

Mark Scheme Summer 2008

GCE

GCE O Level Biology (7040)

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Summer 2008

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7040 / 01 Paper 1 Mark Scheme - June 2008

Question Number	Answer	Mark																																							
1	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Characteristic</th> <th colspan="4" style="text-align: center;">Type of organism</th> </tr> <tr> <th style="text-align: center;">Bacteria</th> <th style="text-align: center;">Plant</th> <th style="text-align: center;">Fungi</th> <th style="text-align: center;">Animal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Are multicellular</td> <td style="text-align: center;">never</td> <td style="text-align: center;">always</td> <td style="text-align: center;">sometimes</td> <td style="text-align: center;">always:</td> </tr> <tr> <td style="text-align: center;">Contain chloroplasts</td> <td style="text-align: center;">sometimes</td> <td style="text-align: center;">always</td> <td style="text-align: center;">never</td> <td style="text-align: center;">never;</td> </tr> <tr> <td style="text-align: center;">Have cell walls</td> <td style="text-align: center;">always</td> <td style="text-align: center;">always</td> <td style="text-align: center;">always</td> <td style="text-align: center;">never;</td> </tr> <tr> <td style="text-align: center;">Are able to move from one place to another</td> <td style="text-align: center;">sometimes</td> <td style="text-align: center;">never</td> <td style="text-align: center;">never</td> <td style="text-align: center;">sometimes;</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Example</th> <th style="text-align: center;">Lactobacillus /eq.;</th> <th style="text-align: center;">Maize / eq.;</th> <th style="text-align: center;">yeast</th> <th style="text-align: center;">Human/ eq.;</th> </tr> </thead> <tbody> <tr> <td style="height: 30px;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Characteristic	Type of organism				Bacteria	Plant	Fungi	Animal	Are multicellular	never	always	sometimes	always:	Contain chloroplasts	sometimes	always	never	never;	Have cell walls	always	always	always	never;	Are able to move from one place to another	sometimes	never	never	sometimes;	Example	Lactobacillus /eq.;	Maize / eq.;	yeast	Human/ eq.;						(7)
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(Total 7 marks)

Question Number	Answer	Mark
2	Water; Plasma; Lower/smaller/eq; Pituitary; Collecting duct; Less; More/greater/eq; Less/ reduced/dilute/eq;	(8)

(Total 8 marks)

Question Number	Answer	Mark
3(a)	dominant allele is always expressed /eq; recessive allele is hidden (in heterozygote) / only expressed in homozygote/eq;	(2)

Question Number	Answer	Mark															
3(b)(i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Father</th> <th>Mother</th> </tr> </thead> <tbody> <tr> <td>Genotype of parents</td> <td style="text-align: center;">Aa</td> <td style="text-align: center;">aa;</td> </tr> <tr> <td>Gametes</td> <td style="text-align: center;">A or a</td> <td style="text-align: center;">a;</td> </tr> <tr> <td>Genotypes of children</td> <td style="text-align: center;">Aa</td> <td style="text-align: center;">aa;</td> </tr> <tr> <td>Phenotypes of children</td> <td style="text-align: center;">Achondroplasic /eq</td> <td style="text-align: center;">normal height /eq;</td> </tr> </tbody> </table>		Father	Mother	Genotype of parents	Aa	aa;	Gametes	A or a	a;	Genotypes of children	Aa	aa;	Phenotypes of children	Achondroplasic /eq	normal height /eq;	(4)
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Question Number	Answer	Mark
3(b)(ii)	50% chance of producing Achondroplasic baby / 50% chance of having normal child; can have embryo testing / cv screening / amniocentesis / genetic test/eq;	Max(2)

(Total 8 marks)

Question Number	Answer	Mark
4(a)	(movement of) water; dilute solution to a more concentrated solution / eq; partially permeable membrane / eq;	(3)

Question Number	Answer	Mark
4(b)(i)	water leaves; lower conc. of solution inside red cells / eq; cells shrink/become spiky / crenate /eq;	Max (2)

Question Number	Answer	Mark
4(b)(ii)	cells burst /eq;	(1)

Question Number	Answer	Mark
4(b)(iii)	same conc. of solution inside and outside red cells / isotonic /eq; no osmosis / movement of water / eq;	(2)

Question Number	Answer	Mark
6(a)	Carbon / C; Hydrogen / H; Oxygen / O; Notes Minus 1 mark for each additional incorrect element	(3)

Question Number	Answer	Mark
6(b)	Benedict's / eq; heat; red / orange / green;	(3)

Question Number	Answer	Mark
6(c)	haemoglobin ; red blood cell / prevent anaemia; oxygen transport / eq;	(2)

Question Number	Answer	Mark
6(d)(i)	for respiration; for energy; movement / active transport/ muscle contraction / converted to glycogen/ fat /eq;	(2)

Question Number	Answer	Mark
6(d)(ii)	prevent blood sugar dropping/ eq; stop feeling tired / maintain concentration/ eq; provide energy;	(2)

(Total 12 marks)

Question Number	Answer	Mark															
7(a)(i)	1 mark for each answer placed in the correct box.																
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		(7)															

Question Number	Answer	Mark
7(a)(ii)	carbon dioxide / CO ₂ ; oxygen/ O ₂ ; water / H ₂ O;	
		(2)

Question Number	Answer	Mark
7(b)	flat/thin/eq; (relatively) high SA ; High SA / Vol ratio (= 2 marks);; diffusion ; no cell far from the surface (of organism); not very active (so less need for exchange);	
		Max (4)

(Total 13 marks)

Question Number	Answer	Mark
8(a)(i)	Sand eel;	(1)

Question Number	Answer	Mark
8(a)(ii)	Sunlight / sun / light;	(1)

Question Number	Answer	Mark
8(b)	Diagram to include: shape; 5 boxes names in order;	(3)

Question Number	Answer	Mark
8(c)	energy lost / not all / only 10 % / reaches next level/ eq; movement / excretion/egestion /uneaten/eq; respiration occurs; too little energy left at top;	(3)

(Total 8 marks)

Question Number	Answer	Mark
9(a)	pollution; can harm other organisms / ecosystem ; affect or alter food chain / food web /eq. ; bioaccumulation / eq. ; toxic to humans / eq. ;	(2)

Question Number	Answer	Mark
9(b)(i)	using an organism/ predator/ eq; to kill pest / feed on / eat / remove /eq;	(2)

Question Number	Answer	Mark
9(b)(ii)	suitable pest e.g. greenfly and named predator e.g. ladybird;	(1)

(Total 5 marks)

Question Number	Answer	Mark
10(a)	transfer of pollen /eq; anther to the stigma; different flower/different plant / eq;	Max (2)

Question Number	Answer	Mark
10(b)(i)	anthers lower in pin/ anthers higher in thrum /eq; stigma higher in pin / style longer /eq.; R stigma longer/ tall	(2)

Question Number	Answer	Mark
10(b)(ii)	Insect picks up pollen / eq; from anthers at top of thrum / anthers low in pin; deposit pollen on stigma at top of pin / low in thrum;	(2)

Question Number	Answer	Mark
10(b)(iii)	allows for exchange of alleles / genetic material /eq.; increases variation / eq.; reduces chance of harmful gene combinations/eq; enables plant to evolve / improve / change /adapt /eq.;	(2)

Question Number	Answer	Mark
10(c)(i)	anthers higher than pin / eq; stigma higher than thrum / longer style eq; anthers and stigma are at same height; ONCE	(2)

Question Number	Answer	Mark
10(c)(ii)	self-pollination / described;	(1)

(Total 11 marks)

Question Number	Answer	Mark
11(a)(i)	gravity; light / sunlight / sun;	(2)

Question Number	Answer	Mark
11(a)(ii)	Positive / +ve / towards; phototropic / phototropism / light / sun / sunlight; negative/ -ve / away from / against/ upwards; gravitropic / geotropic / gravity;	(4)

Question Number	Answer	Mark
11(b)	growth response / muscle contraction; chemical/ auxin/ eq. electrical / impulse; diffusion / neurones / nerves / nervous;	(3)

(Total 9 marks)

(Total for paper: 100 marks)

7040 / 02 Paper 2 Mark Scheme - June 2008

Section A

Question Number	Answer	Mark
1(a)	humans (not nature) select; (desirable) characteristics / eq.;	(2)

Question Number	Answer	Mark
1(b)	cattle lack genes / tissue / structures that enable increased milk yield ; still frightened / teats / nipples close;	max (1)

Question Number	Answer	Mark
1(c)(i)	adrenaline;	(1)

Question Number	Answer	Mark
1(c)(ii)	run away / eq; survive / avoid danger / be protected/eq; humans / predators / other animals;	max (2)

Question Number	Answer	Mark
1(d)	fathered high milk producing cows / choose males from high yielding mothers; chose males not easily frightened; have DNA / alleles / genes (for high milk yield/eq);	Max (2)

Question Number	Answer	Mark
1(e)	low oil for food / eat; low oil healthy / lower calories / energy content / less harm to arteries / eq; high oil for cooking oil; high oil for biofuel; I ref. to cost	max (3)

Question Number	Answer	Mark
1(f)	rare / less chance / slim; I sudden / spontaneous / random few plants involved / only 15,000 / 250 per generation;	(2)

(Total 13 marks)

Question Number	Answer	Mark
2(a)	South Africa;	(1)

Question Number	Answer	Mark
2(b)(i)	0.674;; allow one mark if 674 in working	(2)

Question Number	Answer	Mark
2(b)(ii)	HIV; allow AIDS	(1)

Question Number	Answer	Mark
2(c)	virus;	(1)

Question Number	Answer	Mark
2(d)	use condoms / practise safe sex; one partner; avoid sex; sex / health education; HIV test; antiviral drugs; clean needles / no sharing / wear gloves; screen blood for transfusion;	max (3)

Question Number	Answer	Mark
2(e)	idea of +ve correlation / eq; HIV reduces disease resistance / TB more likely to develop / harm to immune system / eq;	(2)

Question Number	Answer	Mark
2(f)	better education / awareness; better health care / needle exchange; more availability of condoms; more HIV testing; blood screening; allow converse	max (2)

(Total 12 marks)

Question Number	Answer	Mark
3(a)	S size (at least half grid); L lines straight and through points; A axes correct way, labelled (units not needed); P points ;; K key to lines: 20 °C and 30 °C;	(6)

Question Number	Answer	Mark
3(b)(i)	increases; up to point / levels off / eq;	(2)

Question Number	Answer	Mark
3(b)(ii)	no difference at low LI / eq. ; increased rate with 30 °C / eq; <u>both</u> level off at high LI;	Max (2)

Question Number	Answer	Mark
3(b)(iii)	slight increase at 30 °C / little effect/eq;	(1)

Question Number	Answer	Mark
3(b)(iv)	<p>at higher level of carbon dioxide, temp. is limiting factor / still carbon dioxide to use / eq; increasing temp. can increase rate / ref. to enzymes /eq.;</p> <p>at low levels of carbon dioxide, carbon dioxide is limiting factor / all carbon dioxide used / eq.;</p> <p>so temperature increase has little effect;</p>	<p>max (2)</p>

Question Number	Answer	Mark
3(c)	<p>burning fossil fuel / methane / gas / oil / wood / keep animals / add Na HCO₃ / pump CO₂ /eq;</p>	<p>(1)</p>

Question Number	Answer	Mark
3(d)	<p>place leaves on graph paper / eq; draw round edge; count squares; add up area / multiply / x2 /eq.;</p>	<p>max (2)</p>

(Total 16 marks)

Question Number	Answer	Mark
4	<p>C vitamin D and no vitamin D / range of vitamin D concentrations / eq;</p> <p>O 1. same species / strain / type of mice / eq; 2. same size/mass/age (at start of expt); I young</p> <p>R several mice / repeat / eq; I mice alone</p> <p>M 1. measure mass (in g) / eq; 2. (rate idea) per unit time / same time interval / eq.;</p> <p>S 1. same food type / same mass of food / eq; 2. same water / caging / temperature / activity /eq;</p>	(6)

(Total 6 marks)

Question Number	Answer	Mark
5(a)(i)	respiration; I anaerobic / aerobic	(1)

Question Number	Answer	Mark
5(a)(ii)	carbon dioxide / CO ₂ ;	(1)

Question Number	Answer	Mark
5(a)(iii)	limewater / hydrogencarbonate / eq; (clear to) milky/cloudy/chalky / (red to) orange/yellow; R potassium hydroxide	(2)

Question Number	Answer	Mark
5(a)(iv)	prevent oxygen/air getting in / eq; <u>anaerobic</u> (respiration);	(2)

Question Number	Answer	Mark
5(b)	mass of yeast / concentration of suspension; use of measuring scales / eq.;	
	OR same time; stopwatch / eq;	
		max (2)

Question Number	Answer	Mark
5(c)	<p>volume of gas / count bubbles; in measuring cylinder / in indicator solution; in (stated) time / use of clock/ eq; repeat / calculate average;</p>	<p>max (3)</p>

Question Number	Answer	Mark
5(d)	<p>(increased rate) more glucose so more respiration / glucose limiting;</p> <p>(levels off) other factor limits respiration / temp. limits / limited number of enzymes / limited number of yeast cells / eq;</p>	<p>(2)</p>

(Total 13 marks)

Total for Section A: 60 marks

Question Number	Answer	Mark
7(a)	<p>(Digestion) large molecules into smaller molecules / insoluble to soluble; uses enzymes; example of enzyme and substrate/eq;</p> <p>(Absorption) taking small/soluble/digested/named molecules; into the blood; via villi; diffusion / active uptake;</p>	<p>max (4)</p>

Question Number	Answer	Mark
7(b)	<p>(mouth:) (salivary) amylase; works in neutral pH / pH 7;</p> <p>(stomach:) protease / pepsin / rennin; hydrochloric acid / acid / low pH / pH 2 to 3;</p> <p>(small intestine:) (pancreas enzymes) amylase / protease/trypsin / lipase / maltase / sucrase /peptidase; acid neutralised / alkaline / pH 7 to 8;</p> <p>ref. optimum pH / enzymes only work/activated in correct pH;</p>	<p>max (4)</p>

(Total 8 marks)

Question Number	Answer	Mark
8(a)(i)	bacteria / fungi /microorganisms; breakdown protein/ amino acids; ammonia / ammonium compounds; converted to nitrates by nitrifying bacteria; accept <i>Nitrosomonas / Nitrobacter</i> increase nitrogen available to plants;	max (2)

Question Number	Answer	Mark
8(a)(ii)	in anaerobic conditions / lack of oxygen; nitrates converted to nitrogen (gas); nitrates to nitrites / nitrates to ammonia; decrease nitrogen available to plants;	max (2)

Question Number	Answer	Mark
8(b)	habitat destruction / loss of trees / eq; loss of species / extinction / migration / eq ; increased carbon dioxide / less photosynthesis / global warming / greenhouse effect; flooding / rising sea level; soil erosion; effect on food chain;	max (4)

(Total 8 marks)

Total for Section B: 16 marks

Question Number	Answer	Mark
10	<p>gene/DNA/allele for insulin; (from) human / insulin producing cell / pancreas / Islets / beta cells; cut; restriction / endonuclease enzyme;</p> <p>plasmid; cut at specific place; using <u>same</u> restriction enzyme; ref. to sticky ends;</p> <p>ligase enzyme; sticks / eq; recombinant DNA;</p> <p>vector / phage/ gene gun; (recombinant) plasmid put into bacteria/ eq;</p> <p>nutrient supply / eq; sterile conditions / aseptic; paddle to stir mixture; temp. probe / temp. controlled / water jacket; (to maintain temp./cool) oxygen / air in / keep aerobic; pH probe / pH controlled;</p>	<p>max (12)</p>

(Total 12 marks)

Question Number	Answer	Mark
11	<p>(absorbed) from soil; root hair (cells); large surface area; osmosis; dilute to concentrated solution/eq;</p> <p>xylem; (water) dead cells / hollow tube /eq.; (up) stem; capillarity / cohesion / adhesion; (to) leaves / eq; stomata; transpiration (pull); evaporation / diffusion; cooling/cell turgor /supports plant/ photosynthesis;</p> <p>(sucrose)from photosynthesis; phloem; living / sieve plates /sieve tubes /companion cells; up <u>or</u> down stem / <u>both</u> directions; to roots / growing points / eq; energy required; active transport;</p>	<p>max (12)</p>

(Total 12 marks)

Total for Section C: 24 marks

Total for Paper: 100 marks

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