

Biology

Advanced GCE **2805/01**

Growth, Development and Reproduction

Mark Scheme for June 2010

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Question			Expected Answers	Marks
1	(a)	(i)	<p><i>absolute</i> change / increase in , size / height / mass, in unit <u>time</u> / over (a period of) time ; absolute growth in a given time period ;</p> <p><i>relative</i> percentage increase in, size / height / mass, in a given time / over time ; efficiency of growth relative to size ;</p> <p><i>formulae</i> <u>change / increase in growth / size / height / mass in unit time</u> size / height / mass, at start ;</p> <p>OR</p> <p><u>absolute growth</u> size / height / mass, at start ;</p>	2 max
		(ii)	<p>two individuals may grow by same amount but may be different percentage of original mass / does not consider original mass ; <i>idea of</i> growth is slow at first because fewer cells to divide but actually fast ; AVP ; e.g. different rate over time not shown true growth is dry mass</p>	2 max
		(iii)	<p>measure (parameter) at start / time 0 ; measure / record, parameter at, end / after, interval ; calculate , change in parameter / absolute growth rate ; divide by parameter at start ; calculate, percentage / %, increase in parameter ; compared to previous measurement / AW ; plot graph , % increase / relative growth rate , against time ; AVP ; e.g. detail of technique / ref. to time interval</p>	4 max
	(b)	(i)	<p>16.8 / 17 ;; Correct answer = 2 marks If answer incorrect, allow 1 mark for $\frac{(51.6 - 34.3)}{34.3} \times 100$ $\frac{50}{50.4} = 16.8 / 17 (\% y^{-1})$; ecf 1 mark</p>	2 max
		(ii)	<p>ill ; malnutrition / named deficiency ; hormone deficiency / named ; genetic / AW ; AVP ; e.g. anorexia</p>	2 max
				[Total: 12]

Question			Expected Answers		Marks	
2			1	(anterior pituitary) produces growth hormone ;		
			2	regulates growth throughout body / AW ;		
			3	stimulates, protein synthesis ;		
			4	helps develop, limb (bones) / (skeletal) muscle ;		
			5	increases, cell division / mitosis ;		
			6	favours respiration of fat instead of carbohydrate ;		
			7	FSH / LH / ICSH (from anterior pituitary) ;		
			8	stimulates oestrogen, from follicle / testosterone, from interstitial cells ;		
			9	these develop secondary sexual characteristics / at least two named ;		
			10	anterior pituitary , secretes TSH ;		
			11	stimulates thyroxine secretion ;		max 5
			12	thyroid gland secretes thyroxine / T ₄ ;		T ₃ neutral
			13	inhibits TSH ;		
			14	controls BMR ;		
			15	increases / stimulates, transcription / formation mRNA ;		
			16	increases / stimulates, respiration ;		
			17	increases / stimulates, protein synthesis ;		
			18	increases / stimulates, development skeletal system ;		
			19	increases / stimulates, brain development ;		
			20	ref to negative feedback ;		
			<i>only penalise once for omitting 'increases' / stimulates</i>		9 max	
			QWC - legible text with accurate spelling, punctuation and grammar ;		1	
					[Total: 10]	

Question 3 cont'd			Expected Answers	Marks
	(e)	(i)	mitosis ;	1
		(ii)	unspecialised / not adapted to function / example ; can develop into any tissue / totipotent ; can still divide ; all genes switched on / some genes switched off ;	2 max
	(f)		cell becomes specialised / differentiated ; to perform a particular function / form a tissue / example / xylem (vessel) dies ; ref. to development organelles ; cell elongates / increases in size ; by uptake of water by osmosis ; vacuoles develop / vacuolation ; cell wall / cellulose thickens ; loses ability to divide / adapt to another function ; ref. to gene switching ;	4 max
				[Total: 17]

Question 4 cont'd			Expected Answers	Marks
	(d)	(i)	<p>increase in temperature, increase in oxygen uptake / absorption , up to day 5 / days 1-5 / initially ; comparative figs. to illustrate ; <i>both axes same day</i></p> <p>increase more rapid at higher temperatures (up to day 3) ; highest rate of oxygen uptake at 30°C / lowest at 10°C ; comparative figs to illustrate ; <i>both axes</i></p> <p>the higher the temperature the earlier the uptake peaks ; decrease at 30°C after 3 days / after 5 days at 20°C / 5.5 days at 15°C ; figs to illustrate ; <i>both axes must illustrate decline</i></p> <p>peak not reached at 10°C (during time of experiment) ;</p> <p>AVP ;</p>	4 max
	(d)	(ii)	<p>increase in rate of, respiration / metabolism ; increase in rate of germination ; <u>aerobic</u> respiration ; effect of temperature on enzymes ; further detail ; e.g. ATP / energy for growth / germination optimum temperature</p> <p>AVP ; e.g. increase in temperature, increases rate of cell division / rate of diffusion</p>	3 max
				[Total: 19]

Question 5 cont'd			Expected Answers	Marks
	(d)	(i)	0.508 ;; <i>Correct answer = 2 marks</i> <i>If answer incorrect, allow 1 mark for $\frac{31}{61}$;</i>	2
		(ii)	(any) exposure increase proportion of females births / ora ; exposure of mother has, little / no, effect ; exposure of father is, more / most, significant / AW ; causes, decrease in male births / increase in female births ; comparative figures in support ; male, fetus harder to carry / prenatal mortality higher ; perinatal mortality higher in males ; small sample / unequal number of births in each category ; AVP ; e.g. X sperm stronger / ora	4 max
				[Total: 21]

Question			Expected Answers	Marks
6	(a)	1	progesterone increases as HCG increases / general statement on the shape of the progesterone graph, linked with at least 2 figures from horizontal axis ; R steadily	5 max
		2	HCG maintains corpus luteum ;	
		3	corpus luteum produces progesterone ;	
		4	for first, 12 weeks / 13 weeks / three months ;	
		5	progesterone production slows / AW, because HCG concentration falls ;	
		6	as corpus luteum breaks down / AW ;	
		7	as placental mass increases , progesterone increases ;	
		8	progesterone, maintains the endometrium or lining / essential to maintain pregnancy ;	
		9	AVP ;	
	(b)	(i)	antibody complementary shape to HCG / AW ; R matches, specific	1
		(ii)	(genetically identical so) produce identical antibodies / proteins ; all, complement / bind to, HCG / antigen ;	1 max
	(c)		<p>2 examples of: <i>named mechanism 1 mark</i> <i>named substance and correctly linked description of mechanism 1 mark</i> <i>max 2</i></p> <p>diffusion ; e.g. O₂ / CO₂ / H₂O / Na⁺ / K⁺ / urea / etc, ref to diffusion / concentration , gradient ; <i>max 2</i></p> <p>facilitated diffusion ; e.g. ions / glucose, correct ref to channel proteins ; <i>max 2</i></p> <p>osmosis ; water, ref to water potential gradient / selectively permeable membrane ; <i>max 2</i></p> <p>active transport ; e.g. amino acids / minerals / ions / Na⁺ / K⁺ / Ca²⁺ / Fe²⁺ / vitamins / etc, ref to energy use / specific protein carrier / against gradient ; <i>max 2</i></p> <p>pinocytosis ; e.g. lipids / fatty acids / antibodies / etc, ref to bulk transport / liquids ; <i>max 2</i></p>	4 max
				[Total: 11]

Paper Total 90

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