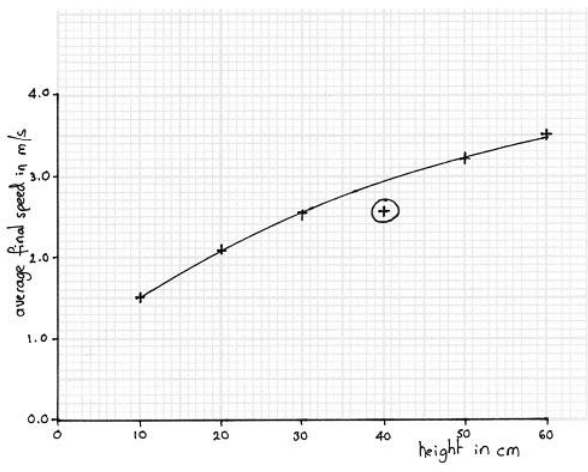

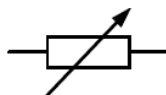




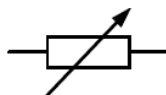





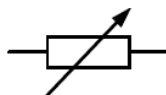



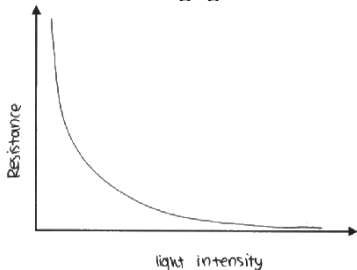


| (ii) | <p>suitable linear scale chosen (>50% of grid used); axes labelled with quantities and unit; plotting correct to nearest half square (minus one for each plotting error);</p>  | <p>ignore orientation</p> <p>ignore final point i.e. two plotting errors = no marks for plotting</p> <table><tr><th>height in cm</th><th>average final speed in m/s</th></tr><tr><td>10.0</td><td>1.39</td></tr><tr><td>20.0</td><td>1.97</td></tr><tr><td>30.0</td><td>2.43</td></tr><tr><td>40.0</td><td>2.45</td></tr><tr><td>50.0</td><td>3.09</td></tr><tr><td>60.0</td><td>3.40</td></tr></table> | height in cm | average final speed in m/s | 10.0 | 1.39 | 20.0 | 1.97 | 30.0 | 2.43 | 40.0 | 2.45 | 50.0 | 3.09 | 60.0 | 3.40 | 4 |
|--------------|---|---|--------------|----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|---|
| height in cm | average final speed in m/s | | | | | | | | | | | | | | | | |
| 10.0 | 1.39 | | | | | | | | | | | | | | | | |
| 20.0 | 1.97 | | | | | | | | | | | | | | | | |
| 30.0 | 2.43 | | | | | | | | | | | | | | | | |
| 40.0 | 2.45 | | | | | | | | | | | | | | | | |
| 50.0 | 3.09 | | | | | | | | | | | | | | | | |
| 60.0 | 3.40 | | | | | | | | | | | | | | | | |
| (iii) | (40.0,2.45) identified clearly; | | 1 | | | | | | | | | | | | | | |
| (iv) | line (curve) of best fit acceptable, ignoring anomalous point; | i.e. smooth curve within 1 small square of each point ignore parts of curve outside plotted points if extrapolated | 1 | | | | | | | | | | | | | | |
| (v) | idea that (average final) speed increases with height; idea that relationship is non-linear; | allow RA ignore 'positive correlation' ignore references to line being curved allow not proportional allow idea of gradient changing | 2 | | | | | | | | | | | | | | |

| Question number | Answer | Notes | Marks | | | | | | | | | | | | |
|------------------------|---|---|----------------|----------------|---|-------------------|---|------|---|------|---|------------------------|---|---|---|
| 4 (a) | <p>1 mark for each correct line; ; ; ;</p> <table><tr><th>Name of component</th><th>Circuit symbol</th></tr><tr><td>fixed resistor</td><td></td></tr><tr><td>variable resistor</td><td></td></tr><tr><td>cell</td><td></td></tr><tr><td>lamp</td><td></td></tr><tr><td>fuse / circuit breaker</td><td></td></tr></table> | Name of component | Circuit symbol | fixed resistor |  | variable resistor |  | cell |  | lamp |  | fuse / circuit breaker |  | <p>symbols do not need to have connecting wires shown at each side</p> <p><u>arrow</u> can be any direction but must be diagonal only</p> <p>ignore 'battery'</p> <p>allow filament lamp symbol </p> | 4 |
| Name of component | Circuit symbol | | | | | | | | | | | | | | |
| fixed resistor |  | | | | | | | | | | | | | | |
| variable resistor |  | | | | | | | | | | | | | | |
| cell |  | | | | | | | | | | | | | | |
| lamp |  | | | | | | | | | | | | | | |
| fuse / circuit breaker |  | | | | | | | | | | | | | | |
| (b) (i) | voltage = current x resistance; | allow in standard symbols or in words e.g. $V = I \times R$ | 1 | | | | | | | | | | | | |
| (ii) | <p>substitution OR rearrangement; evaluation;</p> <p>e.g. $R = V/I = 8.0/0.50$ $R = 16 \text{ (ohms)}$</p> | either seen | 2 | | | | | | | | | | | | |
| (c) | <p>axes labelled with resistance and { light intensity / light / intensity / brightness};</p> <p>resistance decreasing as light intensity increases; curve of decreasing gradient; e.g.</p>  | <p>ignore units and orientation</p> <p>allow 'dark' and 'light' labels</p> <p>DOP</p> <p>DOP</p> | 3 | | | | | | | | | | | | |

Total for question 4 = 10 marks

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 8 (a) | faster; expands; decreases; convection; | must be in this order | 4 |
| (b) (i) | gravitational (potential) energy = mass x g x height; | allow in standard symbols or in words e.g. $GPE = m \times g \times h$ reject ' gravity ' for g | 1 |
| (ii) | substitution; evaluation; e.g. (GPE =) $50 \times 10 \times 80$ (GPE =) 40 000 (joules) | allow use of $g=9.8 / 9.81$ allow 40 kJ, 39 200, 39 240 (J) | 2 |
| (iii) | same answer as (b)(ii); | allow 40 000 (J) | 1 |

Total for question 8 = 8 marks