be grown from groups of cells that are taken from other plants.

The diagram shows part of a plant, **X**.

From which structure will cell samples grow into new plants that are genetically identical to plant **X**?

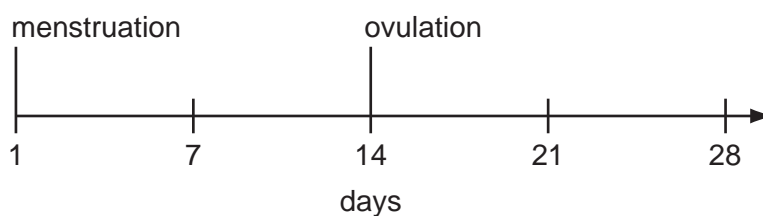


- 35 Chimpanzees have 48 chromosomes in each normal body cell.

How many chromosomes does a chimpanzee gamete contain?

- A** 23 **B** 24 **C** 46 **D** 48

- 36 The diagram shows a 28 day menstrual cycle.



During which days would a woman be most and least fertile?

	most fertile	least fertile
A	1–7	14–21
B	7–14	21–28
C	14–21	1–7
D	21–28	7–14

- 37 Pure breeding pea plants with green pods are crossed with pure breeding pea plants with yellow pods.

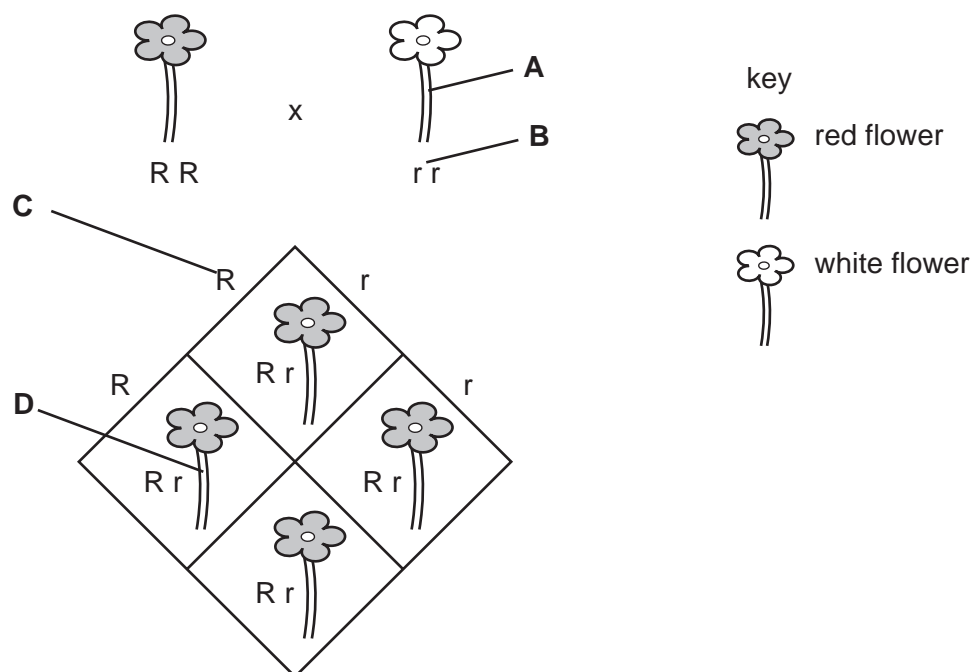
All the F1 generation have green pods. Plants from the F1 generation are allowed to be interbred.

What colour are pods of the F2 generation?

- A all green
 B all yellow
 C 1 green : 1 yellow
 D 3 green : 1 yellow
- 38 What causes sickle cell anaemia?
- A a change in the structure of a gene
 B an iron-deficient diet
 C infection following a bite from a mosquito
 D loss of blood following an accident

- 39 The diagram shows a simple genetic cross between a red flower and a white flower.

Which represents the dominant phenotype?



40 The genotype for the height of an organism is written as Tt.

What conclusion may be drawn?

- A The allele for height has at least two different genes.
- B There are at least two different alleles for the gene for height.
- C There are two different genes for height, each having a single allele.
- D There is one allele for height with two different forms.