



**Exampro A-level Biology
(7401/7402)**

Name:

Class:

Carbohydrates Markscheme

Author:

Date:

Time: **61**

Marks: **47**

Comments:

These questions mix the different styles of questions. Short answers, practical techniques, experimental data analysis, extended answer and comprehension Work through these, the more you do the better you will become with your exam technique.

- M1.** (a) (i) β / Beta glucose;
 Accept *b / B*
 Reject any reference to *alpha / α* 1
- (ii) Glycosidic;
 Reject references to *α (1-4) glycosidic bond*, but allow *beta 1-4*, or *unspecified reference to 1-4 (1,4)* 1
- (iii) OH / hydroxyl / HO;
 Reject *hydroxide*
 Reject *OH / HO molecule*
 Ignore *alcohol* 1

(b) (i)

Starch	Cellulose
1. (1,4 and) 1,6 bonds / contains 1,6 bonds / branching	1. 1,4 bonds / no 1,6 bonds / unbranched / straight;
2. All glucoses / monomers same way up	2. Alternate glucoses / monomers upside down;
3. Helix / coiled / compact	3. Straight;
4. Alpha glucose	4. Beta glucose;
5. No (micro / macro) fibrils / fibres	5. Micro / macro fibrils / fibres;

1 mark per pair of contrasts, both starch and cellulose required

*Accept other comparable differences eg hydrogen bonds **within** starch but **between** cellulose molecules*

2 max

- (ii) 1. H-bonds / micro / macro fibrils / fibres;
Reject strong hydrogen bonds
- 2. Strength / rigidity / inelasticity;
'Strong hydrogen bonds' = 0 but 'Strong hydrogen bonds give strength (to the molecule)' = 1

2

[7]

M2. (a) (i) (Molecule) made up of many identical / similar molecules / monomers / subunits;
Not necessary to refer to similarity with monomers.

1

(ii) Cellulose / glycogen / nucleic acid / DNA / RNA;

1

(b) (i) To keep pH constant;
A change in pH will slow the rate of the reaction / denature the amylase / optimum for reaction;

2

(ii) Purple / lilac / mauve / violet;
Do not allow blue or pink.

1

(iii) Protein present / the enzyme / amylase is a protein;
Not used up in the reaction / still present at the end of the reaction;

2

[7]

M3.(a)

High GI foods	Low GI foods
1. Rapid rise	Slow rise
2. Higher rise	Lower rise
3. Falls early / quickly	Falls later / slowly
4. Falls below normal	Does not fall below normal

.....
 ;;;;

1 mark per row

A pair of correct statements is required for each mark. They can be presented in any order

Accept use of figures derived from the graph to illustrate difference, eg marking point 2, High GI foods rise to (about)155 whereas Low GI foods rise only to about 125

NB There is no grid so exact values are not expected

4

(b) **EITHER**

Mark as a pair. Do not mix and match

1. White bread has sugars;

Accept a named example of a sugar

2. (So) less digestion required / sugars rapidly absorbed;

OR

3. Wholegrain bread has more fibre;

4. Fibre slows digestion / reduces absorption / speeds up movement in gut;

OR

5. White bread contains more salt / sodium (ions);

6. (So) more rapid absorption of glucose;

2

[6]

M4.(a) (i) Assumed that did not eat due to discomfort in the past;

1

(ii) Positive correlation / as lactose concentration increases the data in column C increases / percentage who do not eat the food or feel discomfort after eating the food increases;

1

(iii) Correlation does not mean that there is a causal relationship;

May be due to some other factor / example of factor;

Do not accept casual

2

- (b) 1. People self-diagnosed lactose intolerant condition;
2. Discomfort may be due to other factor / infection / other component of diet / is subjective;
3. Large variation in lactose content of specific food items / e.g. variation in lactose content of different soft cheeses;
4. Amount in a serving may vary;
5. Untruthful responses / demand characteristics;
- Sample size = neutral.*

2 max

[6]

M5. (a) (i) both are polymers / polysaccharides / built up from many sugar units / both contain glycosidic bonds / contain (C)arbon, (H)ydrogen and (O)xygen;

1

- (ii) hemicellulose shorter / smaller than cellulose / fewer carbons; hemicellulose from pentose / five-carbon sugars and cellulose from hexose / glucose / six-carbon sugars;
- (only credit answers which compare like with like.)*

2

(b) protein / nucleic acid / enzyme / RNA / DNA / starch / amylose / amylopectin polypeptide;

1

(c) (i) to make sure that all the water has been lost;

1

- (ii) only water given off below 90 °C; (above 90°C) other substances straw burnt / oxidised / broken down; and lost as gas / produce loss in mass;

2

(d) enzymes are specific;
shape of lignin molecules will not fit active site (of enzyme);
 OR
shape of active site (of enzyme);
 will not fit molecule;

2 max

- (e) 1. made from β -glucose;
 2. joined by condensation / removing molecule of water / glycosidic bond;
 3. 1 : 4 link specified or described;
 4. "flipping over" of alternate molecules;
 5. hydrogen bonds linking chains / long straight chains;
 6. cellulose makes cell walls strong / cellulose fibres are strong;
 7. can resist turgor pressure / osmotic pressure / pulling forces;
 8. bond difficult to break;
 9. resists digestion / action of microorganisms / enzymes;
(allow maximum of 4 marks for structural features)

6 max

[15]

M6. (a) presence of nuclei;

1

- (b) (i) 1 mark growth clearly calculated from difference
between lengths at beginning and end of lesson

2 marks correct answer of 300 μm

2

(Allow for slight measurement errors)

- (ii) divide by time (between measurements);

1

- (c) blue-black / dark blue / purple / black;
iodine added to slide / specimen / granules;

2

[6]