Question number	Answer	Notes	Marks
1 (a)	(transfer) pollen from <u>anther</u> to <u>stigma</u>;	ignore stamen to carpel/style ignore male to female gamete	1
(b)	1. to make honey / food; 2. sugar(y) / sucrose / glucose / fructose; 3. energy / respiration;	2. ignore carbohydrate	2
(c)	(can) produce offspring / (can) reproduce / eq;	ignore egg / gamete / babies / children production ignore fertilisation	1
(d)	1. mutation; 2. (different) allele / different version of a gene / DNA / genetically different / eq; 3. resistant / resistance; 4. idea of survival; eg not all die from disease	2. ignore different gene 3. ignore immune	2
(e)	16;		1

Question number	Answer	Notes	Marks

(f)	1. the number of <u>drones</u> the queen mates with /
	    queen may mate with different <u>drones</u>;
	
	2. each drone has a different set of alleles /
	    is genetically different;
	
	3. (queen's eggs made by) meiosis /
	    have different alleles / eq;
		ignore bees
		
		ignore mutation
		
		ignore genes
			2

(g)	1. disease resistant; 2. large quantity of honey / beeswax ; 3. ability to collect nectar; 4. fecundity / more bees / eq; 5. less aggressive / eq;	1. ignore immune / combat disease / live longer / hardier 2. ignore taste / flavour / quality of honey	2

(Total for Question = 11 marks)

Question number			Answer	Notes	Marks
2	(a)	(i)	transfer oxygen / nutrients / named nutrient / water / carbon dioxide / waste / named waste / antibodies / release progesterone; reject if linked to exchange of blood	allow examples of named nutrient eg protein ignore food	1
		(ii)	cushions / protects (from physical damage) / shock absorber / supports / eq;	protects must be qualified eg from bumps ignore keeps fetus safe / insulated	1
		(iii)	antibodies;		1
	(b)	(i)	46 / 23 <u>pairs</u>;		1
		(ii)	<table><tr><td>**Sex chromosomes**</td><td>**tick**</td></tr><tr><td>XX</td><td></td></tr><tr><td>X</td><td></td></tr><tr><td>XY</td><td>✓</td></tr><tr><td>YY</td><td></td></tr><tr><td>Y</td><td></td></tr></table>	No mark if more than one tick	1

Question number	Answer	Notes	Marks
(c) (i)	1. calcium / Ca; 2. vitamin D; 3. protein;		2
(ii)	1. more mass / heavier / extra weight; 2. growth / development / division / respiration of fetus / eq;	she has a fetus alone = 0 / she needs to feed the fetus = 0 / more energy to carry baby = 0 / energy for fetus = 0 ignore prevent anaemia / more iron for baby	2
(iii)	1. red blood cells; 2. haemoglobin; 3. oxygen; 4. respiration;		3

(Total for Question = 12 marks)

Question number	Answer	Notes	Marks
3 (a)			

Process	genetic variation in offspring
runners producing new plants	(x)
micropropagation	x
wind-pollination	✓
taking cuttings	x
self-pollination of a flower	✓

4 correct = 3
2 or 3 correct = 2
1 correct =1

(b)	1. male gamete/sperm/nucleus AND female gamete/egg/nucleus / haploid / 23 chromosomes; 2. fuse / join / combine / eq; 3. <u>zygote</u> / diploid / 46 chromosomes; 4. <u>mitosis</u> / cell division; 5. three times / 2, 4 then 8 / three divisions;		4

(Total for Question = 7 marks)

Question number	Answer	Notes	Marks
4 (a) (i)	flask A 22 and flask B 18 (both temperatures correct) ;	units not required	1
(ii)	respiration; heat released / eq;	allow converse ignore energy / warmth	2
(b)	kill bacteria / kill microorganisms / remove bacteria / no bacteria / fewer bacteria / sterilise / eq;	ignore other organisms	1
(c)	oxygen (in) / carbon dioxide (out);	ignore air / gas / gas exchange; reject oxygen out alone / carbon dioxide in alone eg to allow oxygen in and out = 1 allow movement of oxygen / carbon dioxide	1
(d)	mass / number / age / amount (of seeds) / eq;	ignore health / time / outside temperature ignore size	1
		Total	

Question number			Answer	Notes	Marks
5	(a)	(i)	15;		1
		(ii)	14 or 15;		1
		(iii)	1. thermometer; 2. clinical / digital / mouth / ear / rectum /anus / armpit / eq;		2
	(b)	(i)	oestrogen	allow estrogen / estradiol	1
		(ii)	progesterone;		1
		(iii)	blood / plasma;	allow blood vessel / blood stream	1
		(iv)	1. breasts / mammary glands / nipples / eq; 2. body shape / wide hips / eq; 3. body hair / pubic hair / eq; 4. menstruation / period / menstrual cycle /ovulation / eq;	reject characteristics only shown by males ignore facial hair ignore voice ignore psychological changes ignore sex drive	2

Total 9 marks

Question number		Answer	Notes	Marks
6	(a)(i)	1. gain entry / break through egg membrane / break into egg / penetrate egg / eq; 2. chromosomes / DNA / genes / alleles / genetic material;	1. Ignore digest / fertilise 2. Ignore nucleus	2
	(ii)	1. respiration; 2. ATP / energy;		2
	(iii)	swim / move / eq;		1
	(b)	1. dendrites connect with other neurones / eq; 2. axon carries/allows impulse / eq; 3. myelin sheath for protection / insulation / faster impulse / eq; 4. connected to muscle fibres / allows impulse to reach muscle fibres / enables muscle fibres to contract / synapses with muscle fibres;		Max 2