

16. Reproduction

16.3 Sexual reproduction in plants

Paper 3 and 4

Marking Scheme

Q1.

(a)(i)	A ; B ;	2	either order
(a)(ii)	D ;	1	
(a)(iii)	(bright) colours / large / landing platform / guidelines / scented ; to attract (named) pollinators / AW ;	2	
(b)(i)	anther ; stigma ;	2	
(b)(ii)	<i>any three from:</i> <i>(insect-pollinated pollen is)</i> larger ; heavier ; sticky / hooked / AW ; produced in smaller quantities ; AVP ;	3	

Q2.

(a)(i)	C ; D / E ;	2	either order
(a)(ii)	cold ticked ; dry ticked ;	2	R each additional tick

Q3.

	A attracts, insects / (named) pollinator ; B produces / contains, female sex cells, female gametes / ovules ; C produces / contains / releases, male sex cells, male gametes / pollen ; D receives pollen (grains) / site of pollination or description ;	4	A site of fertilisation / where seeds develop
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Q4.

(a)	<i>any two from:</i> smooth(er) / AW ; small(er) ; light(er) ; more pollen ;	2	
(b)	X drawn on the ovary ; stigma circled ; label line to anther ; correct labelling as anther ;	4	
(c)	<i>any two from:</i> suitable temperature ; water / moisture ; oxygen ;	2	

Q5.

(a)(i)	A – filament ; C – petal ; E – ovary ;	3	
(a)(ii)	produce / release, pollen / male gamete ;	1	
(a)(iii)	D ;	1	
(b)	<i>any one from:</i> large petals ; (named) sexual organ(s) are, inside (the flower) / are internal ;	1	
(c)	<i>total of three from:</i> <i>flower structure - max two from:</i> petals / flower, small / none / dull / not (brightly) coloured ; anthers / stigma, hang outside (of flower) / are external / AW ; feathery stigma ; pendulous / versatile, anther AW ; <i>pollen - max two from:</i> large amounts of pollen, produced / released ; light / small, pollen ; smooth pollen ;	3	
(d)	Animal ;	1	

Q6.

(b)	suitable temperature ; oxygen ; water ;	3	R each additional circle
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Q7.

(d)	<i>any four from:</i> large petals ; colourful / bright, petals ; scented ; nectar / nectaries ; anthers / stigmas, inside the flower ; sticky / spiky, pollen grains ; less pollen made (than wind pollinated) ; AVPs ; e.g. larger / heavy, pollen grain	4	
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Q8.

(a)(i)	water ;	1	
(a)(ii)	light ;	1	
(a)(iii)	no seeds, germinate / grow ; seeds are, killed or damaged / enzymes destroyed ;	2	

Q9.

(a)(i)	B ; C ; A ;	3	
(a)(ii)	X drawn on an ovule ;	1	
(a)(iii)	sepal ;	1	
(b)	<i>any two from:</i> larger ; heavier ; stickier ; spiky ; AVP ;	2	

Q10.

(a)(i)	anther labelled ; petal labelled ; stigma labelled ;	3
(a)(ii)	<i>any two from:</i> (large) petals ; stigma inside petals ; anther inside petals ; large stigma ;	2

Q11.

(a)(i)	B and C ; (B) is too cold / not optimum temperature / needs warmth ; (C) is dry / lacks water / needs to be damp ;	3	
(b)	1 : 2 ;	1	

Q12.

(a)		5	one mark for each correct line
(b)	small(er) ; light(er) / less mass ; smooth(er) / not rough / not spiky / AW ; not sticky ; have, wings / extensions / air bladders or sacs ;	2	
(c)	sexual ; oxygen ; water ; gravity / light ; water / oxygen / mineral ions ;;	6	mp2 and mp3 in either order

Q13.

(a)(i)	B: no water / AW; C: low temperature / AW ;	2	
(a)(ii)	<i>prediction</i> – all / some / most (seeds), germinate ; <i>explanation</i> – light not necessary for germination / all conditions for germination present / water and suitable temperature present ; OR (for explanation) poor or no growth / die, as no light for photosynthesis / AW ;	2	
(b)(i)	91(%) ;;	2	
(b)(ii)	<i>Idea of:</i> something wrong with seed e.g. infertile / diseased / dead / immature / abnormal ; OR <i>idea of :</i> lack of resources ; e.g. no oxygen / need more time / not enough water / competition / too close together / insufficient nutrients / AVP ;	1	

Q14.

(a)(i)	labelled line to one ovule ; labelled line to petal ;	2	
(a)(ii)	carpel / ovary ; sepal ;	2	
(b)	line from the anther of one flower ; line to stigma of another flower ;	2	
(c)	(large) petals ; stamens / anthers / filaments, inside flower or short, stamens / filaments or small anthers ; stigma inside flower / short style ; stigma, broad / wide / not feathery / AW ;	2	1 features that are not visible on Fig. 7.1

Q15.

(a)(i)	a group of organisms that can reproduce ; to produce fertile offspring ;	2	
(a)(ii)	self-pollination labelled and arrow drawn from an anther to the stigma on the same flower ; cross-pollination labelled and arrow drawn from anther on one flower to stigma on the other flower ; anther labelled and stigma labelled ;	3	
(a)(iii)	X : contains ovules / female gamete / site of fertilisation / forms the fruit / site of seed, formation or production ; Y : protects (flower when in) bud ;	2	

Q16.

(a)(ii)	feathery stigma / stigma with large surface area ; stigma / anthers, hang outside the flower(s) ;	2	
(b)(i)	C ovary (wall) ; D ovule ; E style ;	3	

Q17.

(a)(i)	any three from: large / obvious / AW, petals / sepals ; anthers / stigmas, inside flower ; filaments are stronger / thicker / AW ; pollinators must touch anthers, to reach nectar / AW ; sticky stigma ; pollen, large ; pollen, sticky / spiky ; AVP ; honey guides / landing platforms / mimic insects	3	
(a)(ii)	anther ;	1	A stamen
(b)(i)	any five from: pollen transferred to stigma ; ref to (pollen) <u>tube</u> ; (pollen) tube, growth / germination ; (pollen tube grows) down style ; (pollen tube) enters ovule ; (ovule is) in the ovary / carpel ; pollen / male, <u>nucleus</u> fuses with ovule / female, <u>nucleus</u> ; ref. to fertilisation ; to form zygote ; (zygote divides by) mitosis to form an embryo ; AVP ; e.g. (fertilised) ovule becomes the seed	5	MP4 A pollen nucleus moves down style
(b)(ii)	any two from: allows, variation / genetic diversity ; plant more likely to survive (named) environmental change ; resistance to disease ; (ability to) evolve ; ref. to fitness ; AVP ;	2	

Q18.

(b)	<u>genetically</u> identical ; quick ; can reproduce even if variety is sterile ; described consequence of being genetically identical ; AVP ; e.g. no pollinators required / reliable / no harmful variation	3	
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Q19.

(a)(i)	anthers / stamens / filaments / stigma, hang / AW, outside (the flower) ; large, anthers / C , produce large quantities of pollen ; <i>idea that</i> anthers / C , easily release pollen ; 'feathery' / AW, stigma / B ; stigma has, feathery surface / large surface area, to catch pollen ; bracts / A , are, small / inconspicuous ;	3	A petals
(b)	<i>idea that</i> pollination / fertilisation, always going to happen / AW ; no agent of pollination needed ; little wastage of pollen ; reduced / little, variation / diversity ; increased competition between plants (as have the same adaptation) ; increase chance of, genetic / inherited, disease ; all plants adapted to same, conditions / environment ; little ability to adapt to changing conditions / little ability to evolve ; an infectious disease can kill all of the population / all plants more susceptible to the same disease ; risk of <u>extinction</u> ; AVP ;	4	

Q20.

(d)(i)	<i>ref. to</i> asexual reproduction ; (plantlets / cells / offspring grow by) <u>mitosis</u> ; all cells / new plants, are <u>genetically identical</u> ; AVP ;	3	
(d)(ii)	competition for resources as all individuals are close together ; increased risk of inheriting harmful, alleles / features / trait ; no / little, (genetic) variation ; no new adaptive features ; no evolution / no (natural) selection / no artificial selection / AW ; no / little, ability to respond to (named) environmental change ; all individuals are susceptible to the same, diseases / pests ; higher risk of <u>extinction</u> ;	3	