Anglo-Chinese School (Independent)

YEAR 4 INTEGRATED PROGRAMME / SBGE / ACS

TERM 2 COMMON TEST

BIOLOGY

Paper 1 Multiple Choice — 21 April 2023

Section A — 1 Hour 45 Minutes

Additional materials: Multiple Choice Answer Sheet

INSTRUCTIONS TO CANDIDATES

Write and shade your index number on the Multiple-Choice Answer Sheet in the spaces provided.
Do not open this examination paper until instructed to do so.

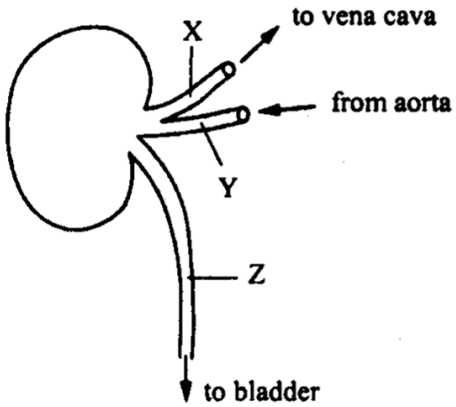
There are **thirty** questions on this question paper. Answer **all** questions. For each question, there are four possible answers, **A**, **B**, **C**, and **D**.
Choose the **one** you consider correct and record your answer in **soft pencil** on the Multiple-Choice Answer Sheet provided.

Read the instructions on the Multiple-Choice Answer Sheet very carefully.

Each correct answer will score one mark. No marks will be deducted for a wrong answer.
Any rough working should be done in the question booklet.
Electronic calculators may be used.

Section A: Multiple-Choice Questions

1 The diagram shows the kidney and three tubes associated with it.



Where will urea be found?

A X, Y and Z

B X and Y

C Y and Z

D Z only

2 About 170 litres of fluid are filtered by the kidneys every day. Only 1.5 litres are excreted in urine. What happens to the remaining 168.5 litres?

A it becomes tissue fluid

B it is stored in the bladder

C it is reabsorbed into the blood

D it is lost as sweat

3 Which of the following, when present in urine, shows that a person is diabetic?

A glucose

B proteins

C urea

D water

4 What is the function of the cornified layer of the epidermis of human skin?

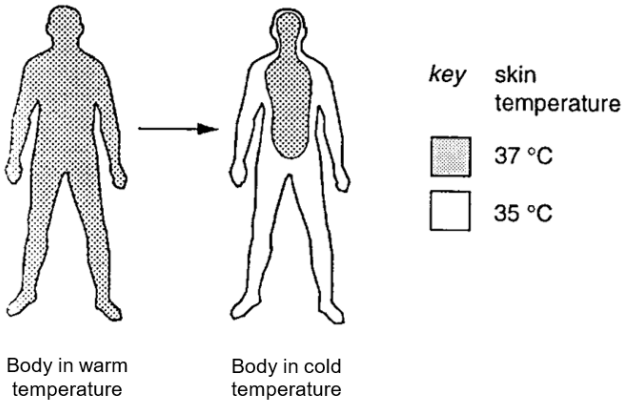
A temperature regulation through sweating

B perception of sensations of temperature, pain, and pressure

C synthesis of vitamin D

D prevention of uncontrolled water loss by evaporation

5 The diagrams show skin temperature in a human body when it is exposed to warm air and then exposed to cold air.



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

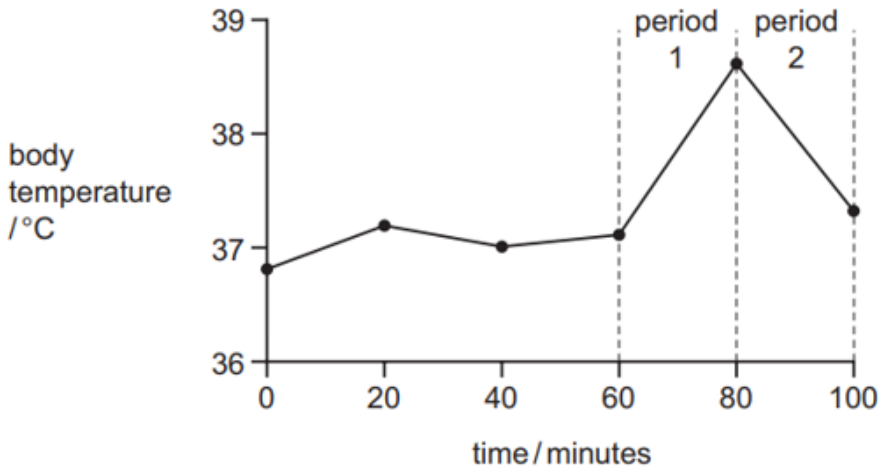
A less blood flowing just below the skin

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

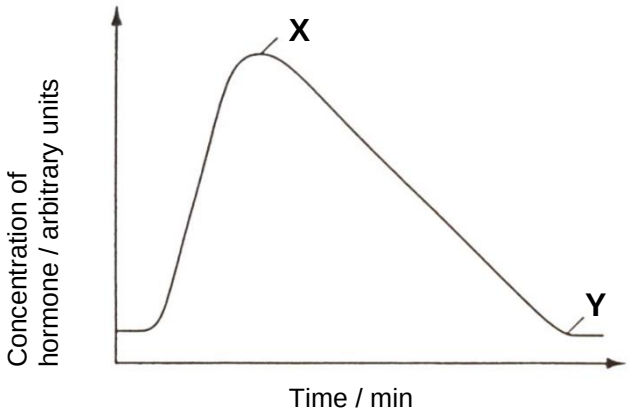
6 The graph shows changes in a person's body temperature plotted against time.



What could cause the changes in body temperature in periods 1 and 2?

	period 1	period 2
A	reduced air temperature	increased air temperature
B	reduced air temperature	shivering
C	vigorous exercise	increased sweating
D	vigorous exercise	shivering

7 The graph below shows the changes in the concentration of a hormone in the blood of a person.



Which statement explains the change in the hormone concentration between the points X and Y?

A the hormone is being broken down by the liver

B the hormone is being excreted by the kidneys

C the hormone is being returned to the glands

D the hormone is being used up the skeletal muscles

8 How does injection of insulin into diabetics lead to a lowering of blood glucose concentration?

A by decreasing the permeability of cells to glucose

B by increasing the excretion of glucose

C by promoting the formation of hormone glucagon

D by promoting the synthesis of polysaccharides

9 Adrenaline not only functions as a hormone in our body but can also be administered as a drug in life-saving situations. Under which condition(s) would the administration of adrenaline be useful?

1 low blood glucose concentration

2 low heart rate

3 low water potential of blood

A 3 only

B 1 and 2 only

C 2 and 3 only

D 1, 2 and 3

10 In which of the following do hormones travel around the body?

A in blood plasma

B in blood platelets

C in red blood cells

D in white blood cells

11 In order to measure the reaction time of a volunteer, the distance a ruler falls before it is caught by his hand is recorded.

Which of the following correctly describes the path taken by the nerve impulses from his eyes to the muscles of his hand?

A retina → optic nerve → spinal nerve → brain → spinal cord

B retina → optic nerve → brain → spinal cord → spinal nerve

C optic nerve → retina → spinal cord → brain → spinal nerve

D optic nerve → retina → brain → spinal nerve → spinal cord

12 What coordinates a reflex action that requires a response from several parts of the body?

A receptors

B endocrine glands

C muscles

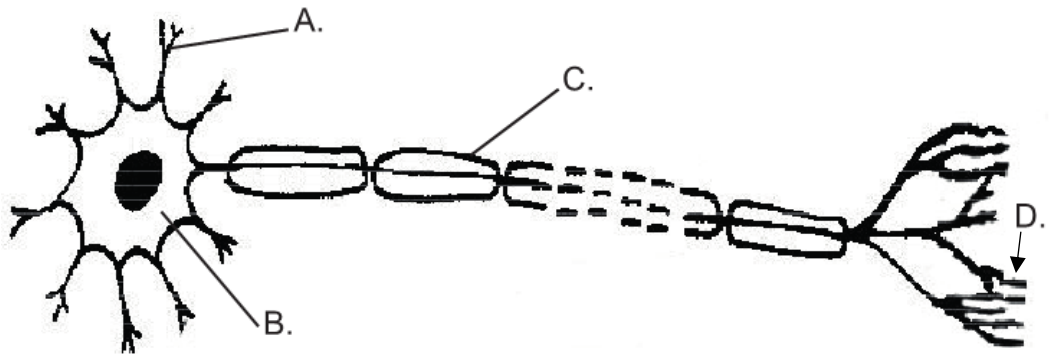
D spinal cord

13 The drug atropine has a similar shape to acetylcholine and stops the effect of acetylcholine. Nerve gas inhibits the activity of cholinesterase. Cholinesterase is an enzyme that breaks down acetylcholine.

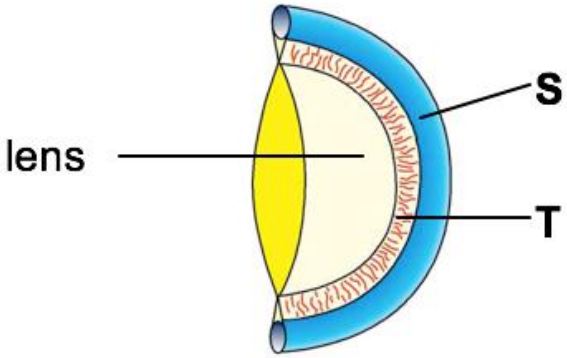
What will be the effects of these substances on the rate of transmission of impulses across a synapse?

	atropine	nerve gas
A	increased	increased
B	increased	reduced
C	reduced	increased
D	reduced	reduced

14 Which structure in the motor neuron is required for fast conduction of nerve impulse?



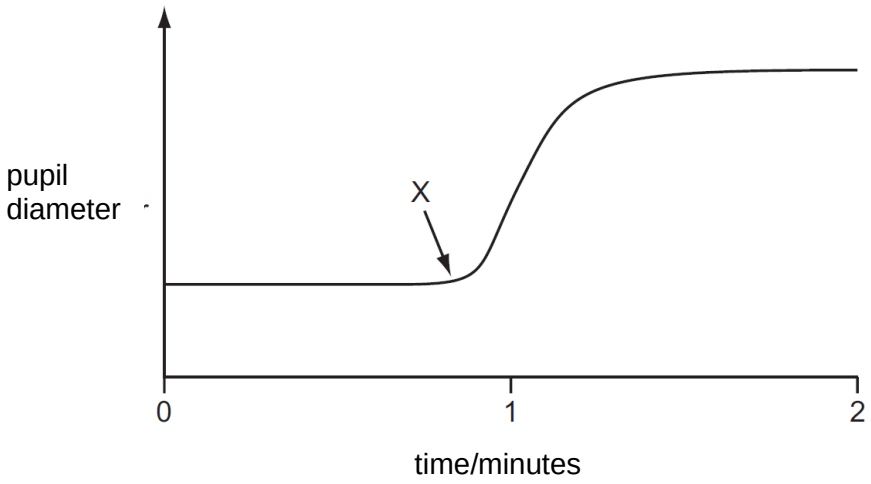
15 The diagram below shows certain parts of the eye when focusing on a distant object.



Which of the following is the correct description of the state of **S**, **T** and the lens?

	S	T	lens
A	relaxed	contracted	more convex
B	contracted	slackened	more convex
C	relaxed	taut	less convex
D	taut	relaxed	less convex

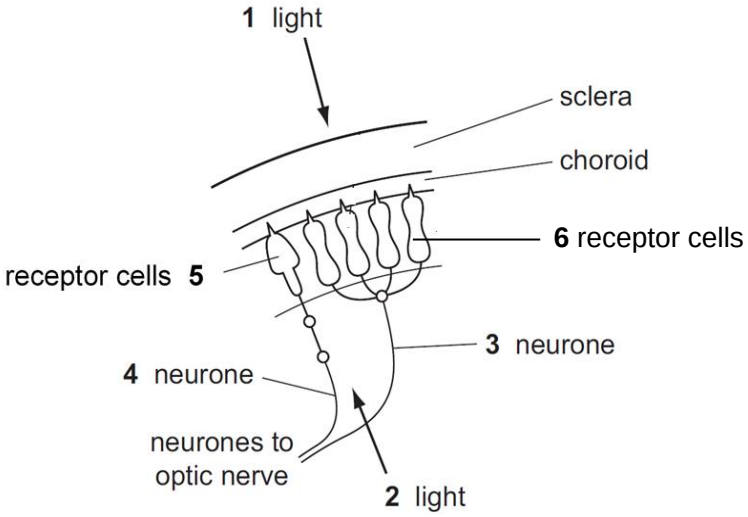
16 The graph shows how the diameter of the pupil of a person's eye changed during the course of two minutes.



What happens to the light intensity at X and which muscles begin to contract?

	light intensity	iris muscles contracting
A	decreases	circular
B	decreases	radial
C	increases	circular
D	increases	radial

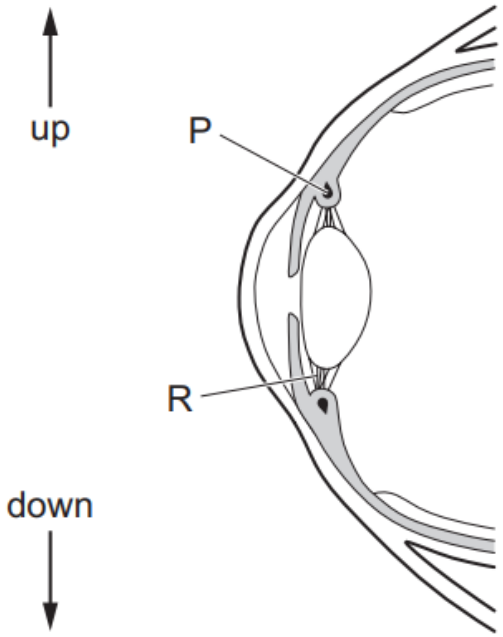
17 The diagram below shows a small section of the retina.



Which arrow shows the direction that the light reaches the retina, and at low level light intensity, which of the receptor cells are activated after a few minutes, and which neurone will send impulses?

	direction of light	impulse sent via neurone	receptor cells activated
A	1	3	6
B	1	4	5
C	2	3	6
D	2	4	5

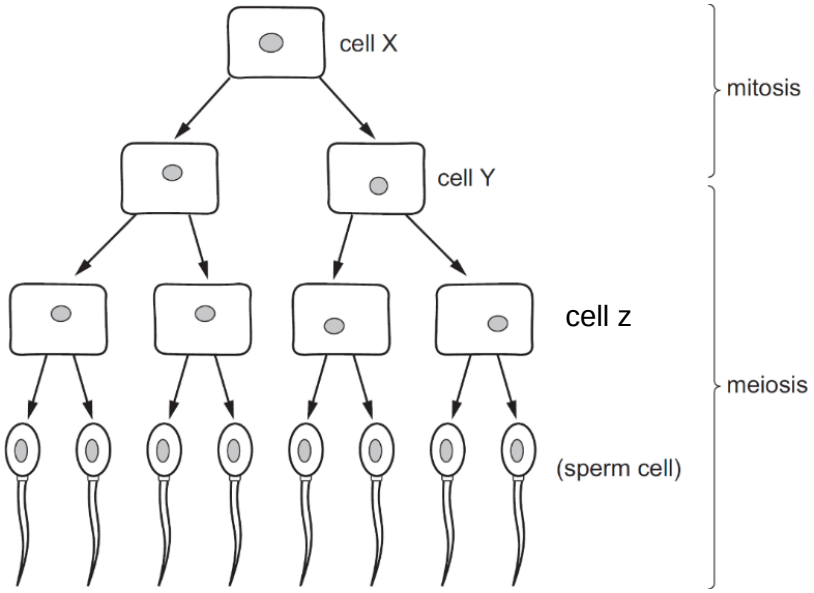
18 The diagram shows a section through the eye.



When the person looks down and focuses on their mobile phone, what is the state of the structures P and R?

	P	R
A	contracted	slacken
B	contracted	taut
C	relaxed	slacken
D	relaxed	taut

19 The diagram below shows some stages in cell division in a mouse (*Mus musculus*).

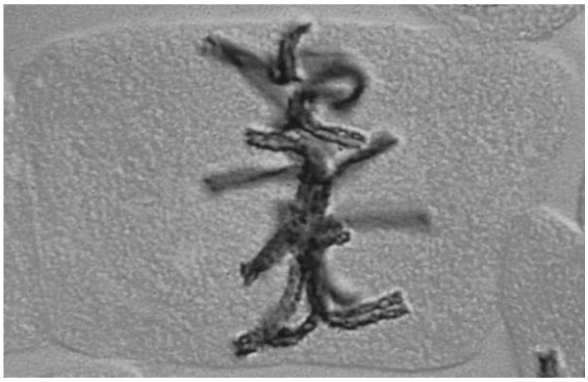


Cell X contains 20 pairs of chromosomes.

How many chromosomes are in cell Y and in cell Z?

	cell Y	cell Z
A	20	10
B	20	20
C	40	20
D	40	40

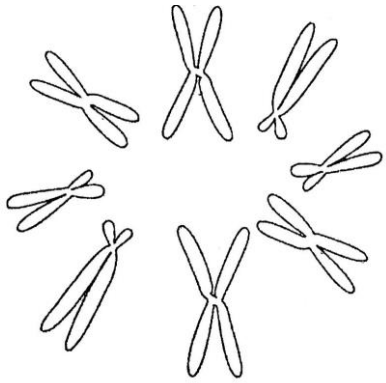
20 The photomicrograph shows a stage of mitosis.



What would be correct for the next stage in mitosis?

	presence of nuclear membrane	sister chromatids	centromeres
A	absent	separated	splits up
B	absent	joined together	at the equator
C	present	separated	attached to spindle fibres
D	present	joined together	remains intact

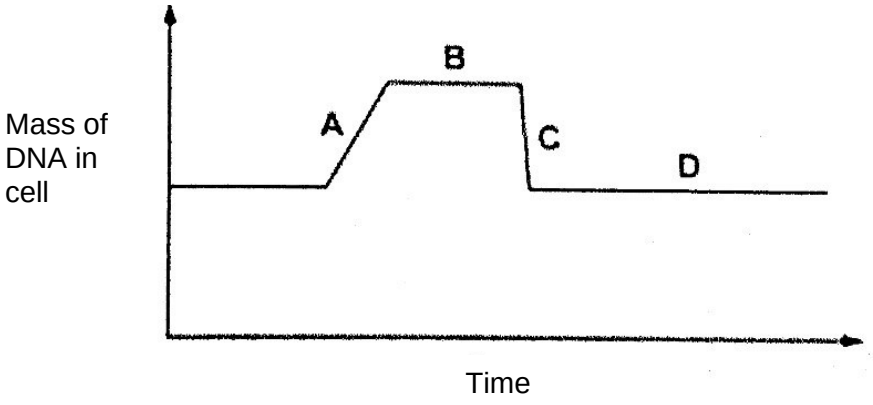
21 The diagram shows chromosomes at metaphase of mitosis.



What are the diploid and haploid numbers of this species?

	diploid	haploid
A	4	8
B	8	4
C	8	16
D	16	8

22 The graph below shows the mass of DNA within a cell during the cell cycle.



When does mitosis occur in the graph?

23 Between which two phases in meiosis do identical centromeres start to separate?

A metaphase I and anaphase I

B metaphase II and anaphase II

C prophase I and metaphase I

D prophase II and metaphase II

24 During which stage of mitosis does the nuclear envelope break down?

A prophase

B metaphase

C anaphase

D telophase

25 During gamete formation, non-disjunction occurs in one of the two daughter cells during meiosis II. What would be the result at the completion of meiosis?

A all gametes would be haploid

B half of the gametes would be haploid, and the other half would be diploid

C half of the gametes would have n chromosomes, one quarter would have (n+1) chromosomes and another quarter would have (n-1) chromosomes

D half of the gametes would have (n+1) chromosomes and the other half would have (n-1) chromosomes

26 In which structure are the cells dividing by mitosis only?

A ovary

B root tip

C stamen

D testis

27 The diagram below shows the parts of a flower. Where is the female gamete located in the flower?

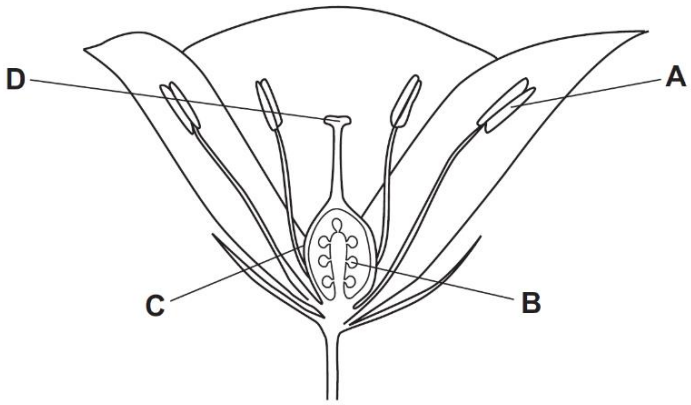


Fig. 27

28 Which processes involve parts of the carpel of a flower?

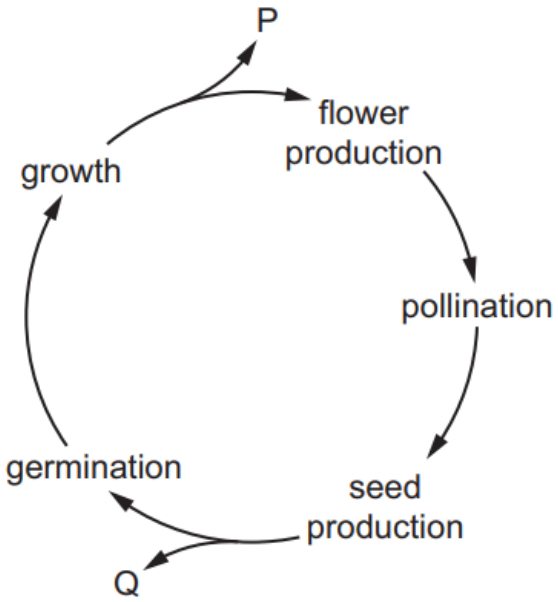
A attracting insects and pollination

B fertilisation and producing pollen

C forming fruit and pollination

D releasing pollen and fertilisation

29 The diagram shows the life cycle of a flowering plant.

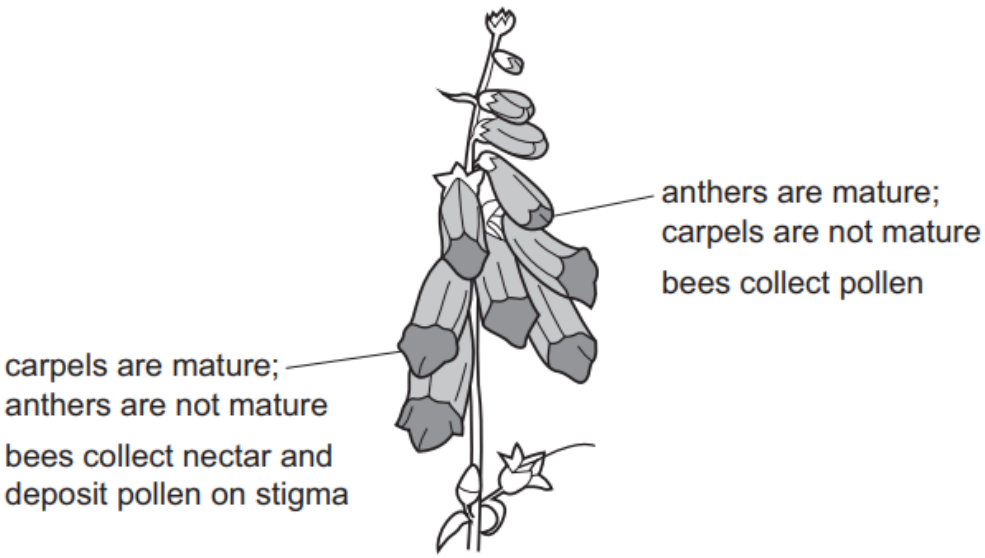


Small pieces are cut from the plant at stage P in the cycle, placed in nutrient jelly, and allowed to grow into new plants. New plants are also grown from seeds produced at stage Q in the cycle.

Which type of reproduction has taken place to produce each of the plants that develop?

	plants developing from P	plants developing from seeds
A	asexual	sexual
B	asexual	asexual
C	sexual	asexual
D	sexual	sexual

30 The diagram shows how bees visit a species of flowering plant that has tall spikes of flowers. In the flowers at the base of the spike, the carpels are mature, but the anthers are not yet mature. In the flowers at the top of the spike, the anthers are mature, but the carpels are not yet mature.



Which statements are correct?

1 bees visit two flowers for successful pollination

2 the difference in maturing times for anthers and carpels ensures pollination between flowers

3 seeds will develop first in the flowers at the top of the plant

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

[End of Paper 1]