

# **Human Biology**

Advanced GCE

Unit **F224**: Energy, Reproduction and Populations

## **Mark Scheme for June 2012**

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## Annotations

Annotation	Meaning
	Correct answer
	Cross
	Benefit of doubt
	Benefit of doubt not given
	Error carried forward
	Given mark
	Underline (for ambiguous/contradictory wording)
	Omission mark
	Correct response
	Ignore
	Poorly expressed
	Contradiction
	Unclear
	Example/Reference

Question			Answer	Marks	Guidance
1	(a)	(i)	<i>in Nigeria</i> 1. idea of little contraception ; 2. idea of large family to compensate for high death rate ; 3. need (more) children to, work for / support, family ; 4. stated or described religious / cultural, reason ; 5. AVP ;	2 max	<b>CREDIT</b> reverse argument for UK  4. eg some religious groups do not condone contraception 5. eg more people of child-bearing age / ref to abortion being more freely available in UK
		(ii)	1. can provide good health care / AW ; 2. can provide adequate nutrition ; 3. may not report all deaths / AW ; 4. idea of lower incidence of risk factors common in UK ; 5. AVP ;	2 max	1. eg 'vaccinations are available (in Ghana)  4. eg obesity, hypertension, diabetes, CHD, alcohol related diseases 5. eg higher proportion of young people (in Ghana)
	(b)		<b>DD</b> <b>DI</b> <b>DI ; ;</b>	2	<b>All 3 correct = 2 marks</b> <b>any 2 correct = 1 mark</b>
<b>Total</b>				<b>6</b>	

Question		Answer	Marks	Guidance
2	(a)	<p><b>Mark the first answer in each box.</b></p> <p><b>E ;</b></p> <p><b>F ;</b></p> <p><b>B ;</b></p>	3	If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>
	(b)	(i)	gonadotrophin releasing hormone ;	1 <b>ALLOW</b> phonetic spelling
		(ii)	1. stimulates Graafian follicle ; 2. to release, secondary / 2 <sup>o</sup> , oocyte ; 3. stimulates, luteinisation / development of corpus luteum ;	2 max <b>CREDIT</b> 'dominant' instead of Graafian <b>CREDIT</b> 'causes ovulation'
		(iii)	1. (steroids) are non-polar / lipid soluble <b>or</b> cell surface membrane made of (phospho) lipids <b>or</b> (steroids) can diffuse directly (through cell surface membrane) ;  2. (progesterone) has, specific / complementary, shape to receptor <b>or</b> forms complex with receptor <b>or</b> directly affects nucleus <b>or</b> idea that switches genes on / off ;	2

Question		Answer	Marks	Guidance
	(iv)	1. (endometrium) gets thicker ; 2. increased, formation of blood vessels / blood supply ; 3. AVP ;	2 max	<b>IGNORE</b> 'maintains, endometrium / lining'  <b>3.</b> eg (due to) increased, mitosis / cell division
	(v)	<u>apoptosis</u> / <u>programmed</u> cell death ;	1	<b>DO NOT CREDIT</b> 'cells die' without qualification <b>ALLOW</b> phonetic spelling
<b>Total</b>			<b>11</b>	

Question			Answer	Marks	Guidance
3	(a)	(i)	anaerobic / absence of oxygen / AW ;	1	<b>IGNORE</b> general ref. to exercise (as given in Q) <b>ACCEPT</b> high intensity exercise eg sprinting
		(ii)	<b>Mark the first answer.</b>  lactate ;	1	If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>  <b>CREDIT</b> lactic acid
		(iii)	<b>Mark the first answer.</b>  carbon dioxide / CO <sub>2</sub> ;	1	If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>
		(iv)	<b>Mark the first 2 answers in any order</b>  (pyruvate) dehydrogenase ;  (pyruvate) decarboxylase ;	2	<b>IGNORE</b> hydrolytic
		(v)	<i>red blood cells</i>  have <b>no</b> , mitochondria / <u>pyruvate</u> dehydrogenase / decarboxylase / coenzyme A ;	1	

Question	Answer	Marks	Guidance
(b)	1. acetyl CoA combines with <b>oxaloacetate</b> to form <b>citrate</b> ; 2. <b>decarboxylation</b> , releases / produces, CO <sub>2</sub> ; 3. <b>dehydrogenation</b> / release of hydrogen, to form, reduced NAD / reduced FAD (at correct point in cycle) ; 4. ATP produced from ADP and Pi ; 5. (by) <b>substrate level phosphorylation</b> ; 6. series of, steps / intermediates / enzyme catalysed reactions ; 7. oxaloacetate regenerated ;	5 max	<b>PENALISE ONCE ONLY</b> if incorrect number of carbons given  <b>1. ACCEPT</b> acetate  <b>3. DO NOT CREDIT</b> release of H <sub>2</sub> / hydrogen ions  <b>4. CREDIT</b> NAD / FAD, accepts hydrogen  <b>6. ACCEPT</b> a description of, 6C / citrate, to 5C to, 4C / oxaloacetate
	QWC ;	1	3 of the emboldened terms used and spelt correctly <b>oxaloacetate</b> <b>citrate</b> <b>decarboxylation</b> <b>dehydrogenation / oxidation</b> <b>substrate level phosphorylation</b>
	<b>Total</b>	<b>12</b>	

Question		Answer	Marks	Guidance
4	(a) (i)	0.96 ; ;	2	Correct answer = 2 marks  If answer is incorrect or given to the incorrect number of decimal places, then <b>ALLOW</b> correct working for one mark eg $121 \div 12600 (x 100)$
	(ii)	1. some maize (plants) die ; 2. maize carries out, respiration / metabolism ; 3. not all of parts of maize fed to cattle ; 4. not all of maize digested (and absorbed) ;	3 max	<b>ACCEPT</b> 'producer' for 'maize' throughout  <b>3.</b> idea that only cobs are eaten  <b>4. ACCEPT</b> energy loss through defaecation / egestion <b>DO NOT CREDIT</b> ref to excretion
	(b) (i)	<b>Mark the first answer.</b>  protein / amino acid / nucleic acid / nitrogenous base / chlorophyll / urea / uric acid ;	1	If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>  <b>ACCEPT</b> abbreviations e.g. DNA / RNA / NAD / FAD / ADP / ATP  <b>DO NOT CREDIT</b> ammonia / NH <sub>3</sub> / urine
	(ii)	<b>Mark the first answer.</b>  nitrifying ;	1	If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>  <b>ACCEPT</b> <i>Nitrobacter</i> <b>DO NOT CREDIT</b> <i>Nitrosomonas</i>
	(iii)	polar / AW ;	1	
<b>Total</b>			<b>8</b>	

Question		Answer	Marks	Guidance
5	(a)	<p><i>damage to DNA</i></p> <ol style="list-style-type: none"> <li>occurs during (semi-conservative) replication ;</li> <li>can lead to,  <b>complementary</b> base pairing not occurring  / <b>nucleotides</b> not matching  / change in base sequence ;</li> <li>(caused by) a <b>mutagen</b> / named mutagen ;</li> </ol> <p><i>repair to DNA</i></p> <ol style="list-style-type: none"> <li>DNA <b>polymerase</b> surveys DNA / AW ;</li> <li>other enzymes cut out mismatched, bases /  nucleotides ;</li> <li>correct, base / nucleotide, inserted ;</li> <li>ref. to correct role of DNA <b>ligase</b> ;</li> </ol>	5 max	<p><b>2. ACCEPT</b> e.g. ref to base deletion / addition / substitution</p> <p><b>3.</b> e.g. UV light / ionising radiation</p> <p><b>5. DO CREDIT</b> restriction enzymes / DNA polymerase  / ligase</p> <p>Look for idea of re-forming phosphodiester bonds</p>
		QWC ;	1	<p>2 of the emboldened terms used and spelt correctly  <b>mutagen / mutagenic</b>  <b>complementary</b>  <b>nucleotides</b>  <b>polymerase</b>  <b>ligase</b></p>



Question		Answer	Marks	Guidance
	(ii)	1. no / few / little, side effects / AW ; 2. (so) could be used for longer ; 3. (so) could be used post operatively ; 4. AVP ;	2 max	<b>1. ACCEPT</b> idea of improved quality of life during treatment  <b>4.</b> eg chemotherapy less selective of cancer cells <b>or</b> idea that makes chemotherapy available to treat more aggressive cancers
		<b>Total</b>	<b>15</b>	

Question		Answer	Marks	Guidance
6	(a)	<p><i>dizygotic</i> two (secondary) oocytes each fertilised (by separate sperm) / AW ;</p> <p><i>monozygotic</i> one (secondary) oocyte fertilised (by one sperm) and then splits into two / AW ;</p>	2	<p><b>DO NOT CREDIT</b> any references to 'egg' alone</p> <p>Penalise use of ovum / ova / egg cell once only</p>
	(b)	<p><b>Mark the first answer.</b></p> <p>vanishing twin syndrome ;</p>	1	<p>If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b></p> <p><b>ACCEPT</b> disappearing twin syndrome</p>
	(c)	<p>1. increase in age of mother leads to more twins ;</p> <p>2. fertility treatment leads to more twins ;</p> <p>3. family history of twins leads to more twins ;</p> <p>4. more chance of fraternal twins (than identical) ;</p> <p>5. use of figures with units (%) to support any of mps 1-4 ;</p>	3 max	<p><b>CREDIT</b> reverse argument</p> <p>eg mp1 age 25-29 yrs number of twins = 3.0% <b>and</b> 30-34 yrs number of twins = 4.0% mp2 with fertility treatment number of twins = 20.0% <b>and</b> without fertility treatment number of twins = 0.4%</p>

Question		Answer	Marks	Guidance
	(d)	1. low birth weight / AW ; 2. stillborn ; 3. named developmental problems ; 4. AVP ;	2 max	3. eg congenital heart defect / poor lung development / poor neurological development  4. eg a social or educational consequence described
		<b>Total</b>	<b>8</b>	

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