

Mark Scheme (RESULTS)

January 2008

GCE

GCE Biology (Salters Nuffield) (6131/01)

Question Number	Answer	Mark										
1(a)	<table border="1"> <thead> <tr> <th>Statement about Daphnia</th> <th>Tick or cross</th> </tr> </thead> <tbody> <tr> <td>(i) The movement of fluid through the heart is an example of mass transport</td> <td>✓ ;</td> </tr> <tr> <td>(ii) <i>Daphnia</i> uses diffusion to transport oxygen into muscle cells</td> <td>✓ ;</td> </tr> <tr> <td>(iii) <i>Daphnia</i> tends to lose water from its body to the freshwater by osmosis</td> <td>✗ ;</td> </tr> <tr> <td>(iv) <i>Daphnia</i> can use active transport to move ions from the freshwater into its body</td> <td>✓ ;</td> </tr> </tbody> </table>	Statement about Daphnia	Tick or cross	(i) The movement of fluid through the heart is an example of mass transport	✓ ;	(ii) <i>Daphnia</i> uses diffusion to transport oxygen into muscle cells	✓ ;	(iii) <i>Daphnia</i> tends to lose water from its body to the freshwater by osmosis	✗ ;	(iv) <i>Daphnia</i> can use active transport to move ions from the freshwater into its body	✓ ;	4
Statement about Daphnia	Tick or cross											
(i) The movement of fluid through the heart is an example of mass transport	✓ ;											
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Question Number	Answer	Mark
1 (b)(i)	A = 50, B = 75 & C = 100 ;	1

Question Number	Answer	Mark
1 (b)(ii)	200 ;	1

Question Number	Answer	Mark
1 (b)(iii)	<ol style="list-style-type: none"> only three <i>Daphnia</i> used / not enough {samples / repeats} to be representative / only one <i>Daphnia</i> used per concentration ; different <i>Daphnia</i> used (for each caffeine concentration) / different <i>Daphnia</i> used for 35 au ; range not large enough to make prediction / eq ; <i>Daphnia</i> may respond differently at higher concentrations / eq OR they may die ; taking readings for 10 seconds not sufficient ; describe one environmental variable to be controlled / allow time for <i>Daphnia</i> to acclimatise ; need for a control ; 	max 3

Question Number	Answer	Mark
2 (a)(i)	<ol style="list-style-type: none"> 1. (waxy layer) is waterproof ; 2. {enzyme / pectinase} in (aqueous) solution ; 3. (therefore) {enzyme / pectinase} unable to pass through (waxy layer) / unable to get to {pectin / polysaccharide / carbohydrate} / eq ; 4. pectinase is specific and will not digest lipid / waxy surface ; 	max 2

Question Number	Answer	Mark
2 (a)(ii)	<ol style="list-style-type: none"> 1. shape of (enzyme / pectinase) active site ; 2. fits pectin / does not fit cellulose / reference to specificity of enzymes ; 	2

Question Number	Answer	Mark
2 (b)(i)	<ol style="list-style-type: none"> 1. increases the surface area ; 2. more {substrate /pectin} available / increases the number of {enzyme-substrate complexes / collisions between enzyme / eq and substrate / eq} ; 	2

Question Number	Answer	Mark
2(b)(ii)	<ol style="list-style-type: none"> 1. hydrolysis uses up water ; 2. evaporation of water /eq ; 3. idea of same number of the {enzyme / pectinase} molecules but in less {solvent/water} ; 4. pectinase released from orange tissues/eq ; 5. correct reference to osmosis (into orange) ; 	max 2

Question Number	Answer	Mark
3 (a)(i)	P = protein ; Q = fat ; R = carbohydrate ;	3

Question Number	Answer	Mark
3 (a)(ii)	calculation (e.g. $3.3 - 1.0$ or 2.3) x 8 (g) ; answer (18.4) ;	2

Question Number	Answer	Mark
3 (b)	<ol style="list-style-type: none"> 1. more protein (in formula milk) ; 2. protein needed for growth / muscle deposition ; 3. {protein / muscle} {heavier / more dense} than same amount of carbohydrate / fat / eq ; 	max 2

Question Number	Answer	Mark
3 (c)	<ol style="list-style-type: none"> 1. description of equation / body mass divided by height² ; 2. look up on a chart to make judgement / over 30 (on BMI scale) ; 	2

Question Number	Answer	Mark
4 (a)	(nitrogenous / organic) base / named base ;	1

Question Number	Answer	Mark
4 (b)	<ol style="list-style-type: none"> 1. 8 double strands drawn ; 2. 2 hybrid and rest all light DNA ; 	2

Question Number	Answer	Mark
4 (c)	DNA polymerase / helicase / DNA ligase / primase / eq ;	1

Question Number	Answer	Mark
4 (d)	TCG AAT GGT ;	1

Question Number	Answer	Mark
4 (e)	<ol style="list-style-type: none"> 1. correct reference to description of gene mutation ; 2. change {mRNA / codon / eq} ; 3. {different / wrong / no} amino acid included / stop codon ; 4. different / eq {sequence of amino acids / primary structure of protein} ; 5. different R groups ; 6. change bonding in protein / correctly named bond(s) ; 7. protein forms different {secondary / tertiary / quaternary} structure ; 8. different (3D) <u>shape</u> ; 	max 5

Question Number	Answer	Mark
5 (a)(i)	X = aorta/ aortic arch ; Y = (left) ventricle / <u>cardiac</u> muscle ; Z = <u>coronary</u> artery /eq ;	3

Question Number	Answer	Mark
5 (a)(ii)	second box down on the left ;	1

Question Number	Answer	Mark
5 (a)(iii)	SAN / sino atrial node / pacemaker / eq ;	1

Question Number	Answer	Mark
5 (b)(i)	<ol style="list-style-type: none"> 1. sequence of events from one beat to the next beat / eq ; 2. reference to {contraction / systole} and {relaxation / diastole} ; 3. correct detail of sequence e.g. atrial systole → ventricular systole → diastole / approx 30% of time spent in systole and 70% in diastole ; 4. correct detail of electrical regulation of cardiac cycle/eq; 	max 2

Question Number	Answer	Mark
5(b)(ii)	<ol style="list-style-type: none"> 1. left ventricle has {more / thicker} muscle / eq ; 2. blood from (left ventricle) has to divide between more capillaries / eq ; 3. left ventricle has to pump blood further / eq ; 	max 2

Question Number	Answer	Mark
5(b)(iii)	<ol style="list-style-type: none"> 1. pressure increases as blood forced into ventricle during atrial systole ; 2. pressure increases during (initial) ventricular systole/eq ; 3. (due to) reducing volume of ventricle (causing pressure increase) ; 4. pressure starts to decrease due to blood into artery / loss of blood from ventricle ; 5. decreases during diastole / eq ; 6. (due to) increasing volume (of chamber) ; 	max 2

Question Number	Answer	Mark
5 (c)	<ol style="list-style-type: none"> 1. gender 2. smoking 3. genes / inheritance / eq 4. stress 5. high LDL level / LDL to HDL ratio / high blood cholesterol 6. reference to inappropriate diet such as high {salt / fat / cholesterol / calorie} intake / eq 7. high alcohol intake 8. obesity 9. lack of exercise / eq <p>Notes: <i>two correct answers needed for one mark</i></p>	max 1

Question Number	Answer	Mark
6 (a)	<ol style="list-style-type: none"> 1. fluid - (phospholipid) molecules can move within phospholipid {layer / monolayer} ; 2. mosaic - {proteins / glycoproteins / eq} dotted throughout the {membrane / bilayer / eq} ; 	2

Question Number	Answer	Mark
6 (b)(i)	(act as) receptors / antigens ;	1

Question Number	Answer	Mark
6 (b)(ii)	<ol style="list-style-type: none"> 1. two {fatty acid / eq} 'tails' ; 2. glycerol ; 3. phosphate ; 	3

Question Number	Answer	Mark
6 (c)	<ol style="list-style-type: none"> 1. charged region (of cholesterol) only in line with hydrophilic phospholipid head /non-charged region only in line with hydrophobic phospholipid tails ; 2. all within 1 monolayer ; 	2

Question Number	Answer	Mark
6 (d)	<ol style="list-style-type: none"> 1. LDLs carry most cholesterol / HDLs more protein / eq ; 2. LDLs bind to receptors on cell membranes ; 3. if in high concentration, they overload receptors ; 4. results in high <u>blood</u> cholesterol ; 5. high risk of atheroma / atherosclerosis / eq ; 6. HDLs transport cholesterol to liver ; 7. cholesterol broken down therefore less risk of atherosclerosis /eq ; 	<p style="text-align: right;">max 4</p>

PAPER TOTAL: 60 MARKS