

- M1.(a)**
1. (Releases) toxins;
 2. Kills cells / tissues.
- 2. Accept any reference to cell / tissue damage*
Ignore infecting / invading cells

2

- (b)
1. Water potential in (bacterial) cells higher (than in honey) / water potential in honey lower (than in bacterial cells);
Q candidates must express themselves clearly
1. Must be comparative e.g. high WP in cell and low WP in honey
 2. Water leaves bacteria / cells by osmosis;
 3. (Loss of water) stops (metabolic) reactions.
3. Needs a reason why lack of water kills the cell

3

[5]

- M2.(a)** Regulator protein.
- Accept regulator protein antigen*
Reject regulator protein receptor
Ignore regular protein

1

- (b)
1. Lipid soluble / hydrophobic
 2. Enters through (phospholipid) bilayer
- OR**
3. (Protein part of) LDL attaches to receptor
 4. Goes through carrier / channel protein.
4. Accept by facilitated diffusion or active transport
4. Reject active transport through channel protein

2

- (c) Any **two** from:
1. (Monoclonal antibody) has a specific tertiary structure / variable region / is complementary to regulator protein

Do not award MP1 if reference to active site.

2. Binds to / forms complex with (regulator protein)
"It" refers to monoclonal antibody in MP1 and MP2
3. (So regulator protein) would not fit / bind to the receptor / is not complementary to receptor
3. Reject receptor on LDL

2 max

- (d)
1. Injection with salt solution
1. Accept inject placebo in salt solution
 2. Otherwise treated the same.

2

[7]

- M3.(a)**
1. (No grease)
means stomata are open
OR
allows normal CO₂ uptake;
Allow 'gas exchange' for CO₂ uptake.
'As a control' is insufficient on its own.
 2. (Grease on lower surface)
seals stomata
OR
stops CO₂ uptake through stomata
OR
to find CO₂ uptake through stomata
OR
shows CO₂ uptake through cuticle / upper surface;
 3. (Grease on both surfaces) shows sealing is effective
OR
stops all CO₂ uptake.

3

- (b) (i)
1. (Mean rate of) carbon dioxide uptake was constant *and* fell after the light turned off;
Ignore absence of arbitrary units in both marking points.

Both ideas needed for mark.

Accept 'stayed at 4.5' as equivalent to 'was constant'.

2. Uptake fell from 4.5 to 0 / uptake started to fall at 60 minutes and reached lowest at 80 minutes / uptake fell over period of 20 minutes;

One correct use of figures required.

Accept fell to nothing / no uptake for 0.

2

- (ii) 1. (Because) water is lost through stomata;
2. (Closure) prevents / reduces water loss;
3. Maintain water content of cells.

This marking point rewards an understanding of reducing water loss e.g. reduce wilting, maintain turgor, and is not related to photosynthesis.

2 max

- (c) (i) (Carbon dioxide uptake) through the upper surface of the leaf / through cuticle.

1

- (ii) 1. No use of carbon dioxide in photosynthesis (in the dark);
2. No diffusion gradient (maintained) for carbon dioxide into leaf / there is now a diffusion gradient for carbon dioxide out of leaf (due to respiration).

2

[10]

- M4.(a)** 1. (Overall) outward pressure of 3.2 kPa;
2. Forces small molecules out of capillary.

2

- (b) Loss of water / loss of fluid / friction (against capillary lining).

1

- (c) 1. High blood pressure = high hydrostatic pressure;

2. Increases outward pressure from (arterial) end of capillary / reduces inward pressure at (venule) end of capillary;
3. (So) more tissue fluid formed / less tissue fluid is reabsorbed.
Allow lymph system not able to drain tissues fast enough

3

- (d)
1. Water has left the capillary;
 2. Proteins (in blood) too large to leave capillary;
 3. Increasing / giving higher concentration of blood proteins (and thus wp).

3

[9]

- M5.(a)**
1. Dissolve in alcohol, then add water;
 2. White emulsion shows presence of lipid.

2

- (b) Glycerol.

1

- (c) Ester.

1

- (d) **Y** (no mark)
Contains double bond between (adjacent) carbon atoms in hydrocarbon chain.

1

- (e)
1. Divide mass of each lipid by total mass of all lipids (in that type of cell);
 2. Multiply answer by 100.

2

- (f) Red blood cells free in blood / not supported by other cells so cholesterol helps to maintain shape;

Allow converse for cell from ileum – cell supported by others in endothelium so cholesterol has less effect on maintaining shape.

1

- (g) 1. Cell unable to change shape;
2. (Because) cell has a cell wall;
3. (Wall is) rigid / made of peptidoglycan / murein.

2 max

[10]

M6.(a) Calculations made (from raw data) / raw data would have recorded initial and final masses.

1

- (b) Add 4.5 cm³ of (1.0 mol dm⁻³) solution to 25.5 cm³ (distilled) water.
If incorrect, allow 1 mark for solution to water in a proportion of 0.15:0.85

2

- (c) 1. Water potential of solution is less than / more negative than that of potato tissue;
Allow Ψ as equivalent to water potential

2. Tissue loses water by osmosis.

2

- (d) 1. Plot a graph with concentration on the x-axis and percentage change in mass on the y-axis;
2. Find concentration where curve crosses the x-axis / where percentage change is zero;
3. Use (another) resource to find water potential of sucrose concentration (where curve crosses x-axis).

3

[8]