MAXIMUM MARK: 40
mark scheme abbreviations

;  separates marking points
/

alternative responses for the same marking point

not  do not allow

allow  accept the response

ecf  error carried forward

avp  any valid point

ora  or reverse argument

owtte  or words to that effect

underline  actual word given must be used by candidate (grammatical variants excepted)

()  the word / phrase in brackets is not required but sets the context

max  indicates the maximum number of marks

Any [number] from:  accept the [number] of valid responses

note:  additional marking guidance
1 (a) complete table with lines neatly drawn (appropriate number of cells);
(column / row) headings – number of pieces of sweet potato / cube number;
(column / row) labelled – number of bubbles in 1 minute;
(column / row) labelled – height of foam with correct units;
number of bubbles recorded 12, 23 and 38;
height values recorded 42 mm 63 mm 76 mm ±1 mm; [6]

(b) (i) Any two from:
    same volume of H$_2$O$_2$;
    same volume of potato cube;
    same time; [max 2]

(ii) Any three from:
    repeat and calculate mean;
    exclude anomalies from mean calculation;
    collect the gas and measure the volume;
    avp; [max 3]

(c) activity is proportional to surface area / the greater the surface area the greater the activity / owtte; [1]

(d) (i) Any six from:
    give a range of at least 4 temperatures;
    describe how temperature would be changed / water-bath;
    describe the use of a controlled equilibration time to reach temperature;
    control stated as: an inert cube / boiled cube or same volume of water as hydrogen peroxide;
    appropriate description of how volume of gas will be measured / bubbles counted;
    appropriate statement regarding time;
    surface area of potato controlled;
    another controlled variable stated, e.g. pH / same potato;
    repeat and calculate mean; [max 6]

(ii) Any one from:
    safety goggles / gloves;
    reference to temperature and safety; [max 1]
2 (a) (i) Any five from:
- drawing with clear outline;
- scaled to fill more than half the space;
- detail without shading to include veins and petiole;
- midrib / main vein;
- branching veins / lateral veins;
- petiole / leaf stalk;
- lamina / leaf blade;

note: max 2 for labels alone [max 5]

(ii) 32–34 and cm² / 320–340 and mm²; [1]

(iii) marking off squares (to avoid miscounting);
- include the part squares / count squares more than ½ covered / owtte; [2]

(b) Any two from:
- veins less prominent;
- more shiny;
- darker colour;
- smoother / waxy;

note: comparison must be made [max 2]

(c) (i) loss in mass 1.9, 2.0, 2.2, 2.5, 2.7;
- all values to one decimal place; [2]

(ii) axes labelled and units;
- even scale and plots to fill more than ½ of printed grid;
- plot 5 points correctly;; (plot 4 points correctly = 1 mark)

note: plotted points must be accurate to ±½ small square straight line; [5]

(iii) 2.9 (g);
- allow: ecf from incorrect plotting
- indication shown on graph; [2]

(iv) percentage change in mass = (change in mass ÷ starting mass) × 100;
- different original mass would affect result / to take into account the starting mass; [2]