

Past-paper walk-through

Sexual reproduction in plants ■ 16.3

eXercise

Questions in this set

- 0610/21 N25 Q24 ■ 1 mark
- 0610/22 N25 Q24 ■ 1 mark
- 0610/23 N25 Q27 ■ 1 mark
- 0610/41 N25 Q4 ■ 18 marks
- 0610/22 J25 Q29 ■ 1 mark
- 0610/23 J25 Q28 ■ 1 mark
- 0610/41 J25 Q3 ■ 17 marks
- 0610/22 M25 Q25 ■ 1 mark

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 24

0610/21 N25 ■ Q24 ■ 1 mark

24 Where does fertilisation occur in a plant?

- A** ovule
- B** pollen grain
- C** pollen tube

D stigma

Solution 24

Answer: **A**

Why

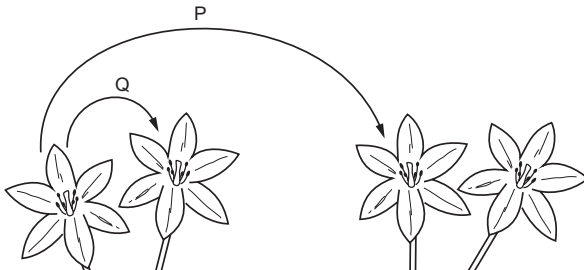
- Pollination only delivers the pollen to the stigma – that is not fertilisation.
- The pollen tube then grows down through the style to the ovule.
- The male nucleus fuses with the egg nucleus inside the ovule, so fertilisation happens there.

Question 24

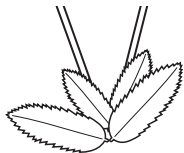
0610/22 N25 ■ Q24 ■ 1 mark

24 The diagram shows parts of two different plants, 1 and 2, of the same species.

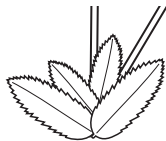
The transfer of pollen between the flowers of these two plants is shown by the arrows labelled P and Q.



Question 24



1



2

Which arrows show cross-pollination, and which transfer of pollen would produce the most variation in the offspring?

	cross-pollination	transfer of pollen that produces the most variation in the offspring
A	P only	P
—	—	—

Question 24

B	P only	Q
C	P and Q	P
D	P and Q	Q

Solution 24

Answer: **A**

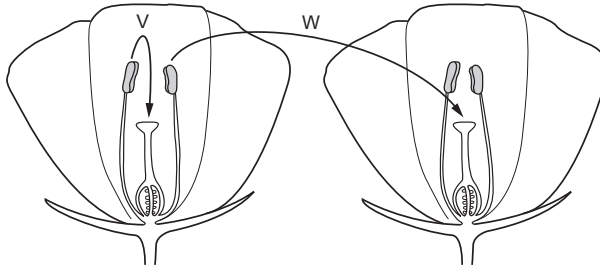
Why

- Pollen moving between flowers on *different* plants is cross-pollination.
- Pollen moving within the same plant is self-pollination.
- So follow each arrow and see whether it starts and ends on the same plant.

Question 27

0610/23 N25 ■ Q27 ■ 1 mark

- 27** The diagram shows two methods of pollination, V and W. The two flowers are on different plants of the same species.



A student made three conclusions about these two methods of pollination.

Question 27

- 1 Method V will produce genetically identical offspring.
- 2 Method W will produce genetically different offspring.
- 3 Method W increases the ability of the species to adapt to its surroundings.

Which conclusions are correct?

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

Solution 27

Answer: **D**

Why

- The two flowers are on *different* plants, so both arrows shown are cross-pollination.
- Cross-pollination increases genetic variation in the offspring.
- It needs an external agent – wind or an insect – to carry the pollen between the plants.

Question 4

0610/41 N25 ■ Q4 ■ 18 marks

- 4 Fig. 4.1 is a photograph of a bee on a flower. One of the bee's legs is covered with pollen.



Question 4



Fig. 4.1

- (a) (i) State **three** features of flowers that attract pollinating insects such as bees.

Question 4

[3]

- (ii) State **one** way that pollen grains are adapted for pollination by bees.

Question 4

- (b) Describe **two** ways the structure of a monocotyledonous plant differs from the structure of a dicotyledonous plant.

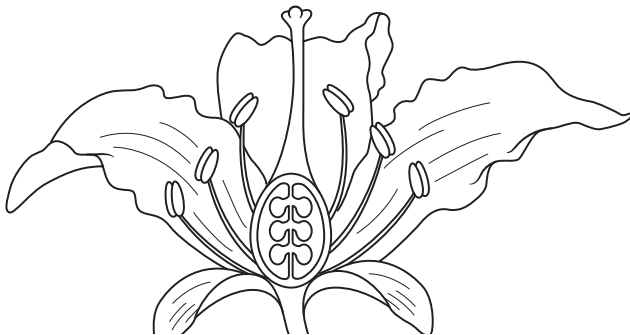
Question 4

Question 4

Question 4

[2]

(c) Fig. 4.2 is a diagram of a cross-section of an insect-pollinated flower.



Question 4

✓ \ \ ~

Question 4



Fig. 4.2

On Fig. 4.2, name and draw label lines to:

- the structure that supports an anther
- a structure that protects the flower bud
- an ovule.

[3]

(d) Describe sexual reproduction in a flower, from the release of pollen to the formation of a zygote.

Question 4

151 -

- (e) Sexual reproduction also occurs in humans.
 - (i) State the name of the male gamete in a human.

Question 4

- (ii) State where gametes are formed in the human male reproductive system.

Question 4

(iii) Human male gametes are haploid.

State the name of the process that produces haploid male gametes.

Question 4

- (iv) Describe the function of the prostate gland in the male reproductive system.

Question 4

[Total: 18]

Solution 4

(a)(i) Mark scheme

- any three from:
- scent ;
- nectar ;
- large / colourful, petals ;
- pollen (as a source of food) ;
- AVP ;
- 3
- e.g. honey guides / ref. to landing

Solution 4

- platforms / ref. to mimicking insects

Solution 4

(a)(ii)

Mark scheme

- any one from:
- large ;
- sticky / spiky / AW ;
- 1

Solution 4

(b) Mark scheme

- any two from:
- (monocots have)
- narrow / strap / long/AW, leaves ;
- parallel (leaf) veins ;
- scattered vascular, tissue / bundles, (in the stem) ;
- hollow stems ;
- petals in multiples of three ;
- fibrous roots ;

Solution 4

- one cotyledon ;
- pollen grains have one pore or furrow ;
- AVP ;;
- 2

Solution 4

(c) Mark scheme

- filament labelled ;
- sepal labelled ;
- an ovule labelled ;
- 3
- 0610/41
- October/November 2025
- Guidance

Solution 4

(d) Mark scheme

- any five from:
- 1
- pollen (released) from the anther ;
- 2
- pollen transferred to stigma ;
- 3
- pollen tube, grows ;
- 4

Solution 4

- (pollen tube goes) down / through, the style ;
- 5
- ref. to ovule / ovary ;
- 6
- pollen / male, nucleus travels down the (pollen) tube / style ;
- 7
- pollen / male, and, ovule / female, nuclei fuse ;
- 8
- fertilisation ;
- 9

Solution 4

- AVP ;
- 5
- e.g. ref. to haploid nuclei or diploid zygote ;

Solution 4

(e)(i)

Mark scheme

- sperm (cell) ;
- 1

(e)(ii)

Mark scheme

- testis / testes ;
- 1

Solution 4

(e)(iii)

Mark scheme

- meiosis ;
- 1 A reduction division

Solution 4

(e)(iv)

Mark scheme

- make fluid / semen, for the sperm / male gametes, to swim / AW ;
- 1 A ref. to providing nutrients
- Guidance

Question 29

0610/22 J25 ■ Q29 ■ 1 mark

29 Which description of cross-pollination is correct?

- A** the transfer of pollen grains from the anther of one plant to the stigma on a different plant
- B** the transfer of pollen grains from the anther to the stigma on the same plant
- C** the transfer of pollen grains from the stigma of one plant to the anther on a different plant
- D** the transfer of pollen grains from the stigma to the anther on the same plant

Solution 29

Answer: **A**

Why

- Cross-pollination means the pollen ends up on a *different plant*.
- So pollen from the anther of one plant reaches the stigma of another plant of the same species.
- A different flower on the *same* plant would still be self-pollination.

Question 28

0610/23 J25 ■ Q28 ■ 1 mark

28 Which statement about pollination is correct?

- A** Self-pollination increases the ability of the population to respond to changes in the environment by increasing variation.
- B** Self-pollination increases the ability of the population to respond to changes in the environment by reducing variation.
- C** Self-pollination reduces the ability of the population to respond to changes in the environment by increasing variation.
- D** Self-pollination reduces the ability of the population to respond to changes in the environment by reducing variation.

Solution 28

Answer: **D**

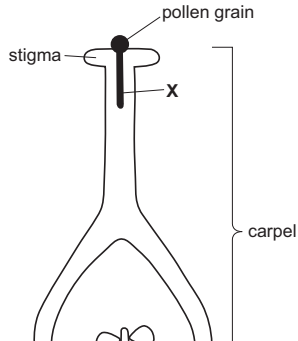
Why

- Self-pollination uses pollen from the same plant, so it *reduces* variation.
- Less variation means the population is less able to adapt to a change in the environment.
- Cross-pollination increases variation, which is the advantage it brings.

Question 3

0610/41 J25 ■ Q3 ■ 17 marks

- 3 (a) Fig. 3.1 shows one stage involved in plant reproduction after pollination.



Question 3



Fig. 3.1

- (i) State the name of the part labelled **X** in Fig. 3.1.

Question 3

- (ii) Describe the events that occur after the stage shown in Fig. 3.1 that result in fertilisation.

Question 3

- (b)** A species of plant can use self-pollination and cross-pollination.
 - (i)** Suggest reasons for this species of plant to use self-pollination rather than cross-pollination.

Question 3

- (ii) Discuss the potential effects of only using self-pollination in a population of plants.

Question 3

(c) Meiosis produces gametes and is a source of genetic variation.

State **two other** sources of genetic variation in populations.

Question 3

Question 3

[2]

(d) Describe mitosis and its roles in organisms.

Question 3

(e) State the name of the unspecialised cells that divide by mitosis.

Question 3

[Total: 17]

Solution 3

(a)(i)

Mark scheme

- pollen tube ;
- 1

Solution 3

(a)(ii)

Mark scheme

- any three from:
- pollen tube grows / AW (and enters ovule / ovary) ;
- pollen / male, nucleus travels down (pollen) tube / style ;
- (pollen and ovule) nuclei fuse ;
- ref. to ovule ;
- 3 A X for pollen tube / ecf from 3ai

Solution 3

(b)(i) Mark scheme

- any three from:
 - 1
 - lack of (named) pollinators ;
 - 2
 - idea that plant is isolated / AW ;
 - 3
 - uses less, pollen / energy ;
 - 4

Solution 3

- increased chance of, fertilisation / pollination / offspring ;
- 5
- idea of (less genetic diversity is) beneficial if plant is well-adapted to its
- environment ;
- 6
- AVP ;
- 3
- 0610/41
- May/June 2025
- Guidance

Solution 3

(b)(ii) Mark scheme

- any three from:
- 1
- less / no, genetic variation ;
- 2
- less likely to, survive / adapt to, changes in the environment ;
- 3
- less resilience against disease / disease spreads more quickly ;
- 4

Solution 3

- (increased risk of) extinction ;
- 5
- ref. to likelihood of genetic disease ;
- 3

Solution 3

(c)

Mark scheme

- any two from:
- mutation ;
- random, mating / pollination ;
- random fertilisation ;
- AVP ;
- 2

Solution 3

(d) Mark scheme

- any four from:
- 1
- ref. to nuclear division ;
- 2
- production of genetically identical cells ;
- 3
- (copies of / replicated) chromosomes separate ;
- 4

Solution 3

- chromosome number is maintained (in each daughter cell) / AW ;
- 5,6 named roles of mitosis ;;
- 4
- e.g. growth / repair of (damaged)
- tissues / replacement of cells / asexual
- reproduction / production of organs or
- tissues

Solution 3

(e)

Mark scheme

- stem (cells) ;
- 1
- Guidance

Question 25

0610/22 M25 ■ Q25 ■ 1 mark

25 Which row describes self-pollination?

	pollen transferred from an anther to the stigma of a different flower on the same plant	pollen transferred from an anther to the stigma of a flower on a different plant of the same species	pollen transferred from an anther to the stigma of the same flower
A	✓	✓	✗
B	✓	✗	✓
C	✗	✗	✓
D	✗	✓	✓

key

✓ = yes

✗ = no

Solution 25

Answer: **B**

Why

- Self-pollination means the pollen reaches a stigma on the *same plant*.
- That includes a different flower on the same plant, since the genes are identical.
- Cross-pollination requires a flower on a *different* plant of the same species.