

1. (a) (i) Chloroplast. 1  
(ii) Granum / thylakoids. (*not: lamella*) 1
- (b) 3.2 - 3.3 - *gains 2 marks*  
Working shows measured length divided by magnification - *gains 1 mark* 2
- (c) Contains chlorophyll / pigments for light absorption;  
Different pigments to absorb different wavelengths;  
Stacking / arrangement of grana/thylakoids maximises light catchment;  
Stroma contains enzymes for photosynthesis;  
Outer membrane keeps enzymes in chloroplast;  
Starch grains / lipid droplets store products of photosynthesis;  
Ribosomes / DNA for enzyme/protein synthesis;  
Shape of chloroplast gives large surface area for CO<sub>2</sub>, absorption. 2
- [6]**
2. (a) **A** ribosome (*RER neutral*); 1  
**B** vacuole; 1  
**C** smooth ER / SER; 1
- (b) (i) support / strength / shape / prevents osmotic lysis;  
(*protection, permeability neutral*) 1
- (ii) photosynthesis / light energy → chemical energy;  
(*makes food/sugar neutral*) 1
- (c) 0.2 – 0.24 gains 2 marks;  
ELSE evidence of observed measurement  
(5 – 6 mm / 0.5 – 0.6 cm) ÷ 25 000  
gains one mark; 2
- [7]**
3. (a) cells become specialised/change to carry out a particular function; 1
- (b) (i) named organelle e.g. nucleus/nuclear envelope; vacuole;  
chloroplast; RER; mitochondrion; no membrane bound organelles;  
(*only award if no organelles named*)  
(*reject ribosomes, cell membrane, cell wall*)  
ref to large(r) size 2 max
- (ii)  $94/95/96 \times \frac{10}{44/45/46}$ ; principle (measured distance Y-Z)  
length of scale bar  
20.4 – 21.8 2  
(*correct answer 2 marks*)
- (iii) no cell wall (permanent) / (large) vacuole / chloroplasts / smaller;

(accept microvilli)

1 max

[6]

4. (a) 16 gains 2 marks; 2

*(accept 15.5 . 16.5)*

*(principal of calculation i.e. measured distance  
(31-33mm/3.1-3.3cm) gains 1 mark) Mag*

(b) relevant adaptation;  
**and** explanation for second mark; e.g.

*idea of many chloroplasts / lots of chlorophyll;  
to trap or absorb light (energy);*

*elongated cells;*

*idea of maximum light absorption / light penetration;*

*chloroplasts move;*

*to trap or absorb light (energy);*

*range of pigments;*

*can absorb a range of wavelengths / colours / for max light absorption;*

*large S.A. or cell wall feature e.g. thin / permeable;*

*for (rapid) CO<sup>2</sup> absorption;*

2

[4]

5. (a) (Group of) similar/identical cells/cells with a common origin; 1

*Q Ignore references to function*

(b) (i) Add iodine/stain specific for starch to the slide/cells/tissue/  
/add iodine/stain specific for starch and examine under microscope;  
Blue-black/blue/black/purple; 2

*Reject sample*

(ii) Need a single layer of cells/only a few cells thick/not too many  
layers;

Light must be able to pass through;

Detail obscured by cells underneath;

2 max

- (c) Both are polymers/made of monomers;  
Joined by condensation/molecules can be broken down by hydrolysis;  
Both have 1-4 links;  
Contain C(arbon), H(ydrogen) and O(xygen)/both made up of glucose;  
Both insoluble;  
Both contain glycosidic bonds;

2 max

*Accept other valid answers.  
Ignore ref to unbranched.*

[7]