

M1.

(a)

Protein synthesis	L;
Modifies protein	H;
Aerobic respiration	N;

3

(b) 1800–2200;

*1.8, 2.0 or 2.2 in working or answer = 1 mark.**Ignore units in answer.*

1 mark for an incorrect answer in which student clearly divides measured length by actual length (of scale).

*Accept I / A or I / O for 1 mark but ignore triangle.**Accept approx 60mm divided by 30 μ m for 1 mark*

2

[5]**M2.(a)**

1. Large / dense / heavy cells;
2. Form pellet / move to bottom of tube (when centrifuged);
3. Liquid / supernatant can be removed.

Must refer to whole cells.

3

(b) Break down cells / cell parts / toxins.

Idea of 'break down / digestion' needed, not just damage

1

(c) 1. To stop / reduce them being damaged / destroyed / killed;

Reject (to stop) bacteria being denatured.

2. By stomach acid.

Must be in context of stomach.

2

- (d)
1. More cell damage when both present / A;
 2. Some cell damage when either there on their own / some cell damage in B and C;
MP1 and MP2 – figures given from the graph are insufficient.
 3. Standard deviation does not overlap for A with B and C so difference is real;
*MP3 and MP4 **both** aspects needed to gain mark.*
 4. Standard deviations do overlap between B and C so no real difference.
MP3 and MP4 accept reference to significance / chance for 'real difference'

3 max

- (e)
1. Enzyme (a protein) is broken down (so no enzyme activity);
Accept hydrolyse / digested for 'broken down'.
 2. No toxin (as a result of protein-digesting enzyme activity);
Must be in the correct context.
 3. (So) toxin is protein.
This must be stated, not inferred from use of 'protein-digesting enzyme'.

3

[12]

- M3.(a)**
1. How to break open cells and remove debris;
 2. Solution is cold / isotonic / buffered;
 3. Second pellet is chloroplast.

3

- (b)
1. **A** stroma;
 2. **B** granum.
Accept thylakoid

2

(c) $\left(\frac{\text{length of chloroplast}}{\text{length of bar}} \right) \mu\text{m}$ 1

- (d) **Two** of the following for **one** mark:
Mitochondrion / ribosome / endoplasmic reticulum / lysosome / cell-surface membrane.

1 max

[7]

- M4.(a)** 1. Starch formed from α -glucose but cellulose formed from β -glucose;
2. Position of hydrogen and hydroxyl groups on carbon atom 1 inverted.

2

- (b) 1. Insoluble;
2. Don't affect water potential;

OR

3. Helical;
Accept form spirals

4. Compact;

OR

5. Large molecule;
6. Cannot leave cell.

2

- (c) 1. Long and straight chains;
2. Become linked together by many hydrogen bonds to form fibrils;
3. Provide strength (to cell wall).

3

[7]

- M5.(a)** 1. (If injected into egg), gene gets into all / most of cells of silkworm;
2. So gets into cells that make silk.

2

- (b) 1. Not all eggs will successfully take up the plasmid;
2. Silkworms that have taken up gene will glow. 2
- (c) Promoter (region / gene). 1
- (d) 1. So that protein can be harvested;
2. Fibres in other cells might cause harm. 2
- M6.(a)** 1. Add drop of water to (glass) slide;
2. Obtain thin section (of plant tissue) and place on slide / float on drop of water;
3. Stain with / add iodine in potassium iodide.
3. *Allow any appropriate method that avoids trapping air bubbles*
4. Lower cover slip using mounted needle. 4
- (b) 1. **W** – chloroplast, photosynthesis;
2. **Z** – nucleus, contains DNA / chromosomes / holds genetic information of cell. 2
- (c) 1. High resolution;
2. Can see internal structure of organelles. 2
- (d) Length of bar in mm \times 1000. 1
- [7]**
- [9]**

- M7.(a)** 1. Bilayer;
Accept double layer
Accept drawing which shows bilayer
2. Hydrophobic / fatty acid / lipid (tails) to inside;
3. Polar / phosphate group / hydrophilic (head) to outside;
 2. & 3. *need labels*
 2. & 3. *accept water loving or hating*

2 max

- (b) (i) 1. (Rough endoplasmic reticulum has) ribosomes;
accept "contains / stores"
2. To make protein (which an enzyme is);
Accept amino acids joined together / (poly)peptide
Reject makes amino acids
Ignore glycoprotein

2

- (ii) (Golgi apparatus) modifies (protein)

OR

packages / put into (Golgi) vesicles

OR

transport to cell surface / vacuole;
Accept protein has sugar added
Reject protein synthesis
Accept lysosome formation

1

[5]