01. 0610_s20_MS_41 Q: 4

(a)(i)	*Sorghum* ;	1
(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
(b)(ii)	meiosis / reduction division ; haploid ; fuses / joins / combines ; diploid ; fertilisation ; zygote ; mitosis ;	7
(c)	*any five from:* (gives) genetic variation / diversity ; ref to, alleles / genes / DNA, from different, plants / parents ; allows mutations to be, expressed / AW ; allows adaptation to, new conditions / changed environment / AW ; (new species) can evolve / allows natural selection to occur ; pollen exchanged between individuals / cross pollination ; seeds are dispersed ; can colonise new areas / AW ; less competition (with parent plant / among offspring) ; seeds may be dormant ; survival through, harsh / adverse, conditions ; AVP ;	5
(d)	*any three from:* protein synthesis ; transport in the phloem ; cell division / mitosis / meiosis ; active transport / absorption of ions (from the soil) ; growth ; movement / muscular contraction ; sensitivity ; nerve impulses ; AVP ;;;	3

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02. 0610_s19_MS_42 Q: 6

	Answer	Mark	Partial Marks
(a)	(group of) organisms that can reproduce ; produce fertile offspring ;	2	
(b)	genetically 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	
(c)	energy (store / sink) ; example of use of starch in plant ; as a reserve / source / store (of energy), when plant cannot photosynthesise / dormancy / winter / no leaves / dark / night ; AVP ; e.g. insoluble	2	

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03. 0610_w18_MS_42 Q: 2

	Answer	Mark	Partial Marks
(a)	a version of a gene ;	1	
(b)	change in base (sequence of DNA) ; DNA / gene / base sequence, codes for, protein / enzyme ; *ref. to* mRNA ; different (sequence of) amino acids in, protein / polypeptide / enzyme ; (mutant / changed) enzyme / active site, has different, shape / structure ; (active site / enzyme) not complementary to substrate / enzyme-substrate complexes cannot form / substrate will not fit into *or* bind ;	3	
(c)	the allele for dwarfism is, recessive / **t** ; both parents are heterozygous (so do not express the allele) ;	2	
(d)(i)	*ref. to* asexual reproduction ; (plantlets / cells / offspring grow by) mitosis ; all cells / new plants, are genetically identical ; 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 extinction ;	3	

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04. 0610_w16_MS_41 Q: 5

	Answer	Mark	Partial Marks
(a)	root hair (cells); long and thin; thin cell wall; large surface area; for absorption; (water by) osmosis ; (ion / nutrients by) active transport; against the concentration gradient; protein (pumps) in membrane; require energy / ATP; ref. to many mitochondria;	5	
(b)(i)	(positive) gravitropism;	1	**A** geotropism **R** negative gravitropism
(b)(ii)	auxin;	1	
(b)(iii)	in space / AW; because no gravity; in a clinostat / AW; gravity constantly changing / AW; remove root tip; no auxin source; lateral roots; searching for, water / nutrients / hydrotropic; light source below, plant / root; roots grow away from light / negatively phototropic; anaerobic mud / mangrove swamp / pneumatophores; need oxygen (for respiration); ORA roots attaching plant to solid objects for support eg walls / other host plants; material is too hard for root to grow through (takes line of least resistance); AVP; e.g. epiphytes / parasitic plants	2	paired marking points
		Total: 9	

<table>
<tr><td>(a)</td><td>any three from:
protein synthesis ;
transport in the phloem ;
cell division / mitosis / meiosis ;
active transport / absorption of ions (from the soil) ;
growth ;
movement / muscular contraction ;
sensitivity ;
nerve impulses ;
AVP ;;;</td><td>3</td></tr>
<tr><td>(b)</td><td>one mark per correct row
<table><tr><th>function</th><th>name of structure</th><th>letter from Fig. 2.1</th></tr><tr><td>pushes food through the stomach</td><td>oesophagus</td><td>A</td></tr><tr><td>assimilation of amino acids to produce plasma proteins</td><td>liver</td><td>K</td></tr><tr><td>storage of bile</td><td>gall bladder</td><td>L</td></tr><tr><td>secretion of insulin</td><td>pancreas</td><td>C</td></tr><tr><td>absorption of fatty acids and glycerol</td><td>small intestine</td><td>H / D</td></tr><tr><td>secretion of pepsin</td><td>stomach</td><td>B</td></tr><tr><td>digestion of starch</td><td>small intestine</td><td>H / D</td></tr></table>;;;;;;</td><td>6</td></tr>
<tr><td>(c)</td><td>any two from:
lactic acid is produced, in muscles / during exercise ;
by anaerobic respiration ;
liver absorbs lactic acid from the blood ;
(aerobic) respiration / oxidation / breakdown, of lactic acid ;
to carbon dioxide and water ;</td><td>2</td></tr>
<tr><td>(d)</td><td>any substance taken into the body ;
that modifies or affects chemical reactions in the body ;</td><td>2</td></tr>
<tr><td>(e)(i)</td><td>any two from:
depressant ;
lengthens reaction time(s) ;
reduces self-control ;
any appropriate effect on the nervous system described ;
AVP ;</td><td>2</td></tr>
<tr><td>(e)(ii)</td><td>any two from:
addiction ;
liver damage ;
AVP ;;</td><td>2</td></tr>
<tr><td>(f)(i)</td><td>any two from:
miscarriage ;
premature birth ;
low birth weight ;
addiction / dependence ;
fetal alcohol syndrome (FAS) ;
AVP ;</td><td>2</td></tr>
<tr><td>(f)(ii)</td><td>any two from:
nicotine ;
pathogens / virus ;
any example ; e.g. HIV / rubella
(named) heavy metal(s) ; e.g. lead / mercury
carcinogen(s) ;
(named) toxin(s) ; e.g. pesticides
(named) medicinal drugs ;
(named) misused (illegal) drugs ; e.g. heroin</td><td>2</td></tr>
</table>

06. 0610_s18_MS_41 Q: 6

	Answer	Mark	Partial Marks
(a)(i)	process / event / letter from Fig. 6.1 meiosis / **R** ; fertilisation / **S** ; implantation / **V** ;	3	
(a)(ii)	oviduct ;	1	
(b)(i)	image size ÷ actual size ;	1	
(b)(ii)	55 (□m) ;	1	
(c)	haploid / *n* / one set of chromosomes / half the diploid number / 23 chromosomes ; (produced by) meiosis ; so number of chromosomes, remains the same / does not double at fertilisation ;	2	**A** so diploid number restored at fertilisation / so zygote is diploid
(d)	*flagellum* (flagellum) propels the sperm ; to, oviduct / site of fertilisation / egg (cell) / ovum ; *mitochondria* aerobic respiration ; provides / releases / supplies, energy / ATP ; *acrosome* (contains / has / releases) enzyme(s) ; (enzymes) digest / break down / dissolve, jelly coat / protein layer ; so sperm nucleus can enter the egg cell / so sperm and egg membranes can fuse together ;	6	**A** flagellum allows sperm to swim **R** 'produces energy'
(e)	*idea that* sex is determined by X and Y chromosomes / males are XY and females are XX ; egg cells have X chromosome / females can only provide X chromosome ; sperm cells have X or Y chromosome / only the males can provide X or Y chromosome / only males can provide the Y chromosome ;	2	

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07. 0610_s18_MS_43 Q: 6

	Answer	Mark	Partial Marks
(a)	process / event / letter from Fig. 6.1 / name of the organ meiosis to produce pollen grains / **C** / anther pollination / **D** / stigma development of seeds / **E** / ovary protection of flower in the bud / **A** / sepal ;;;;	4	*one mark per row*
(b)(i)	image size ÷ magnification ;	1	
(b)(ii)	82 (□m) ;	1	
(b)(iii)	(covered in) spikes / sticky ; (pollen) sticks to, insect / animal (bodies / legs / AW) ; large(r) size (in comparison with wind) ; AVP ;	2	
(c)(i)	ovule ;	1	
(c)(ii)	(nucleus) containing one set of (unpaired) chromosomes ;	1	
(c)(iii)	so that chromosome number does not double (at fertilisation) ; so that chromosome number remains constant from generation to generation ;	1	

<table>
<tr><th></th><th>Answer</th><th>Mark</th><th>Partial Marks</th></tr>
<tr><td>(a)(i)</td><td>reflex (action) ;</td><td>1</td><td></td></tr>
<tr><td>(a)(ii)</td><td>contains antibodies / passive immunity / idea of fighting infections ;
bonding with mother /AW ;
is at a suitable body temperature ;
sterile / less risk of infection / contamination ;
convenience / always available / no preparation ;
cheap / free ;
easy to digest / less risk of colic / less risk of diabetes in child ;
no additives / less risk of allergies ;
idea of volume is controlled / no over-feeding ;
nutrient requirements met / change with age / change with development ;
AVP ;;</td><td>4</td><td></td></tr>
<tr><td>(b)(i)</td><td><table><tr><td>enzyme</td><td>substrate</td><td>product(s)</td></tr><tr><td>amylase</td><td>starch</td><td>glucose / maltose ;</td></tr><tr><td>maltase</td><td>maltose</td><td>glucose ;</td></tr><tr><td>protease</td><td>protein</td><td>amino acids ;</td></tr></table></td><td>3</td><td></td></tr>
<tr><td>(b)(ii)</td><td>high temperatures denature enzymes / AW ;
low temperatures result in low energy / fewer collisions / slower reactions / AW ;
enzymes work best / most efficient at optimum temperature ;</td><td>2</td><td></td></tr>
<tr><td>(b)(iii)</td><td>pH ;
enzyme concentration ;
substrate concentration ;</td><td>1</td><td></td></tr>
</table>

09. 0610_w18_MS_43 Q: 4

	Answer	Mark	Partial Marks
(a)(i)	conversion / process, needs energy ; aerobic respiration occurs (in mitochondria) ; (aerobic) respiration releases energy ;	2	
(a)(ii)	enzyme ;	1	
(b)	from the mother ; glucose (in mother / fetus) carried in blood ; glucose) diffuses / moves from high concentration to low concentration ; across the placenta ; (through) umbilical cord ; AVP ;	3	
(c)(i)	chemical substance produced by a (endocrine) gland ; carried by the blood ; alters the activity of specific target organs / AW ;	3	
(c)(ii)	182 (%) ;;	2	
(c)(iii)	*max four from mp1 to 6:* **1** no glycogen (measured) until day 10 / at first (measurable) / AW, glycogen concentration is 200–220 □mol per g ; **2** small / no, change / decrease, in glycogen until day 20–26 ; **3** glycogen increases from day 20 - 26, until birth / day 62–64 ; **4** 610–630 □mol per g at, peak / AW / birth ; **5** steep decrease in glycogen, after birth / after day 62–64 / to 330–350 □mol per g / to day 69–71 ; **6** glycogen starts to increase (slowly), after day 70–73 / 7–10 days after birth ; **7** insulin is linked to increase in glycogen ; **8** glucagon is linked to decrease in glycogen ; **9** *idea of* changes in glycogen is linked to control of (blood) glucose concentration ; **10** homeostasis / negative feedback (in context of Fig. 4.1 / blood glucose) ; **11** AVP ;	6	units must be stated at least once **A** 420 □mol per g increase at birth (from start)
(d)	not all mothers can produce enough milk ; some drugs can pass through into milk ; transfer of named pathogens in correct context ; painful nipples ; time consuming ; only mother can produce milk / fathers can't express milk ; infant not, suckling / has difficulties, so not enough intake / AW ; tiring ; AVP ;	3	

10. 0610_s18_MS_42 Q: 4

	Answer	Mark	Partial Marks
(a)	there are many, diseases / infections / pathogens / transmitted through sexual contact ; named example of STI ; STIs / AW, can be prevented by the use of some (contraceptive) methods ; such as, condoms / femidoms ; for education about STI prevention / inform preventative strategies / AW ; assess effectiveness of different (contraceptive) methods (to prevent disease) ;	3	
(b)(i)	(named) oestrogen ; (named) progesterone ;	2	
(b)(ii)	(FSH would) stimulate an egg / follicle, to mature / develop / grow / ripen ; **ora** (FSH would) stimulate (release of) oestrogen / LH ; **ora** (FSH would) lead to ovulation ; **ora** (FSH would) increase the chance of fertilisation / pregnancy / AW ; **ora**	3	**I** production (of eggs) **A** FSH is a fertility drug
(b)(iii)	implant / patch / injection / IUD / IUS (containing contraceptive hormones) ; spermicide ;	1	**I** birth control pills
(b)(iv)	abstinence / body temperature / cervical mucus / natural contraception ;; diaphragm ; (named) surgical (sterilisation) method ;;	2	**I** birth control pills **A** cap **A** (named) tubes tied
(b)(v)	some females could use more than one method of contraception ; some people may not have completed the survey, correctly / honestly / AW ;	1	 **A** not used a method regularly (so not answered all questions accurately)

11. 0610_w16_MS_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	**A**: vagina; **B**: oviduct / Fallopian tube; **D**: sperm / male gamete;	3	
(a)(ii)	to remove, egg cells / ova / female gametes;	1	
(b)(i)	follicle stimulating hormone / FSH; luteinizing hormone / LH;	1	
(b)(ii)	start of new cycle / days 1–10 / during menstruation / AW;	1	
(b)(iii)	**X** positioned anywhere in uterus (wall / lining);	1	
(c)	1 allows infertile couples / single parents / same sex couples (to have children); 2 religious / legal / moral / ethical, concerns about IVF; 3 may not treat infertility successfully; 4 expense of fertility treatment; 5 may lead to multiple births; 6 *idea of* genetic screening before implanting is possible; 7 storage of, eggs / embryos, is possible (during chemotherapy); 8 qualification of an religious / ethical / legal / moral, issue; 9 has allowed stem cell research on embryos; 10 AVP;	4	**A** high chance of miscarriage / stress **A** cost to health services / cost means restricted availability
		Total: 11	

12. 0610_s20_MS_42 Q: 2

(a)	embryo ;	1
(b)	*any two from:* growth in all stages ; development during all stages ; (more) increase in complexity in early stages ; (more) increased in size in later stages ;	2
(c)	*any four from:* maintains temperature ; (mechanical) protection ; provides support (of the fetus) ; provides a sterile environment / prevents infections ; allows movement (of the fetus) ; (movement) allows for development of bones and muscles ; ref. to swallowing (of fluid) ; lubrication / AW ; AVP ;	4
(d)(i)	pulmonary (artery) ;	1
(d)(ii)	carbon dioxide / urea / AVP ;	1
(d)(iii)	diffusion ;	1
(e)(i)	0.005 (mm) ;	1
(e)(ii)	130 000 ;;	2
(e)(iii)	nicotine, drug X, rubella virus ;	1
(f)(i)	**A** sensory neurone ; **B** vesicle ; **C** synapse / synaptic cleft ; **D** receptor molecules ;	4
(f)(ii)	*any three from:* drug **X** blocks, **D** / receptor (molecules) ; neurotransmitters are not able to bind to, **D** / receptor (molecules) ; drug **X** is similar in shape to neurotransmitter / complementary to shape of receptor (molecule) ; drug **X** stops, impulse/electrical signal, being transmitted in relay neurone ; (so) less / no, pain felt with drug **X** ;	3
(g)	*any two from:* (contaminated) blood transfusion ; sexual fluids ; breast feeding ; blood to blood contact ; AVP ;;	2

13. 0610_m18_MS_42 Q: 4

<table>
<tr><th></th><th>Answer</th><th>Mark</th><th>Partial Marks</th></tr>
<tr><td>(a)</td><td>
<table>
<tr><th>function</th><th>letter</th><th>name</th></tr>
<tr><td>releases oestrogen</td><td>F</td><td>ovary</td></tr>
<tr><td>site of fertilisation</td><td>A</td><td>oviduct</td></tr>
<tr><td>site of implantation</td><td>E</td><td>uterus lining</td></tr>
<tr><td>dilates during the process of birth</td><td>C / D</td><td>vagina (C) / cervix (D)</td></tr>
</table>
;;;;</td><td>4</td><td>1 mark for each correct row</td></tr>
<tr><td>(b)</td><td>23 ;
46 / 23 pairs ;</td><td>2</td><td></td></tr>
<tr><td>(c)</td><td>1 cases increases then decrease ;
2 large increase between 10–14 and 15–19 ;
3 most cases in the 15–19 age group ;
4 from 15–19 number of cases decrease / from 20–24 number of cases steep decrease ;
5 no cases above 55 years old / in 55–64 age group / 65+ age group ;
6 data quote with number of cases and age group ;</td><td>3</td><td></td></tr>
<tr><td>(d)(i)</td><td>antibiotics ;</td><td>1</td><td></td></tr>
<tr><td>(d)(ii)</td><td>HIV ;</td><td>1</td><td></td></tr>
<tr><td>(d)(iii)</td><td>(named) bodily fluids / sexual fluid ;
barrier ;
condom / femidom ;</td><td>3</td><td></td></tr>
</table>

14. 0610_w16_MS_42 Q: 5

	Answer	Mark	Partial Marks
(a)	4.92 / 4.93;	1	
(b)	(platelets) promote / involved in, clotting; fibrinogen changes to fibrin; soluble to insoluble; fibrin forms a mesh; traps blood cells; prevents loss of blood / stops bleeding; prevents entry of pathogens; AVP;	4	**I** ref. to scab formation **A** net **A** RBCs / WBCs / platelets
(c)	secrete / produce / release, antibodies;	1	
(d)	active immunity; ref to memory, cells / lymphocytes; memory cells produced in first infection;	2	
(e)(i)	decrease, steep / in short period of time / in two months / AW, to 500 cells per mm^3; increase to 650 – 670 cells per mm^3; gradual / AW, decrease until 10 years; to 40 cells per mm^3 at 10 years;	3	**A** by 500 – 700 cells per mm^3
(e)(ii)	no / reduced, (active) immune response; reduced production of antibodies; vulnerable to, infections / (opportunistic) disease / TB / cancers / pneumonia / AW; AIDS; weight loss / death / reduce life span;	3	
		Total: 14	