

16. Reproduction

16.5 Sexual hormones in humans

Paper 3 and 4

Marking Scheme

Q1.

(c)(i)	testosterone ;	1	
(c)(ii)	breasts develop deepening of the voice growth of facial and pubic hair menstruation begins muscular development pelvis widens	3	R each additional tick

Q2.

(b)(i)	7 (days) ;	1	A 8 / 6.8 / 7.2
(b)(ii)	straight line drawn horizontally on the graph grid between day 16 and day 28 as a continuation of the existing line ;	1	
(b)(iii)	13 / 14 / 15 ;	1	
(c)	any three from: voice deepens / AW ; shoulders broaden ; growth spurt / AW ; sexual organs enlarge ; sperm, production / release ; (increased) production of testosterone ; facial hair grows ; pubic / body / underarm, hair grows ; increase in, muscle / bone (mass) ; AVP ;	3	

Q3.

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

Q4.

(b)	Oestrogen linked to first three boxes: is a hormone ; is produced by ovaries ; makes breasts grow ;	3	one mark for each correct line R each additional line
(c)(i)	(ovulation) 13 / 14 / 15 ; (lining shed) 0 / 1 ; (lining thinnest) 4–9 ;	3	
(c)(ii)	egg matures / oestrogen / progesterone / hormone, secreted / AW ;	1	A formation of Graafian follicle / egg develops I eggs produced / made

Q5.

(a)(i)	decreases then increases and levels off ; lowest thickness (reached) at day 6 / decreases from day 0/1 to day 6 ; increases in thickness from day 6 to day 15 ; constant thickness between days 15 and 28/0/end ;	3	
(a)(ii)	day 0 / 1, to day 6 ;	1	
(a)(iii)	X drawn on the graph at approximately day 14 ;	1	A ± 2 days

Q6.

(b)(i)	ovary ;	1	
(b)(ii)	any three from: secondary sexual characteristics ; start of, the menstrual cycle / AW ; hips widen ; growth of breasts ; growth of, pubic / body, hair ; AVP ;	3	

Q7.

(a)(i)	Y is FSH ; Z is LH ;	2	
(a)(ii)	line drawn: low until day 14 ; increasing until day 21, then a decrease ;	2	
(a)(iii)	14 ;	1	
(a)(iv)	placenta ;	1	

Q8.

(a)	oestrogen ; progesterone ;	2	
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Q9.

(b)	<i>hormones:</i> insulin ; glucagon ; <i>enzymes:</i> amylase / carbohydrase ; trypsin / protease ; lipase ;	5	<i>enzymes and hormones can be in any order in each column</i>
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Q10.

(a)(i)	<table border="1"><tr><td>E</td><td>A</td><td>B</td><td>D</td><td>C</td></tr></table>	E	A	B	D	C	;	1	Accept <table border="1"><tr><td>A</td><td>E</td><td>B</td><td>D</td><td>C</td></tr></table>	A	E	B	D	C
E	A	B	D	C										
A	E	B	D	C										
(a)(ii)	FSH ;		1											

Q11.

(a)(i)	ovary ;	1	
(a)(ii)	plasma / blood (vessels) ;	1	
(a)(iii)	<p><i>any two from:</i></p> <p>1 both hormones, follow the same pattern / increase and decrease ; 2 both hormones reach a peak at, day 14 / the same time / the same day ; 3 LH starts increasing before FSH ; ora 4 LH has a higher concentration than FSH at, the peak / day 14 ; 5 LH concentrations are lower than FSH before the peak ; ora 6 LH concentrations are higher than FSH after the peak; ora 7 comparative data quote between concentrations of LH and FSH ;</p>	2	
(b)	<p><i>any four from:</i></p> <p>1 FSH stimulates, development / growth / maturation, of <u>follicles</u> (in ovary) ; 2 FSH stimulates, development / growth / maturation, of, egg (cell) / ova / ovum / (female) gamete(s) ; 3 FSH stimulates, production / release / secretion, of oestrogen (from ovary) ; 4 (FSH and) LH (surge) stimulates, ovulation / release of egg from ovary ; 5 LH stimulates (corpus luteum / yellow body / empty follicle), secretion / production / release, of progesterone ; 6 decrease in LH decreases secretion of progesterone (by corpus luteum) ; 7 AVP ;</p>	4	
(c)	<p><i>any three from:</i></p> <p>1 loss / thinning, of lining (of uterus), at the beginning of the cycle / during first week / between day 1–7 ; 2 regrowth / thickening of, lining (of uterus), during second week / after loss (of lining) / before ovulation ; 3 thickness of lining remains constant, in the last two weeks / at the end of the cycle / after ovulation / if no fertilisation ; 4 ref. to, blood vessels / glands ;</p>	3	
(d)	<p><i>any three from:</i></p> <p>1 (contraceptives contain) progesterone (with oestrogen) ; 2 decreases secretion / prevents release, of FSH / LH ; 3 prevents, development / maturation of, follicles / eggs / ova ; 4 prevents ovulation / described ; 5 AVP ; e.g. changes / thickens, cervical mucus to prevent entry of sperm OR prevents, regrowth / thickening, of uterus lining (reducing chance of implantation)</p>	3	

Q12.

(a)	hormone	site of production	target organ	role	5
	FSH	pituitary gland	ovary	(stimulates) development of egg <i>or</i> ovum / ref. to secretion of oestrogen ;	
	LH	pituitary gland	ovary	(stimulates) ovulation / ref. to secretion of progesterone (and oestrogen) ;	
	oestrogen	ovary ; A placenta	uterus	stimulates growth of the lining of the uterus	
	progesterone	ovary ; A placenta	uterus	maintains / AW, the lining of the uterus ;	
(b)	<p><i>days 0–7:</i> decrease in thickness ; decreases quickest between days 0 and 3 ;</p> <p><i>days 7–28:</i> increase in thickness ; remains at same thickness from day, 21 / 22 / 23 ;</p>	3			

Q13.

(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	<p>I production (of eggs)</p> <p>A FSH is a fertility drug</p>