**Chapter 13 Reproduction in flowering plants**

**Multiple-choice questions** (p.13**-31**)

1. C

2. D

Both shoots P and Q are grown from the same tuber. Therefore, the three structures should be genetically identical.

3. D

4. D

5. C

In flowering plants, the formation of gametes occurs in the anthers and the ovules of flowers. The process involves meiotic cell division.

6. D

7. C

8. D

9. D

10. B

11. A

Structure (3) is developed from the zygote, which contains a combination of genetic materials from two parent plants. Therefore, it is genetically different from structures (1) and (2).

**Short questions** (p.13*-***33**)

12. (a) (i) asexual   
(ii) sexual (0.5 + 0.5)  
(iii) gamete  
(iv) gamete (0.5 + 0.5)  
(v) fertilization (1)

(b) Potatoes have tubers. (1)  
The tubers grow into plants, which have leaves to carry out photosynthesis and produce food. (1)  
The plants use the excess food to produce more tubers for vegetative propagation. (1)

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14. (a) They have the same genetic composition / are genetically identical. (1)

(b) (i) The genetic composition of gametes varies. (1)  
The plants in box Y inherit different combinations of genes from both parents. (1)

(ii) • Genetic variation exists among offspring. This allows the species to adapt to environmental changes / for evolution. (1)

• The chance of disease transmission from parent plants to offspring is lower. (1)

(Any ***one***, 1)

**Structured questions** (p.13*-***34**)

15. (a) (i) pollination (1)

(ii) stigma (1)

(b) Correct drawing (3)  
• line continuing down the style (1)  
• line entering micropyle (1)  
• line touching / entering the ovule (1)

(c) (i) stigma / style / ovary wall (1)

(ii) ovule / ovary / ovum (1)

(d) • The pollen grain is from a different species of plant. (1)

• The pollen grain is not viable / cannot germinate. (1)

(or other acceptable answers) (Any ***one***, 1)

16. (a) The pollen grain landed on the stigma develops a pollen tube. (1)  
The pollen tube carries the male gametes (1)  
down the style and through the ovary. (1)  
When reaching the ovule, the pollen tube releases the male gametes, which will then fuse with the female gamete in the ovule. (1)

(b) The pollen grains are rough. This allows them to stick to the insect bodies more easily. (1)  
The pollen grains are likely to be from an insect-pollinated flower. (1)

(c) (i) Some pollen grains may be dispersed to places without suitable plants. (1)  
The production of a large amount of light pollen grains increases the chance of being dispersed by wind onto stigmas. (1)

(ii) Pollen grains are carried in the air by wind. (1)  
Branched and feathery stigmas provide a large surface area to catch pollen grains in the wind. (1)

17. (a) (i) Independent variable: temperature (1)  
Dependent variable: length of pollen tube (1)

(ii) (0.9 – 0.2) / 0.2 (1)  
= 350% increase (1)

(iii) • There is no significant / only a little difference between varieties A and B at 15 oC / 35 oC. (1)

• A positive correlation between temperature and pollen tube length in A and B up to 30 oC. (1)

• Greater effect of temperature on variety A than on B / pollen tubes of A grew longer than B at all temperatures. (1)

• The optimum temperature for the growth of pollen tube for both A and B is 30 oC. (1) (Any ***three***, 3)

(b) The pollen tube creates a pathway for the male gametes to pass (1)  
from stigma to ovule through the style / micropyle. (1)

(c) Meiosis reduces the chromosome number of gametes by half. (1)  
It produces new genetic combinations in gametes / creates genetic variation (1)  
through crossing over / independent assortment of homologous chromosomes. (1)

**Essays** (p.13*-***36**)

18. • Anthers hang out of flower (1)  
to release pollen grains into air. (1)

* Stigmas hang out of flower (1)  
  to catch pollen grains in the wind. (1)
* Stigmas are feathery / branched to provide a large surface area (1)  
  for catching pollen grains in the wind. (1)
* Pollen grains are small and light (1)  
  so they can be easily dispersed by wind. (1)
* Large amounts of pollen grains are produced (1)  
  to increase the chance of pollination. (1) (Any ***three*** sets, 6)

Communication (Max. 3)

19. Name an example of flowering plants that can reproduce asexually and sexually, such as lotus, potato, lily, etc. (1)  
Asexual reproduction produces offspring that are genetically identical to the parent. (1)  
When in favourable conditions, asexual reproduction allows rapid colonization of the environment around the parent plant. (1)  
If the environmental conditions become unfavourable, all offspring may not adapt well and may die. (1)  
Sexual reproduction involves the production and fertilization of gametes to produce offspring that are genetically different from the parent. (1)  
Genetic variations among the offspring can help them adapt to environmental changes. (1)  
The seeds and fruits formed can be dispersed over long distances. (1)  
This reduces overcrowding and competition (1)  
and helps the offspring to colonize new habitats. (1)  
Communication (Max. 3)