

Mark Scheme (RESULTS)

June 2008

GCE

GCE Biology (6101/01)

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	<table border="1" data-bbox="360 300 1118 712"> <thead> <tr> <th data-bbox="360 300 644 405">Process</th> <th data-bbox="651 300 874 405">Requires transport proteins</th> <th data-bbox="880 300 1118 405">Requires energy in the form of ATP</th> </tr> </thead> <tbody> <tr> <td data-bbox="360 414 644 479">Simple diffusion</td> <td data-bbox="651 414 874 479">✗</td> <td data-bbox="880 414 1118 479">✗</td> </tr> <tr> <td data-bbox="360 488 644 553">Facilitated diffusion</td> <td data-bbox="651 488 874 553">✓</td> <td data-bbox="880 488 1118 553">✗</td> </tr> <tr> <td data-bbox="360 562 644 627">Osmosis</td> <td data-bbox="651 562 874 627">✗</td> <td data-bbox="880 562 1118 627">✗</td> </tr> <tr> <td data-bbox="360 636 644 701">Active transport</td> <td data-bbox="651 636 874 701">✓</td> <td data-bbox="880 636 1118 701">✓</td> </tr> </tbody> </table> <p data-bbox="316 745 858 779">NB 1 mark for every two correct answers</p>	Process	Requires transport proteins	Requires energy in the form of ATP	Simple diffusion	✗	✗	Facilitated diffusion	✓	✗	Osmosis	✗	✗	Active transport	✓	✓	(4)
Process	Requires transport proteins	Requires energy in the form of ATP															
Simple diffusion	✗	✗															
Facilitated diffusion	✓	✗															
Osmosis	✗	✗															
Active transport	✓	✓															

Question Number	Answer	Mark
2	<ol style="list-style-type: none">1. hydrophobic / non-polar / not charged ;2. glycerol / propan-(1,2,3)-triol ;3. (saturated / unsaturated) fatty acids ;4. ester / covalent ;5. insulation / buoyancy / energy store / protection / source of metabolic water ;	(5)

Question Number	Answer	Mark			
3	<table border="1"> <thead> <tr> <th data-bbox="316 327 544 427">Name of cell structure</th> <th data-bbox="552 327 887 427">Description of cell structure</th> <th data-bbox="895 327 1153 427">Diagram of cell structure</th> </tr> </thead> </table>	Name of cell structure	Description of cell structure	Diagram of cell structure	
	Name of cell structure	Description of cell structure	Diagram of cell structure		
	nucleolus ; (1)				
			pair of cylinders ; at right angles to each other ; (2)		
		1. spherical (structures) ; 2. single membrane ; 3. containing {hydrolytic / eq} enzymes ; max (2)			
microtubules; (1)					
		(6)			

Question Number	Answer	Mark
4(a)	<ol style="list-style-type: none"> 1. size: drawing is correct length ; 2. shape is accurate ; 3. cell content - nucleus drawn in correct position with nucleoli shown ; 	(3)

Question Number	Answer	Mark
4(b)	<ol style="list-style-type: none"> 1. {fatty acids / tails} are {hydrophobic / non-polar / eq} ; 2. (so orientate themselves) away from {water / polar environment / eq} ; 3. {phosphate/heads} are {hydrophilic / polar / eq} ; 4. (so orientate themselves) towards {water / polar environment} ; 5. idea that phospholipids arranged in bilayer due to aqueous environment on both sides of membrane / eq ; 	max (3)

Question Number	Answer	Mark
5(a)	<ol style="list-style-type: none"> 1. cell cycle is shorter in A than B /eq ; 2. {interphase / eq} is shorter in A than B / eq ; 3. {mitosis / eq} is shorter in A than B / eq ; 4. {S phase / eq} is the same duration ; 5. comparative figures ; 	max (3)

Question Number	Answer	Mark
5(b)	<ol style="list-style-type: none"> 1. cells preparing to divide /eq ; 2. reference to S phase ; 3. reference to replication (of DNA) ; 4. reference to semi-conservative (replication) or a description of it ; 5. idea that new cells will have same quantity of DNA as parent / eq ; 	max (2)

Question Number	Answer	Mark
5(c)	<ol style="list-style-type: none"> 1. chromosomes {move to / at} opposite poles of cell / eq ; 2. reference to formation of nucleus / eq ; 3. reference to formation of cell {plate / wall} ; 4. {cell splits in two / eq} / reference to cytokinesis; 	max (2)

Question Number	Answer	Mark
6(a)(i)	<ol style="list-style-type: none"> 1. solution A contains starch but neither reducing sugar nor protein / contains ONLY starch ; 2. solution B contains a reducing sugar but neither protein nor starch / contains ONLY reducing sugar ; 	(2)

Question Number	Answer	Mark
6(a)(ii)	<ol style="list-style-type: none"> 1. {starch / (named) non-reducing sugar} has been {hydrolysed / eq} ; 2. to form a reducing sugar ; 	(2)

Question Number	Answer	Mark
6(a)(iii)	solution C contained a lower concentration of (reducing) sugar than solution B ;	(1)

Question Number	Answer	Mark
6(b)	<ol style="list-style-type: none"> 1. use equal volumes of each (protein) solution ; 2. use equal {volumes / concentrations} of biuret reagent /eq ; 3. {purple / lilac / mauve / violet} colour produced /eq ; 4. {compare intensity of colour / eq} / use a colorimeter ; 5. (deeper colour / eq) shows higher protein (concentration) / eq ; 	max (3)

Question Number	Answer	Mark
7(a)	<ol style="list-style-type: none"> 1. idea that part of the DNA helix unwinds ; 2. DNA strands separate ; 3. hydrogen bonds are broken ; 4. idea of one strand acting as a template ; 5. (RNA) (mono)nucleotides line up against complementary (DNA) bases ; 6. reference to formation of phosphodiester bonds / eq ; 7. correct reference to {RNA polymerase / DNA helicase} ; 8. reference to detachment of mRNA (molecule) from the DNA ; 	max (4)

Question Number	Answer	Mark
7(b)	<ol style="list-style-type: none"> 1. reference to translation / eq ; 2. mRNA becomes {associated / eq} with ribosomes ; 3. idea that a ribosome hold two transfer RNA molecules ; 4. reference to transfer RNA attached to amino acid; 5. peptide bonds formed (between adjacent amino acids) ; 6. reference to ribosome moving along mRNA ; 	max (3)

Question Number	Answer	Mark
7(c)(i)	<p>GGG CGC UCG AAA;;</p> <p>[1 mistake : 1 mark]</p>	(2)

Question Number	Answer	Mark
7(c)(ii)	(glycine) arginine serine lysine;; [1 mistake = 1 mark]	(2)

Question Number	Answer	Mark
7(c)(iii)	ATT / ATC / ACT;	(1)

Question Number	Answer	Mark
8(a)(i)	<ol style="list-style-type: none"> 1. A: can be re-used ; E: reduces overall cost / more economical / eq ; 2. A: process is continuous / eq ; E: saves time / can be automated / reduces cost ; 3. A: enzymes more stable ; E: less likely to be {denatured / affected by temperature changes / affected by pH changes} ; 4. A: enzymes can be used at higher temperatures ; E: faster reaction / saves time ; 5. A: enzymes does not have to be separated from product / eq ; E: reduces cost / saves time ; 6. A: more than one enzyme can be fixed in order ; E: greater control over process / saves time / more efficient ; 7. A: idea that enzyme is safer to handle e.g. allergic reaction / irritant ; E: enzyme only activated when in use ; 	max (4)

Question Number	Answer	Mark
8(a)(ii)	<ol style="list-style-type: none"> 1. lactose {hydrolysed / eq} to glucose and galactose / eq ; 2. production of lactose-reduced milk / eq ; 3. reference to lactose intolerance / eq ; 4. reference to (change in) sweetness / use in confectionery industry / eq ; 	max (3)

Question Number	Answer	Mark
8(b)(i)	<ol style="list-style-type: none"> 1. cyanide binds to active site of cyanidase ; 2. {linear / eq} up to 38/40 (minutes) ; 3. decrease in rate between 38/40 and 68/70 minutes / eq ; 4. maximum concentration {reached at 68/70 (minutes) / is 0.325 (au) } ; 5. maximum rate is 0.0069 au per minute ; 	max (3)

Question Number	Answer	Mark
8(b)(ii)	<ol style="list-style-type: none"> 1. idea that substrate has to penetrate into gel / bead / support material; 2. idea that not all active sites may be on / near surface of bead; 3. immobilised enzyme has little kinetic energy / {fewer / less energetic} collisions ; 4. fewer enzyme-substrate complexes formed; 	max (2)