Biological Molecules

Mark Scheme 4

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Biological Molecules
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 4

Time Allowed: **56 minutes**

Score: **/46**

Percentage: **/100**

1 **(a)** drawing: **O** clear outline; [single line - allow detail of spots but no shading]
S good size and correct shape; [detail of petals and overall shape]
A detail of stamens; [3 stamens, accurate and double line for filament]
G detail of carpel; [bilobed stigma and above stamens and double structure below stigma down towards ovary] **[4]**

Labels: **X** correct location and label line to anther;
Y correct location and label line to stigma;
Z correct location and label line to style; **[3]**

(b) **(i)** reducing sugar: add Benedict's [reagents]; heat/boil/warm;
starch: add iodine (solution)/iodine/I_2 **[3]**

(ii) from blue to green/yellow/orange/red; **[1]**

(c) **(i)** size of grains with unit [mm or cm] accept range 52-57 mm/÷magnification - 200;
actual size in mm or cm; accept range 0.26 to 0.285 mm **[2]**

(ii) rough surface/hooks/not smooth/spikes/thorns/horns/projections; **[1]**

(d) **(i)** **1** choice of one type/same species of flower with different colour varieties/artificial flowers/coloured cards; [not petals alone].
2 arrange flower(s) in separate colour blocks/in separate areas/places;
3 record the number of visits/observe where most insects visit; [easy point]
4 set time period specified e.g. minutes or hours; ['days' are too long]
5 keep other variables constant e.g. water/turgidity of flowers/background/time of day/AVP;
6 repeating experiment; **[Max: 4]**

(ii) odour or scent or smell/shape e.g. resemble female insect/detail of flower to attract insect e.g. honeyguides or markings on petals/brightly coloured bracts or sepals/reference to UV light for moths/AVP; **[1]**

[Total: 19]

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>2 (a)</td><td>
<table>
<tr><td></td><td>lentil</td><td>chi</td><td>soya bean</td></tr>
<tr><td>shape of seed</td><td>round / circular / disc-like / biconvex/ flat & round / AW</td><td>circular / round / spherical / irregular / pointed / tear shape / AW</td><td>elongate / oval / AW</td></tr>
<tr><td>appearance of seed coat</td><td>varied / speckled / patterned / AW</td><td>uneven / ridged / rough / AW</td><td>even / smooth / uniform / AW</td></tr>
</table>
</td><td>[3]</td><td>Any two boxes correctly completed = 1 mark</td></tr>
<tr><td>(b)</td><td>variable to change: temperature;
variable to measure: number of seeds (germinated);</td><td>[2]</td><td></td></tr>
<tr><td>(c) (i)</td><td>Drawing of lentil seedling from Fig. 1.2

O – outline;

S – size;

D – fork in first leaf and split testa revealing cotyledon;

L – two labels;</td><td>[4]</td><td>R. shading
R. sketched / artistic lines

Drawing larger than photograph (> 61 mm)

A. labels: radicle / root / stem / shoot / plumule / leaf / cotyledon / testa / seed coat.
I. Label lines which do not touch the part or cross</td></tr>
</table>

(ii)	*Magnification of drawing* measurement: 61 ±1 [mm]; measurement of ST on their drawing ±1 [mm]; formula: drawing length ÷ original length; correct magnification;	[4]	mm given in question, If different unit e.g. cm, then units must be present. **R.** no clear indication of ends of line between S and T but allow e.c.f .for calculation. If correct answer then award last 2 marks irrespective of formula. If incorrect answer then award 1 for correct working. **R.** if incorrectly rounded e.g. 2.6 for 2.66
(d) (i)	*Protein test* add <u>biuret</u> solution / biuret A and B / biuret 1 and 2 / copper sulphate and potassium / sodium hydroxide; <u>blue</u> to purple / mauve / lilac / AW;	[2]	**A.** correct chemical symbols **I.** copper sulphate or sodium / potassium hydroxide alone **A.** other correct tests**.** e.g. Xanthoproteic – yellow to orange Millons – flesh to reddish brown albustix – yellow to green **R.** if heated or boiled.
(ii)	*Fat test* add alcohol / ethanol; pour / add to water; white / cloudy / emulsion formed / AW;	[3]	Max 2 if describe grease spot test.

(e) (i)	*Plotting bar chart* **A** – label axes and even scale; **S** – size plots to fill half or more on both axes; **P** – plot; **C** – columns do not touch; **K** – key or label [protein and fat];	[5]	**A.** vertical or horizontal bars. Line graph max 3, **A,S** and **K** **I.** graphs drawn side by side or above one another on the grid. Minimum accepted = names of beans and %. Do not award if columns exceed printed grid. If no scale / no seeds labelled, P = 0 Accurate to ±0.5 of grid square. **P.** allow 2 errors. **A.** protein and fat columns touching if space between different seed columns. **R.** columns of unequal widths.
(ii)	soya (bean);	[1]	
(f)	*measure–* starting and final temperature / change in temperature; *control–* mass of sample / volume of water / distance of flame to tube; one safety measure: fume cupboard / tongs AW / lab coat / goggles / correct ref. to hair / ties;	[3]	
		[Total: 27]	