

Mark Scheme (FINAL)

June 2008

GCE

GCE Biology (Salters Nuffield) (6131/01)

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

**PRE-STANDARDISATION MARK SCHEME - UNIT SN1 (6131/01)
AS BIOLOGY (SNAB) June 2008**

STRICTLY CONFIDENTIAL

Principal Examiner: Mr Stephen Winrow-Campbell
LITTLE ORCHARD
BARNETS LANE
BROAD OAK
CANTERBURY
KENT
CT2 0QT Tel.: 01227 713766
susan@winrow-campbell.freemove.co.uk

Team Leader : Mr Robin Harbord
84 RAINBOROWE ROAD
COLCHESTER
Colchester
ESSEX
CO2 7JS Tel.: 01206 543082 or 07824 867619 (Mob)
robin.harbord@ntlworld.com
robin.harbord@essex.gov.uk

This paper is to be Standardised Online - further details will follow.

Please contact the ePEN helpdesk for technical queries:

Online Associates Helpdesk

Telephone 0800 169 9202

Email UKservicedesk@pearson.com

GCE Biology SNAB Exam Management Contact Details

QDAM	Damian Riddle
Tel	0207 190 5024
Email	damian.riddle@edexcel.org.uk
Address	Edexcel 5 th Floor 190 High Holborn London WC1V 7BH

Subject Leader	Assie Yamin
Tel	0207 190 4741
Email	assie.yamin@edexcel.org.uk
Address	Edexcel 5 th Floor 190 High Holborn London WC1V 7BH

Exams Co-ordinator	Katerina Keplova
Tel	0207 190 4367
Email	katerina.keplova@edexcel.org.uk
Address	Edexcel 5 th Floor 190 High Holborn London WC1V 7BH

Question Number	Answer	Mark
1(a)	right-hand 1 st box down ; ACCEPT if a cross rather than a tick is used	1

Question Number	Answer	Mark
1(b)	<ol style="list-style-type: none"> 1. (skeletal) muscle contracts / eq ; 2. squeezes vein / named vein ; 3. blood forced in both directions (away from squeezed area) / eq ; 4. (one way) valves present (in veins) ; 5. one way flow / prevent backflow / eq ; [ACCEPT as a diagram] 6. reference to role of thorax e.g. pressure changes during inspiration / expiration / breathing ; 7. lower pressure in {heart / atria} during {diastole / eq} ; <p>Comments mp 1: ALLOW muscles either side of vein contract NOT muscles in veins</p> <p>IGNORE: references to the idea of blood being pushed into vein from capillaries references to gravity</p>	max 3

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

Question Number	Answer	Mark
2(a)(i)	1. active {transport / uptake} ; 2. facilitated diffusion ; 3. endocytosis / pinocytosis / endopinocytosis / eq ; Comments mp 1: ALLOW phonetic spelling mp 2: NOT diffusion alone mp 3: NOT 'EXO' as prefix	max 2

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

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

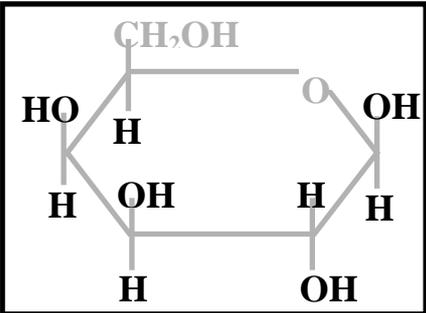
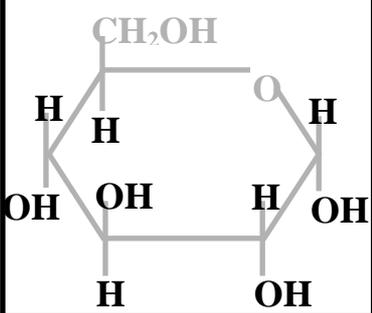
Question Number	Answer	Mark
2(b)(ii)	906 ; ACCEPT 903	1

Question Number	Answer	Mark
2(c)	1. {ATP / ADP / P _i / (inorganic) phosphate} ; 2. mRNA ; 3. tRNA ; 4. rRNA ; Comments mp 1: NOT phosphorous ALLOW RNA for one mark <u>only</u> (mps 2, 3 & 4) NOT RNA polymerase NOT translation initiation complex unless named molecule given	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 ;	max 3
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 ;												

Question Number	Answer	Mark
3(b)	<p>no {difference / effect} due to :</p> <ol style="list-style-type: none"> 1. genotype / eq ; 2. age ; 3. size / eq ; 4. gender /eq ; 5. physiological state / eq ; 6. pre-treatment / eq ; 7. absorption rate /eq ; <p>Comments mp 1: ALLOW same species, genetic make up mp 3: ALLOW size of heart / organism, same mass, same surface area mp 4: ALLOW sex, male, female mp 5: ALLOW resting heart rate, metabolic rate, pregnancy but NOT health mp 6: ALLOW from same environment.</p>	max 3

Question Number	Answer	Mark
3(c)	<ol style="list-style-type: none"> 1. variation due to chance / eq ; 2. still some caffeine present within the organism / still some caffeine present on the surface ; 3. idea of time to recover from effect of caffeine ; 4. inaccuracy of measurements / eq ; <p>Comments IGNORE references to stress, temperature, light or pH</p> <p>mp 4: need the idea that it is difficult to count heart beats, NOT miscalculations.</p>	<p>max 2</p>

Question Number	Answer	Mark
4(a)(i)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>galactose ;</p> </div> <div style="text-align: center;">  <p>glucose ;</p> </div> </div> <p>NB do not penalise if it appears that the bond goes to the H rather than the O in OH (e.g. as shown in glucose at carbon 4)</p>	2

Question Number	Answer	Mark
4(a)(ii)	<ol style="list-style-type: none"> 1. breaking of (glycosidic) bond / eq ; 2. {addition of / using} water / eq ; 3. breaking larger molecule(s) into smaller molecules / named example other than lactose to glucose and galactose OR disaccharide being broken into two monosaccharides ; 4. reference to {hydrolytic / named} enzyme ; <p>Comments mp 1: NOT peptide / hydrogen bond.</p>	max 2

Question Number	Answer	Mark
4(b)(i)	<p>1. Parents' genotypes : Gg / gG for both parents <u>and</u> parents' gametes: G g for both parents ;</p> <p>2. Possible genotypes of second child: GG Gg Gg gg ; ACCEPT gG in place of Gg</p> <p>3. Probability of not having the condition: 0.75 / 75% / $\frac{3}{4}$; NOT 3:1</p> <p>Comments mp 1: both genotypes of gametes need to be correct mp 2: ALLOW if Punnett given</p> <p>IF incorrect letters / genotypes in mp 1, ALLOW mps 2 & 3 as consequential errors for max 2 marks IF probability correct based on their genotypes, ALLOW mp 3</p>	3

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"> more than one {triplet / codon / eq} may code for same amino acid ; third base in {triplet / eq} often not important/eq ; at 3rd base {point mutation / base changes /eq} ; amino acid swapped but does not change shape of protein / eq ; (mutation occurs) in intron / eq ; <p>Comments Terms such as genetic codes / codes are not sufficiently precise as alternatives to triplet / codon</p>	max 2

Question Number	Answer	Mark
4(b)(iii)	<ol style="list-style-type: none"> 1. risk of miscarriage ; 2. risk of harm to {fetus / eq} / eq ; 3. reference to a fetus' right to life ; 4. should the pregnancy be terminated / eq ; 5. {practical / financial} issues ; 6. mental and emotional issues ; <p>Comments ALLOW baby or child as equivalent to fetus</p> <p>mp 3: ALLOW idea of 'life is precious' mp 5: practical issues include planning for medical treatment or domestic arrangements mp 6: ALLOW idea of psychological effects on family members</p> <p>IGNORE references to cost of screening</p>	<p style="text-align: center;">max 3</p>

Question Number	Answer	Mark
5(a)	far right-hand box ; ACCEPT if a cross rather than a tick is given	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"> 1. <u>high</u> salt {intake / in diet / eq} ; 2. <u>high</u> (saturated) {fat / cholesterol / LDL / eq} {intake / in diet / eq} ; 3. <u>high</u> alcohol intake ; 4. smoking ; 5. stress ; 6. hardening of arteries / atherosclerosis / eq ; 7. old age ; 8. inherited trait / eq ; 9. obesity / overweight ; 10. lack of exercise / eq ; <p>Comments mps 1, 2 & 3 need to have the high idea mp 6: NOT atheroma, blood clots</p>	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 ; Comments NOT guaranteed / 100% likely to get heart disease ALLOW consequential error from 5 (c)(i)	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"> 1. allows blood / metabolite / named metabolite / oxygen; 2. to reach (cardiac) <u>muscle</u> (tissue / cells) ; 3. (heart) muscle / region beyond block able to work (more efficiently) ; 4. enables aerobic respiration / eq ; 5. removal of {lactic acid / lactate} / eq ; <p>Comments mp 2: NOT to reach body, skeletal muscle mp 3: IGNORE reference to restores normal function as in the stem of the question mp 4: enables aerobic respiration in heart or body</p>	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 ; ALLOW thymine, thimin, thimine NOT thiamine, thiamine, 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"> 1. (ion / Ca²⁺) {binds / eq} to protein (in membrane) / {named / channel / carrier} protein ; 2. reference to {specificity / eq} of protein to {ion / Ca²⁺} ; 3. protein spans the membrane / eq ; 4. protein changes shape / description of shape change / eq ; 5. (ion / Ca²⁺) moves across from a region of high concentration to a region of lower concentration / down a concentration gradient / eq ; 6. until both sides are equal / eq ; <p>Comments NOT reference to ATP or energy needed</p>	max 4

Question Number	Answer	Mark
7(b)(i)	<ol style="list-style-type: none"> 1. {linear / rapid / steady / eq} increase for first {3½ / 4} minutes ; 2. uptake slows after {3½ / 4 / {next 2 / eq}} minutes ; 3. no further {increase / uptake} after {5.5 / 6 minutes} ; 4. credit correct manipulation of the data e.g. uptake is 1.8 to 2 au min⁻¹ ; <p>Comments ALLOW reference to concentration as equivalent to time references in mark scheme e.g. linear increase between 1 and 8.6 au as equivalent to mp 1</p> <p>mp 3: mark for commenting on what happens to <u>uptake</u> NOT rate e.g. plateau, levels off</p>	max 3

Question Number	Answer	Mark
7(b)(ii)	<ol style="list-style-type: none"> 1. (a 10°C rise) increases the (initial rate of) uptake / diffusion / eq ; 2. no effect on final concentration / eq ; 3. credit comparative manipulation of the data e.g. doubles the (initial) rate ; <p>Comments mp 1: ALLOW reaches equilibrium, maximum earlier mp 3: ALLOW correct reference to time difference e.g. maximum reached 3 to 4 minutes earlier</p> <p>NOT just repeating of each bit of data!!</p>	max 2

Question Number	Answer	Mark
7(b)(iii)	<ol style="list-style-type: none"> 1. more kinetic energy / moving faster / eq ; 2. therefore more collisions with {membrane / protein / carrier /eq} ; 3. more ions moving into cell per unit time / eq ; 4. (dynamic) equilibrium will occur (independent of temperature) / eq ; 5. more {membrane / named} protein altered / eq ; 6. more channels open ; <p>Comments mp 1: NOT vibrating / moving around more mp 2: NOT collisions with enzymes / active sites mp 5: NOT denaturation, disruption of membrane</p> <p>NOT reference to no more left to move in</p>	max 2