

GCE



Edexcel GCE

Biology / Biology (Human) (6101/01)

Summer 2005

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Mark Scheme (Results)

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General Principles

Symbols used in the mark scheme

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. It is used because it is not always possible to list every alternative answer that a candidate may write that is worthy of credit.
/ 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 1

Maximum mark

(a)

Disaccharide	Monosaccharide		
	Galactose	Glucose	Fructose
Sucrose		✓	✓
Maltose		✓	
Lactose	✓	✓	

[One mark for each correct row]

3 marks

(b)

Glycosidic ;

1 mark

Total 4 marks

Question 2

Maximum mark

Nitrogen / N ;

Peptide ;

{Alpha / α } helix ;

Hydrogen / H ;

R groups / side groups / side chains ;

5 marks

Question 3

Maximum mark

- (a) A Nucleus / nucleoplasm / chromatin / nuclear {envelope / membrane} ;
B Chloroplast / stroma ;
C DNA / chromosome / nucleoid ;

3 marks

- (b) Cell wall of leaf cell is made of cellulose / bacterial cell wall is not made of cellulose / bacterial cell wall is {peptidoglycan / mucopolysaccharide} / plant cell wall is not made of peptidoglycan / mucopolysaccharide ;

1 mark

- (c) To enable cell to move (through medium) ;
Rotates / eq ;
Any valid reason for movement ;

2 marks

Total 6 marks

Question 4

Maximum mark

- (a) (i) A Glycoprotein ;
B Phospholipid ; [do not allow bilayer] 2 marks
- (ii) Cell {recognition / attachment} / {receptor / eq} / antigen ; 1 mark
- (iii) 1. {Fatty acids / tails} are {hydrophobic / non-polar} ;
2. Idea that fatty acids are in the middle of the bilayer ;
3. {Phosphate / heads} are {hydrophilic / polar} ;
4. Idea that phosphate groups are on the outside of the bilayer ;
5. Reference to {cytoplasm / tissue fluid} being {polar / eq} in nature ; 3 marks
- (b) 1. The membrane is fluid ;
2. (Because) {phospholipids / B} are able to move (within membrane) ;
3. (Therefore) proteins can move (within membrane / phospholipid bilayer) ;
4. Idea that there is a new arrangement of proteins ; 2 marks

Total 8 marks

Question 5

Maximum mark

- (a)
1. Reference to named stain (acetic orcein / acetocarmine / Feulgens / Schiff's) ;
 2. {Warm / heat} (with the stain / acid) ;
 3. Break open tip (with needle / eq) ;
 4. {Mount / eq} in {stain / acid / water / glycerol} ;
 5. (Gently) squash under coverslip / eq ;
 6. Warm (gently to intensify stain) ;

4 marks

- (b)
1. Telophase is the longest stage ;
 2. Anaphase is the shortest stage ;
 3. Correct manipulation of figures to compare any two phases ;
 4. Any two actual times given e.g. {prophase 29.16 mins / metaphase 16.80 mins / anaphase 8.40 mins / telophase 33.36 mins} ;

3 marks

- (c) (Use the equation to) work out actual time of each phase ;

Total all four times ;

OR

Add up all 4 percentages ;

{Substitute into equation / eq} / Multiply by $\frac{1200}{100}$;

2 marks

Total 9 marks

Question 6

Maximum mark

(a) Magnification How many times bigger the image is than the real size of the specimen / eq ;

Resolution The ability to distinguish two points as separate points / the {degree / amount} of detail visible ;

2 marks

(b)
$$\frac{\text{Number of stage microscope units}}{\text{Number of eye piece units}} \times 100$$
 (to give correct answer) ;

2 marks

(c) (i) 300 / 320 (μm) ;

1 mark

(ii) Two cells drawn with indication of unequal thickening of cell wall ;
In correct proportions ;
No cell contents shown ;

3 marks

Total 8 marks

Question 7

Maximum mark

- (a) (i) (By adding a) buffer (solution) ;
Using the same area of {cloth / 1 cm²} / even spraying of cloth ;
2 marks
- (ii) Starch and iodine on 1 cm² square of cloth and 5 cm³ of buffer ;
Add 5 cm³ of water (instead of enzyme) ;
2 marks
- (b) 1. Change in H⁺ concentration ;
2. (Changes in pH) alter {charges / ionisation} of R groups ;
3. Reference to bonds broken / eq ;
4. Resulting in change in active site ;
5. Reference to {substrate binding / eq} being affected ;
6. Reference to (complete) {denaturation / eq} of enzyme at extreme pHs / eq ;
3 marks
- (c) 1. (It) is a {polymer / polysaccharide / eq} ;
2. Of α glucose (molecules) ;
3. (Joined by α) glycosidic links ;
4. (It) consists of amylose and amylopectin ;
5. Amylose {is unbranched / forms helical shape} ;
6. Amylopectin is branched (molecule) ;
7. Amylose has only 1,4 (glycosidic) bonds ;
8. Amylopectin contains 1,4 and 1,6 bonds ;
9. Starch molecules {can be built up into starch grains / have a compact shape} ;
5 marks
- Total 12 marks

Question 8

Maximum mark

- (a) Stack of at least three cisternae ;
Cisternae curved / showing {budding / fusing} vesicles / eq ;
{Cisternae / sacs / vesicles} labelled ;
3 marks
- (b) (i) Level of radioactivity falls ;
Protein moving out (of the RER) ;
2 marks
- (b) (ii) 1. (In first 20 minutes) there were no secretory vesicles / only non-radioactive material in vesicles ;
2. (Because) radioactive proteins have not yet reached the vesicles ;
3. (Because) {proteins / radioactivity / eq} has yet to pass into Golgi apparatus ;
4. From RER (into Golgi) ;
5. (After 20 minutes) reference to formation of vesicles (from Golgi) now containing (radioactive) protein ;
3 marks
- Total 8 marks