Mark scheme

Reproduction in humans

Biology 0610 · Questions from Paper 3 and Paper 4

Total marks

84

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	Total
4	8	9	12	9	10	10	11	11	**84**

Question 1 [4]

1 **(a)**	cushions / protects (fetus) ; allows (fetus) to move ; supports (fetus) ;	[max 1]	I reference to maintains temperature
(b)	*box 2 and 3:* cervix dilates / amniotic sac bursts (either order) ;; *box 4:* baby passes down vagina ; *box 6:* placenta delivered ;	[max 3]	3 or 4 correct = 3 2 correct = 2 1 correct = 1
		[Total: 4]	

Question 2 [8]

2(a)(i)	**K ;** **P ;** **L ;**	**3**	
2(a)(ii)	***L*** uterus **;** ***M*** vagina **;** ***N*** cervix **;**	**3**	
2(b)	energy stores **;** jelly coat (that changes at fertilisation) **;**	**2**	

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Question 3 [9]

3(a)(i)	30 ; 5 ; 15 ; 0 / 30 ;	4	
3(b)	<table><tr><th></th><th>boys</th><th>girls</th></tr><tr><td>breasts grow</td><td></td><td>✓</td></tr><tr><td>growth of pubic hair</td><td>✓</td><td>✓</td></tr><tr><td>widening of hips</td><td></td><td>✓</td></tr></table> ;;;	3	one mark for each correct row
3(c)	oestrogen ;	1	
3(d)	testes ;	1	

Question 4 [12]

4 **(a)** **X –** placed clearly on oviduct; [1]	**A – X** with label line clearly indicating oviduct
(b) **(i)** M – placenta / villi; N – umbilical cord; [2]	**A –** umbilicus
(ii) 1 has large surface area; 2 for diffusion; 3 of oxygen from mother / to fetus; 4 of carbon dioxide from fetus / to mother; 5 two blood supplies very close to one another; *any three – 1 mark each* [3]	**A –** baby / embryo **A –** baby / embryo
(c) (O / uterus wall / muscle) contracts to push baby (out); (P / cervix) dilates to allow exit of baby / OWTTE; [2]	**A –** vagina
(d) **(i)** 1 virus may pass across / through placenta; 2 virus may be carried by blood leakage (during pregnancy / birth); 3 from mother to fetus *any two – 1 mark each* [2]	must be in context of leakage and not the misconception of joint blood systems
(ii) 1 eating a balanced / varied diet; 2 extra iron / calcium / protein in diet: 3 not smoking (tobacco); 4 not drinking (alcohol); 5 not taking drugs; 6 checks with health team; 7 taking exercise / antenatal exercises; 8 any other valid point; *any two – 1 mark each* [2]	**I –** healthy diet **A –** vitamin C / folic acid **A –** named (illegal) drugs Ignore numbering of answer spaces and read as a paragraph. **I –** inadequate / irrelevant answers and award up to 2 marks
[Total: 12]	

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Question 5 [9]

5(a)	**R** oestrogen ; **S** LH ;	**2**	
5(b)	*ovulation* 12 / 13 / 14 / 15 / 16 ; *menstruation* 1 – 8 ;	**2**	
5(c)	*description* concentration of progesterone increases and remains / is, high ; *reason* to thicken or maintain uterus lining / prevent ovulation or menstruation ; **OR** progesterone is produced by the placenta ;	**2**	1 mark for description and 1 mark for reason
5(d)	*during a menstrual cycle* – ovary ; *during pregnancy* – ovary / placenta ;	**2**	
5(e)	*any one from:* stimulates ovaries to release of oestrogen ; stimulates eggs to, mature / develop (in the ovary) ;	**1**	

Question 6 [10]

6(a)(i)	E A **B** D C ;	**1**	Accept A E **B** D C
6(a)(ii)	FSH ;	**1**	
6(a)(iii)	*any two from:* (menstruating females need more) iron ; ORA (iron is needed for) haemoglobin / red blood cells / transport of oxygen / to prevent (iron-deficiency) anaemia ;	**2**	
6(b)	**1** sperm / male gametes are, deposited in, **S** / vagina OR travel through, **R** / cervix ; **2** egg / sperm / gametes, travel, to **P** / oviduct ; **3** enzymes (from acrosome / sperm) digest jelly coat (around egg) ; **4** fertilisation OR fusion of nuclei, of sperm / male gamete, and of female gamete / egg (cell) ; **5** formation of diploid zygote ; **6** zygote / embryo, travels, down **P** / oviduct OR zygote / embryo, travels to, **T /** uterus ; **7** mitosis / cell division / growth / develop (zygote / embryo / fetus) ; **8** ball of cells / embryo, implants in, **T** / uterus ; **9** **U** / placenta / **V** / umbilical cord (between mother, and fetus) ; **10** delivery / diffusion, of (named) resource / excretion of (named) waste, via **U /** placenta / **V** / umbilical cord ; **11** AVP ; e.g. • named sperm adaptation for swimming e.g. mitochondria • **Q** / ovary / **U /** placenta, releases progesterone (to maintain lining) • *ref to* (cell) specialization / complexity, of fetus / (named) organs (in fetus)	**6**	

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Question 7 [10]

7(a)(i)	1 maternal and fetal blood are kept separate / AW ; *plus any three from:* 2 umbilical cord / placenta, transfers named substance, from mother / to fetus ; 3 umbilical cord / placenta, transfers named substance, from fetus / to mother ; 4 umbilical cord / placenta, transfers, antibodies / passive immunity, from mother / to fetus ; 5 placenta forms barrier to, toxins / pathogens ; 6 placenta secretes, progesterone / oestrogen ; 7 AVP ;	**4**	
7(a)(ii)	*any three from:* 1 protects, (fetus) against (mechanical) damage ; 2 regulation of temperature ; 3 allows fetus to move / allows muscle **or** bone development ; 4 protects fetus from infection / provides antibodies ; 5 allows lung development ; 6 sac produces amniotic fluid ; 7 AVP ;	**3**	
7(b)(i)	HIV / named STI ;	**1**	
7(b)(ii)	*any two from:* (named) barrier method of contraception / condom / femidom ; abstinence ; (regular) testing / screening ; education ; tracing sexual partners ; use of antibiotics ; vaccination ; AVP ;;	**2**	

Question 8 [11]

8	**(a)**	**A** protein ; **B** RNA / nucleic acid ;	[2]	**A** capsid / protein coat **R** membrane **R** capsule, slime coat **A** DNA
	(b)	lymphocytes stop making antibodies ; *ref to* antibodies stop, bacteria / viruses, spreading / AW ; help phagocytes, ingest / AW, bacteria / AW ; lymphocytes kill infected cells ; AVP ; e.g. another function of antibodies	[max 3]	**A** lymphocytes normally make antibodies **A** in context of lymphocytes and antibodies NOT doing their normal functions **A** pathogens for bacteria **R** 'fight diseases' e.g. clumping bacteria / attaching to antigens
	(c)	(unprotected / AW) sexual intercourse ; across placenta ; at birth ; in breast milk ; sharing, needles / syringes ; in blood products / blood for transfusion / transplants / blood to blood contact ;	[max 3]	**R** saliva **R** other sharps, e.g. razors unless qualified by blood contact **R** using contaminated / dirty / used, needles unqualified **R** donating blood
	(d)	use of, condoms / femidoms ; provide education / suitable example ; publicity campaigns ; needle exchange schemes for drug addicts ; sterilisation of needles / safe disposal / no reuse ; screening blood / blood donors ; AVP ; e.g. HIV+ mothers should bottle feed, limit number sexual partners	[max 3]	**R** not sharing needles unqualified
		[Total: 11]		

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Question 9 [11]

9 (a) (i)

circulatory system	blood vessels that carry oxygenated blood
maternal	V ;
fetal	Y / Y **and** X ;

[2]

(ii)

umbilical cord ;
Any one of the following:

tied / clamped ;
cut ;
(part attached to mother) comes away with placenta ;
(part attached to baby) drops off ;

[2]

(iii)

MP1 oxygen, from maternal / to fetal ;
MP2 carbon dioxide, from fetal / to maternal ;
MP3 named nutrients from maternal / to fetal ;
MP4 water, either direction or both ;
MP5 antibodies, from maternal / to fetal ;
MP6 urea / nitrogenous waste, from fetal / to maternal ;
MP7 passage of hormones, from maternal / to fetal / both directions ;
MP8 diffusion in correct context ;
MP9 active transport in correct context ; (amino acids)

[max 4]

(b)

oestrogen and progesterone

MP1 develops, (lining of) uterus / endometrium ;
MP2 prevent, shedding of lining / menstruation ;
MP3 inhibit (release of) FSH ;
MP4 by pituitary gland ;
MP5 prevent egg cells / follicles, developing (in ovary) / ovulation ;
MP6 promote development / growth, of mammary glands ;

[max 3]

[Total: 11]

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