

Biological Molecules

Mark Scheme 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Biological Molecules
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 2

Time Allowed: 59 minutes

Score: /49

Percentage: /100

1 (a)	<p>Drawing: O: clear outline, drawing same size or larger than photograph; P: reasonable proportions of parts of leg;</p> <p>D: detail mark e.g. hairs / detail of segments at the end / claws / presence of segment attached to abdomen;</p> <p>Labels: any 2 from joint / segment / jointed legs; hairs; claw;</p>	[max 5]	<p>R. sketchy outline / incomplete outline (take account of scanning) / shading A. three parts, largest at the top, medium then smallest en part I. individual segments on end part I. segment of leg attached to abdomen R. parallel sided segment</p> <p>A. articulatio A. hook I. fu I. pointed end</p>
(b) (i)	20 +/- 1 (mm);	[1]	
(ii)	working: $\frac{\text{measurement from (i)}}{500}$; 0.04 (mm);	[2]	<p>A. correct diameter = 2 marks A. 0.038 – 0.042mm Allow e.c.f A. 4×10^{-2}</p>

<p>(c)</p>	<p>Any four from safety feature e.g. goggles / tongs / lab. coat / water bath;</p> <p><u>Starch</u> iodine solution;</p> <p>colour change expected – (brown) to blue / black (if present) ;</p> <p><u>Reducing sugar</u> Benedict’s solution / correct chemicals / Clinistix; heat; colour change expected;</p>	<p>[max 4]</p>	<p>I. gloves</p> <p>I. iodine A. drops of iodine I. reference to boiling for starch test</p> <p>Benedict’s – green / orange / brick red (if present) Clinistix – (pink -) purple (if present) For each test do not award expected colour change if incorrect reagent. N.B. Colour changes must be correctly linked to starch or reducing sugar</p>
<p>(d) (i)</p>	<p>it is a pest / causes harm / AW;</p> <p>lives on (adult) bees / (their) larvae; sucks / blood /AW; AVP;</p>	<p>[2]</p>	<p>I. ‘affects’ organism if unqualified A. correct reference to harm within a general definition of a parasite</p>
<p>(ii)</p>	<p>Mark independently :</p> <p><i>honey bee</i> – insecta; <i>feature</i> – wings / 3 pairs or 6 legs / 3 body parts or head + thorax + abdomen / 1 pair of antennae / (1 pair of) compound eyes;</p> <p><i>parasite</i> – arachnida; <i>feature</i> – 4 pairs of legs;</p>	<p>[4]</p>	<p>A. insect / insectoid I. features common to arthropods e.g. jointed limbs</p> <p>A. arachnid / arachnoid I. spider I. 4 or more pairs of legs I. negative features I. incorrect features</p>
<p>[Total: 18]</p>			

- 2 (a) Drawing:
O outline; (all drawing lines unbroken and no shading)
N correct number of cloves; (9/10 + 4)
A detail of central area shown in cloves of correct proportion;
- If 1.1a drawn** – max 1 for **O** outline
Label:
outer layer / epidermis / epicarp / skin / scale;
cloves / (central) stem; [5]
- (b) (i) (thin protective) covering / skin; AW [1]
- (ii) **two** from:
one part / many;
central stem / none;
skin AW: loose / attached / speckled / plain;
correct comment on shape;
AVP; [MAX 2]
- (c) **1** two equal samples (by mass or size) / equal reagents (by volume or concentration),
2 comparative point e.g. intensity of colour / positive and negative;
(ignore time factor)
- Starch*
3 iodine **solution / iodine in KI**;
4 black if positive / remains colour of iodine solution if negative;
- Sugars*
5 crush / grind / extract with water;
6 add Benedict's solutions or named chemicals;
7 heat (not warm);
8 colour change given green / yellow / orange / red / remains blue if negative;
- Safety*
S9 use of water bath – safety;
S10 test tube holders;
S11 safety / laboratory spectacles;
S12 use of lab coat;
S13 tie / hair tied back;
- [Max 2 for safety and Max 5 for method] [MAX 6]

[Total: 14]

- 3 (a) Drawing: **O** clear, continuous outline and no shading;
S 7–10 seeds on left and 4 on the right;
C cavity of seed area larger on the left than the right;

Labels: seeds/placenta/pericarp/fruit wall;
 (remains of) calyx/sepals/stalk/pedicel;

[ignore stem, pips, branch, petiole, peduncle] [ecf for pips, stem in (b)(i)] [if apple drawn, allow labels only]

[5]

- (b) (i) Give **four** differences.

Table 2.1

Feature	Tomato	Apple
Seeds	many (11–14)	one seed
	towards edge	central/middle
	space for seeds/seed chamber	solid/no space
	small seeds	large seed
	light seeds	dark seed
Fruit	smaller	larger
	darker	lighter
	round/no dent	dent top and bottom
	large placenta/core	smaller/no core
	bottom of fruit smooth/round	bottom is where flowers remains are/AW
Wall	thin wall/not much flesh	thick wall/mainly flesh
	calyx/sepals large/present	calyx/sepals small/absent
	calyx same end as stalk	calyx opposite end to stalk

Ignore references to colour, juice, moisture, texture, hard/soft, stalk differences.

[max 4]

(ii) **Two** from:

- fruit shape – bilateral symmetry/round/spherical;
- stalk/stem;
- pericarp/fruit wall/fleshy fruit;
- seeds present;
- AVP;

[max 2]

(c) Procedure: any **four** from:

- 1 equal sample of fruit;
- 2 crush fruit/chopping into small pieces;
- 3 Benedict's/Clinistix;
- 4 heating/boiling; (not warming)
- 5 same time for heating/look at same time;
- 6 comparison of colours/check colours/see which changes colour fastest; (pink to purple for clinistix)
- 7 AVP; (including same volume of Benedict's/water)

Safety: any **two** from:

- 8 safety glasses/goggles;
- 9 lab-coat (for protection);
- 10 test-tube holders or tongs
- 11 caustic chemicals/clear spillage/point away from people;
- 12 tie back hair (to prevent burning)/tuck in ties;
- 13 AVP;

*[ignore gloves/description of dangers
if wrong reagent given, allow points 1 and 2 only plus safety points]*

[max 6]

[Total: 17]