

# Mark Scheme (RESULTS)

## June 2008

GCE

GCE Biology (Salters Nuffield) (6131/01)

## GENERAL INFORMATION

The following symbols are used in the mark schemes for all questions:

Symbol	Meaning of symbol
; semi colon	Indicates the end of a marking point
eq	Indicates that credit should be given for other correct alternatives to a word or statement, as discussed in the Standardisation meeting
/ oblique	Words or phrases separated by an oblique are alternatives to each other
{ } curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion
( ) round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point
[ ] square brackets	Words inside square brackets are instructions or guidance for examiners

### Crossed out work

If a candidate has crossed out an answer and written new text, the crossed out work can be ignored. If the candidate has crossed out work but written no new text, the crossed out work for that question or part question should be marked, as far as it is possible to do so.

### Spelling and clarity

In general, an error made in an early part of a question is penalised when it occurs but not subsequently. The candidate is penalised once only and can gain credit in later parts of the question by correct reasoning from the earlier incorrect answer.

No marks are awarded specifically for quality of language in the written papers, except for the essays in the synoptic paper. Use of English is however taken into account as follows:

- the spelling of technical terms must be sufficiently correct for the answer to be unambiguous  
e.g. for amylase, 'ammalase' is acceptable whereas 'amylose' is not  
e.g. for glycogen, 'glicojen' is acceptable whereas 'glucagen' is not  
e.g. for ileum, 'illeum' is acceptable whereas 'ilium' is not  
e.g. for mitosis, 'mytosis' is acceptable whereas 'meitosis' is not
- candidates must make their meaning clear to the examiner to gain the mark.
- a correct statement that is contradicted by an incorrect statement in the same part of an answer gains no mark - irrelevant material should be ignored.

Question Number	Answer	Mark
1(a)	right-hand 1 <sup>st</sup> box down ;	(1)

Question Number	Answer	Mark
1(b)	<ol style="list-style-type: none"> <li>1. (skeletal) muscle contracts / eq ;</li> <li>2. squeezes vein / named vein ;</li> <li>3. blood forced in both directions (away from squeezed area) / eq ;</li> <li>4. (one way) valves present (in veins) ;</li> <li>5. one way flow / prevent backflow / eq ;</li> <li>6. reference to role of thorax e.g. pressure changes during inspiration / expiration / breathing ;</li> <li>7. lower pressure in {heart / atria} during {diastole / eq} ;</li> </ol>	max (3)

Question Number	Answer	Mark
1(c)	<ol style="list-style-type: none"> <li>1. {squamous / pavement / flattened / thin / eq } cell / endothelium ;</li> <li>2. (only) one cell thick ;</li> <li>3. small lumen present /(capillary) small diameter ;</li> <li>4. pores present / gaps present / eq ;</li> </ol>	max (2)

Question Number	Answer	Mark
2(a)(i)	<ol style="list-style-type: none"> <li>1. active {transport / uptake} ;</li> <li>2. facilitated diffusion ;</li> <li>3. endocytosis / pinocytosis / endocytosis / eq ;</li> </ol>	max (2)

Question Number	Answer	Mark
2(a)(ii)	translation ;	(1)

Question Number	Answer	Mark
2(b)(i)	299 ;	(1)

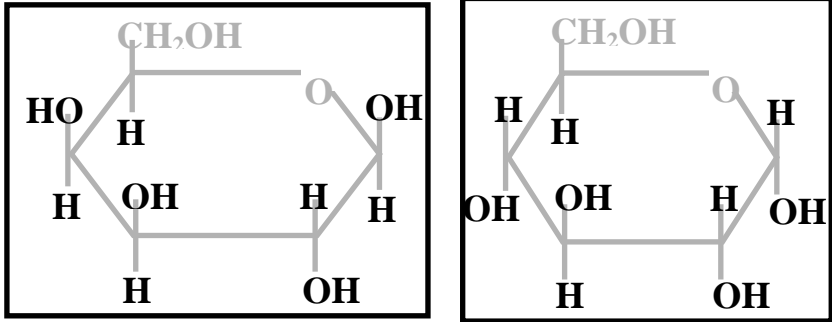
Question Number	Answer	Mark
2( b)(ii)	906 ;	(1)

Question Number	Answer	Mark
2(c)	<ol style="list-style-type: none"> <li>1. {ATP / ADP / P<sub>i</sub> / (inorganic) phosphate} ;</li> <li>2. mRNA ;</li> <li>3. tRNA ;</li> <li>4. rRNA ;</li> </ol>	max (2)

Question Number	Answer	Mark												
3(a)	<table border="1"> <thead> <tr> <th>Drink</th> <th>Time taken for 180 heart beats / seconds</th> <th>Caffeine concentration / mg per 100ml</th> </tr> </thead> <tbody> <tr> <td>Instant coffee</td> <td></td> <td>33 to 34 ;</td> </tr> <tr> <td>Filter coffee</td> <td></td> <td>58 to 60 ;</td> </tr> <tr> <td>Tea</td> <td></td> <td>30 ;</td> </tr> </tbody> </table>	Drink	Time taken for 180 heart beats / seconds	Caffeine concentration / mg per 100ml	Instant coffee		33 to 34 ;	Filter coffee		58 to 60 ;	Tea		30 ;	(3)
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Filter coffee		58 to 60 ;												
Tea		30 ;												

Question Number	Answer	Mark
3(b)	<p>no {difference / effect} due to :</p> <ol style="list-style-type: none"> <li>1. genotype / eq ;</li> <li>2. age ;</li> <li>3. size / eq ;</li> <li>4. gender /eq ;</li> <li>5. physiological state / eq ;</li> <li>6. pre-treatment / eq ;</li> <li>7. absorption rate /eq ;</li> </ol>	max (3)

Question Number	Answer	Mark
3(c)	<ol style="list-style-type: none"> <li>1. variation due to chance / eq ;</li> <li>2. still some caffeine present within the organism / still some caffeine present on the surface ;</li> <li>3. idea of time to recover from effect of caffeine ;</li> <li>4. inaccuracy of measurements / eq ;</li> </ol>	max (2)

Question Number	Answer	Mark
4(a)(i)	 <p style="text-align: center;">galactose ;                      glucose ;</p>	(2)

Question Number	Answer	Mark
4(a)(ii)	<ol style="list-style-type: none"> <li>1. breaking of (glycosidic) bond / eq ;</li> <li>2. {addition of / using} water / eq ;</li> <li>3. breaking larger molecule(s) into smaller molecules / named example <b>other than</b> lactose to glucose and galactose <b>OR</b> disaccharide being broken into two monosaccharides ;</li> <li>4. reference to {hydrolytic / named} enzyme ;</li> </ol>	max (2)

Question Number	Answer	Mark
4(b)(i)	<ol style="list-style-type: none"> <li>1. Parents' genotypes : Gg / gG for both parents <b>and</b> parents' gametes: G g for both parents ;</li> <li>2. Possible genotypes of second child: GG Gg Gg gg ;</li> <li>3. Probability of not having the condition: 0.75 / 75% / ¾ ;</li> </ol>	(3)

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"> <li>1. more than one {triplet / codon / eq} may code for same amino acid ;</li> <li>2. third base in {triplet / eq} often not important / eq ;</li> <li>3. at 3<sup>rd</sup> base {point mutation / base changes / eq} ;</li> <li>4. amino acid swapped but does not change shape of protein / eq ;</li> <li>5. (mutation occurs) in intron / eq ;</li> </ol>	max (2)

Question Number	Answer	Mark
4(b)(iii)	<ol style="list-style-type: none"> <li>1. risk of miscarriage ;</li> <li>2. risk of harm to {fetus / eq} / eq ;</li> <li>3. reference to a fetus' right to life ;</li> <li>4. should the pregnancy be terminated / eq ;</li> <li>5. {practical / financial} issues ;</li> <li>6. mental and emotional issues ;</li> </ol>	max (3)

Question Number	Answer	Mark
5(a)	far right-hand box ;	(1)

Question Number	Answer	Mark
5(b)(i)	110 / first one / higher one / eq ;	(1)

Question Number	Answer	Mark
5(b)(ii)	<ol style="list-style-type: none"> <li>1. <u>high</u> salt {intake / in diet / eq} ;</li> <li>2. <u>high</u> (saturated) {fat / cholesterol / LDL / eq} {intake / in diet / eq} ;</li> <li>3. <u>high</u> alcohol intake ;</li> <li>4. smoking ;</li> <li>5. stress ;</li> <li>6. hardening of arteries / atherosclerosis / eq ;</li> <li>7. old age ;</li> <li>8. inherited trait / eq ;</li> <li>9. obesity / overweight ;</li> <li>10. lack of exercise / eq ;</li> </ol>	max (2)

Question Number	Answer	Mark
5(c)(i)	100% ;	(1)

Question Number	Answer	Mark
5(c)(ii)	{twice as / x2 more / 100% more} likely to have heart disease / eq ;	(1)

Question Number	Answer	Mark
5(d)(i)	thrombus / (blood) clot / cholesterol / atheroma / fat / fatty deposits / plaque / fibrin ;	(1)

Question Number	Answer	Mark
5(d)(ii)	<ol style="list-style-type: none"> <li>1. allows blood / metabolite / named metabolite / oxygen ;</li> <li>2. to reach (cardiac) <u>muscle</u> (tissue / cells) ;</li> <li>3. (heart) muscle / region beyond block able to work (more efficiently) ;</li> <li>4. enables aerobic respiration / eq ;</li> <li>5. removal of {lactic acid / lactate} / eq ;</li> </ol>	max (3)

Question Number	Answer	Mark
6(a)(i)	{phosphate / phosphoric acid } / {deoxyribose / pentose / eq} (sugar) ;	(1)

Question Number	Answer	Mark
6(a)(ii)	AA ; TT ;	(2)

Question Number	Answer	Mark
6(a)(iii)	thymine ;	(1)

Question Number	Answer	Mark
6(b)(i)	hydrogen / H (bond) ;	(1)

Question Number	Answer	Mark
6(b)(ii)	(sample) 4 ;	(1)

Question Number	Answer	Mark
7(a)	<ol style="list-style-type: none"> <li>1. (ion / Ca<sup>2+</sup>) {binds / eq} to protein (in membrane) / {named / channel / carrier} protein ;</li> <li>2. reference to {specificity / eq} of protein to {ion / Ca<sup>2+</sup>} ;</li> <li>3. protein spans the membrane / eq ;</li> <li>4. protein changes shape / description of shape change / eq ;</li> <li>5. (ion / Ca<sup>2+</sup>) moves across from a region of high concentration to a region of lower concentration / down a concentration gradient / eq ;</li> <li>6. until both sides are equal / eq ;</li> </ol>	max (4)

Question Number	Answer	Mark
7(b)(i)	<ol style="list-style-type: none"> <li>1. {linear / rapid / steady / eq} increase for first {3½ / 4} minutes ;</li> <li>2. uptake slows after {3½ / 4 / {next 2 / eq}} minutes ;</li> <li>3. no further {increase / uptake} after {5.5 / 6 minutes} ;</li> <li>4. credit correct manipulation of the data e.g. uptake is 1.8 to 2 au min<sup>-1</sup> ;</li> </ol>	max (3)

Question Number	Answer	Mark
7(b)(ii)	<ol style="list-style-type: none"> <li>1. (a 10°C rise) increases the (initial rate of) uptake / diffusion / eq ;</li> <li>2. no effect on final concentration / eq ;</li> <li>3. credit comparative manipulation of the data e.g. doubles the (initial) rate ;</li> </ol>	max (2)

Question Number	Answer	Mark
7(b)(iii)	<ol style="list-style-type: none"> <li>1. more kinetic energy / moving faster / eq ;</li> <li>2. therefore more collisions with {membrane / protein / carrier / eq} ;</li> <li>3. more ions moving into cell per unit time / eq ;</li> <li>4. (dynamic) equilibrium will occur (independent of temperature) / eq ;</li> <li>5. more {membrane / named} protein altered / eq ;</li> <li>6. more channels open ;</li> </ol>	<p>max (2)</p>