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CAMBRIDGE INTERNATIONS

NOVEMBER 2002

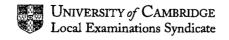
GCE Advanced Level

MARK SCHEME

MAXIMUM MARK: 50

SYLLABUS/COMPONENT: 9700 /4

BIOLOGY (STRUCTURED QUESTIONS (A2 CORE))



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Question 1

(ii) decreases to 0 / all used up; (b) (i) GP continues to be formed from RuBP; (until) all RuBP used up; the GP falls as converted to hexose/glucose/TP; (ii) in dark RuBP not regenerated/converted to GP; R used up requires the products /ATP/reduced NADP from the light reaction / photophosphorylation; (c) ATP; reduced NADP;	(a)	•	
rapid/sharp/steep; then decrease; does not drop to original value; (ii) decreases to 0 / all used up; 1 (b) (i) GP continues to be formed from RuBP; (until) all RuBP used up; the GP falls as converted to hexose/glucose/TP; (ii) in dark RuBP not regenerated/converted to GP; requires the products /ATP/reduced NADP from the light reaction / photophosphorylation; 2 (c) ATP; reduced NADP;	(i)		
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ATP; reduced NADP; 2		•	on ; 2
ATP; reduced NADP; 2	(c)		
reduced NADP;			
			2
and the control of th			
Total: 9		To	ntal:9

Question 2

(a)

	name of structure	stage of respiration			
Α	matrix	Krebs cycle ;			
В	cristae / inner membrane A intermembrane space	oxidative phosphorylation/ETC; A build up of protons			

Penalise once if rows A and B are correct but swapped If both structure names are correct (but stages incorrect) allow one mark

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(b) membranes separate from rest of cytoplasm; allows different pH; inner membrane attachment of stalked particles / ATPase; allows linear / ordered arrangement of carriers/ETC/respiratory chain; ref. to large internal surface area/AW; 3 max matrix contains enzymes; (c) carries / transfers protons/hydrogen(atoms); and electrons; in/to ETC /FAD/respiratory chain; ref. to dehydrogenation/oxidising; energy used to form ATP; ref. to coenzyme; ref. alternative pathways (named); 3 max (d) light involved; occurs in chloroplasts/chlorophyll; on thylakoid membranes; ref. to cyclic and non-cyclic; photolysis of water/produces oxygen; If oxidative phosphorylation stated light not involved; oxygen final hydrogen acceptor/oxygen not evolved; 3max Total:11 Question 3 engulf / remove / breakdown red blood cells; haemoglobin broken down; into haem and globin; iron removed (from haem); remainder passes to liver cells to form bile pigments; globin broken down into amino acids; 4 max (b) forms lipoproteins; stores fats; synthesises cholesterol; forms bile salts from cholesterol; converts glucose to fats; converts fats to fatty acids and glycerol; converts fats/glycerol to glucose; 3 max

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(c) diffuses into sinusoids; dissolved/in solution; in blood/ plasma; via hepatic vein; via renal artery; 2 max (d) 1 less glucose / amino acids / fatty acids and glycerol / nutrients/more urea; less oxygen / more carbon dioxide; 1 Total: 11 Question 4 (a) 1 metaphase; (b) centromeres divide / splits; R break chromatids separate; idea movt. to opposite poles / centrioles; by microtubules / spindle fibres; 3 max idea.mechanism of movement; (c) (i) 1 breaks down / disperses; (ii) centrioles divides/replicate; to form two pairs (of centrioles); 2 max move to (opposite) poles; (d) 1 random alignment / independent assortment / or description; different mix of maternal and paternal chromosomes/chromatids; 2 crossing over / chiasmata formation/exchange of genetic material; between chromatids of homologous chromosomes; breaks up linkage groups / mixes maternal and paternal alleles; 4 max In 1 or 2 ref. different gametes produced; Total: 11

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Question 5

(a)

Either

If genetic diagram used

Penalise once for incorrect symbols

orange dominant to black (or converse);

orange scallop

black scallop

parents
$$S^b S^b$$
 X $S^b S^b$ gametes $S^b S^b$ $S^b S^b$ $S^b S^b$ genotype $S^b S^b$ black

<u>Or</u>

If text explanation given

orange dominant to black (or converse); orange are heterozygous; (because) ref. 3:1 ratio; link data to ratio; black are homozygous; because all offspring are black;

6

(b) separate orange scallops produced from first cross / test cross orange with black; some will produce only orange offspring; these will be homozygous for orange allele/pure breeding;

2 max

Total: 8