

| Question number | Answer                                                                                                                                                                                                                                                                                           | Notes                       | Marks |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------|
| 1 (a) (i)       | A;<br><br>(C)<br><br>B;<br><br>A;                                                                                                                                                                                                                                                                | Only one letter in each box | 3     |
| (ii)            | 1. (bile) <u>emulsification</u> / <u>emulsifies</u> ;<br><br>2. small(er) drops / increased surface area / more drops;<br><br>3. optimum pH / correct pH / best pH;<br><br>4. (lipase) is an enzyme;<br><br>5. digestion / breakdown;<br><br>6. into <u>fatty acids</u> / into <u>glycerol</u> ; |                             | 4     |
| (b)(i)          | villus / villi;                                                                                                                                                                                                                                                                                  | allow phonetic spelling     | 1     |

|      |                                                                                                                                                                                                                        |                                                                          |   |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---|
| (ii) | 1. large surface area;<br>2. microvilli ;<br>3. capillaries;<br>4. movement of blood / concentration gradient / eq;<br>5. one cell thick / thin wall / thin / short distance;<br>6. diffusion;<br>7. active transport; | 1. ignore many villi idea<br><br><br><br><br><br><br>4. ignore cell wall | 5 |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---|

Total 13 marks

| Question number |       | Answer                                                        | Notes                                    | Marks |
|-----------------|-------|---------------------------------------------------------------|------------------------------------------|-------|
| 2(a)            | (i)   | safety glasses / wear gloves ;                                | Ignore lab coat / tie hair back / eq     | 1     |
|                 | (ii)  | 11/ eleven;                                                   |                                          | 1     |
| (b)             | (i)   | remove starch / solution from surface of syringe / eq;        | Ignore get into syringe                  | 1     |
|                 | (ii)  | mix <u>contents</u> / mix <u>amylase and starch</u> / eq;     | Mix alone = 0<br>Allow enzyme and starch | 1     |
|                 | (iii) | keep at correct temperature / keep temperature constant / eq; | Ignore fair test                         |       |

|     |      |                                                                                                                                                                                                                     |                        |   |
|-----|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|
| (c) | (i)  | 1. volume / concentration of amylase;<br>2. volume / concentration of starch;<br>3. volume / concentration of iodine / drops of iodine;<br>4. volume / concentration of mixture;                                    | Allow amount only once | 2 |
|     | (ii) | temperature;                                                                                                                                                                                                        | Ignore time            | 1 |
| (d) |      | 1. 6 minutes / between 5 and 6 minutes / eq;<br><br>2. iodine stays yellow / orange / brown / iodine stays same colour / colourless / not blue black;<br><br>3. no starch present;<br><br>4. digested/broken down ; | Reject 6-7 mins        | 3 |

| Question number | Answer                                                                                                                                                                       | Notes                  | Marks |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------|
| (e)(i)          | 1. fewer wells with blue black colour / more wells yellow / orange / brown / colourless / eq;<br>2. starch digested sooner / quicker / reaction completed sooner / eq;       |                        | 2     |
| (ii)            | 1. enzymes work faster at 40°C / ref to optimum / eq;<br>2. more (kinetic) energy / molecules move faster / eq;<br>3. more collisions / more enzyme substrate complexes /eq; | Ignore ref to denature | 2     |

**Total 15 marks**

| Question number     | Answer                                                                                                                                                                                                                                                                                                                                                             | Notes                                  | Marks                        |                              |        |         |                    |          |          |                                        |       |         |                         |                      |   |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------|------------------------------|--------|---------|--------------------|----------|----------|----------------------------------------|-------|---------|-------------------------|----------------------|---|
| 3 (a)               | <table><tr><th>Large food molecule</th><th>Enzyme involved in digestion</th><th>Small food molecule produced</th></tr><tr><td>starch</td><td>amylase</td><td>glucose / maltose;</td></tr><tr><td>protein;</td><td>protease</td><td>amino acids / polypeptides / peptides;</td></tr><tr><td>lipid</td><td>lipase;</td><td>fatty acids / glycerol;</td></tr></table> | Large food molecule                    | Enzyme involved in digestion | Small food molecule produced | starch | amylase | glucose / maltose; | protein; | protease | amino acids / polypeptides / peptides; | lipid | lipase; | fatty acids / glycerol; | Ignore simple sugars | 5 |
| Large food molecule | Enzyme involved in digestion                                                                                                                                                                                                                                                                                                                                       | Small food molecule produced           |                              |                              |        |         |                    |          |          |                                        |       |         |                         |                      |   |
| starch              | amylase                                                                                                                                                                                                                                                                                                                                                            | glucose / maltose;                     |                              |                              |        |         |                    |          |          |                                        |       |         |                         |                      |   |
| protein;            | protease                                                                                                                                                                                                                                                                                                                                                           | amino acids / polypeptides / peptides; |                              |                              |        |         |                    |          |          |                                        |       |         |                         |                      |   |
| lipid               | lipase;                                                                                                                                                                                                                                                                                                                                                            | fatty acids / glycerol;                |                              |                              |        |         |                    |          |          |                                        |       |         |                         |                      |   |
| (b)                 | 1. large surface area / microvilli;<br>2. thin / short diffusion distance / eq;<br>3. blood / capillaries / eq;<br>4. permeable;<br>5. lacteal;                                                                                                                                                                                                                    | Ignore many villi / long villi         | 3                            |                              |        |         |                    |          |          |                                        |       |         |                         |                      |   |

**Total 8 marks**

| Question number | Answer                                                                                                                       | Notes                                     | Marks     |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|
| 4 (a)           | (trap/absorb) light / eq;<br>chlorophyll;<br>photosynthesis / starch / glucose / eq;                                         | ignore trap energy                        | 2         |
| (b)             | A cell wall;<br>B vacuole;<br>C cytoplasm;                                                                                   |                                           | 3         |
| (c) (i)         | C;<br>A;                                                                                                                     |                                           | 2         |
| (ii)            | starch removed / starch used / no starch / eq;<br>(converted to) glucose;<br>respiration / energy;                           |                                           | 2         |
| (iii)           | boil (in ethanol) / heat (in ethanol)/ eq;<br>ethanol / alcohol;<br>no naked flame / water bath / hot water / in water / eq; | allow water mark if linked to boil / heat | 3         |
| (iv)            | iodine / iodide;                                                                                                             |                                           | 1         |
|                 |                                                                                                                              | <b>Total</b>                              | <b>13</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                                                               | Notes                                                                                                                                      | Marks                  |                                     |         |       |           |        |         |                   |       |                                        |           |                                                                                            |   |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------|---------|-------|-----------|--------|---------|-------------------|-------|----------------------------------------|-----------|--------------------------------------------------------------------------------------------|---|
| 5(a)            | 1. iodine;<br>2. blue / black / blue black = starch;<br>3. Benedict's / eq;<br>4. heat / use water bath / eq;<br>5. red / orange / yellow / green = glucose;                                                                                                                                                                         | if iodine for glucose goes blue black = 0<br><br>only award Mp1 and Mp3 if linked to correct test<br><br>heat must be linked to Benedict's | 4 max                  |                                     |         |       |           |        |         |                   |       |                                        |           |                                                                                            |   |
| (b)             | <table><tr><th>Group</th><th>Example from the group</th><th>Molecule used to store carbohydrate</th></tr><tr><td>animals</td><td>(cat)</td><td>glycogen;</td></tr><tr><td>plants</td><td>(maize)</td><td>starch / sucrose;</td></tr><tr><td>fungi</td><td>mucor / yeast / mushroom / mould / eq;</td><td>glycogen;</td></tr></table> | Group                                                                                                                                      | Example from the group | Molecule used to store carbohydrate | animals | (cat) | glycogen; | plants | (maize) | starch / sucrose; | fungi | mucor / yeast / mushroom / mould / eq; | glycogen; | Ignore in plants sugar / glucose / fructose<br><br>Allow<br><i>Fomes formentarius</i> / eq | 4 |
| Group           | Example from the group                                                                                                                                                                                                                                                                                                               | Molecule used to store carbohydrate                                                                                                        |                        |                                     |         |       |           |        |         |                   |       |                                        |           |                                                                                            |   |
| animals         | (cat)                                                                                                                                                                                                                                                                                                                                | glycogen;                                                                                                                                  |                        |                                     |         |       |           |        |         |                   |       |                                        |           |                                                                                            |   |
| plants          | (maize)                                                                                                                                                                                                                                                                                                                              | starch / sucrose;                                                                                                                          |                        |                                     |         |       |           |        |         |                   |       |                                        |           |                                                                                            |   |
| fungi           | mucor / yeast / mushroom / mould / eq;                                                                                                                                                                                                                                                                                               | glycogen;                                                                                                                                  |                        |                                     |         |       |           |        |         |                   |       |                                        |           |                                                                                            |   |

Total 8 marks

| Question number | Answer |                                                                                   | Notes                              | Marks |
|-----------------|--------|-----------------------------------------------------------------------------------|------------------------------------|-------|
| 6               | C      | plus and minus statin(s) / range / eq;                                            | allow principles if lab based      |       |
|                 | O      | same gender / same age / same mass / same level of cholesterol / eq;              | allow if use animals               |       |
|                 | R      | several people / group of people / repeat the test / eq;                          |                                    |       |
|                 | M1     | measure cholesterol level;                                                        |                                    |       |
|                 | M2     | at start and at end / time stated / measure change;                               |                                    |       |
|                 | S1+ S2 | same diet / same mass of food / same stress / same exercise / same smoking / eq;; | ignore temperature / light / water | 6     |