

# **16. Reproduction**

## **16.5 Sexual hormones in humans**

### **Paper 3 and 4**

#### **Marking Scheme**

**Q1.**

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

**Q2.**

(b)(i)	7 (days) ;	<b>1</b>	<b>A</b> 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 ;	<b>1</b>	
(b)(iii)	13 / 14 / 15 ;	<b>1</b>	
(c)	<i>any three from:</i> 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 ;	<b>3</b>	

**Q3.**

(a)(i)	30 ; 5 ; 15 ; 0 / 30 ;	4													
(b)	<table><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> <p>***</p>		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)	<p>Oestrogen linked to first three boxes:</p> <div>is a hormone ;</div> <div>is produced by ovaries ;</div> <div>makes breasts grow ;</div>	<b>3</b>	one mark for each correct line <b>R</b> each additional line
(c)(i)	(ovulation) 13 / 14 / 15 ; (lining shed) 0 / 1 ; (lining thinnest) 4–9 ;	<b>3</b>	
(c)(ii)	egg matures / oestrogen / progesterone / hormone, secreted / AW ;	<b>1</b>	<b>A</b> formation of Graafian follicle / egg develops <b>I</b> 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 ;	<b>3</b>	
(a)(ii)	day 0 / 1, to day 6 ;	<b>1</b>	
(a)(iii)	<b>X</b> drawn on the graph at approximately day 14 ;	<b>1</b>	<b>A</b> $\pm$ 2 days

**Q6.**

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

**Q7.**

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

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

## Q12.

(a)	<b>hormone</b>	<b>site of production</b>	<b>target organ</b>	<b>role</b>	<b>5</b>	
	FSH	pituitary gland	ovary	(stimulates) development of egg or ovum / ref. to secretion of oestrogen ;		
	LH	pituitary gland	ovary	(stimulates) ovulation / ref. to secretion of progesterone (and oestrogen) ;		
	oestrogen	ovary ; <b>A</b> placenta	uterus	stimulates growth of the lining of the uterus		
	progesterone	ovary ; <b>A</b> 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>				<b>3</b>	

## Q13.

(b)(i)	(named) oestrogen ; (named) progesterone ;	<b>2</b>	
(b)(ii)	(FSH would) stimulate an egg / follicle, to mature / develop / grow / ripen ; <b>ora</b> (FSH would) stimulate (release of) oestrogen / LH ; <b>ora</b> (FSH would) lead to ovulation ; <b>ora</b> (FSH would) increase the chance of fertilisation / pregnancy / AW ; <b>ora</b>	<b>3</b>	I production (of eggs)    <b>A</b> FSH is a fertility drug