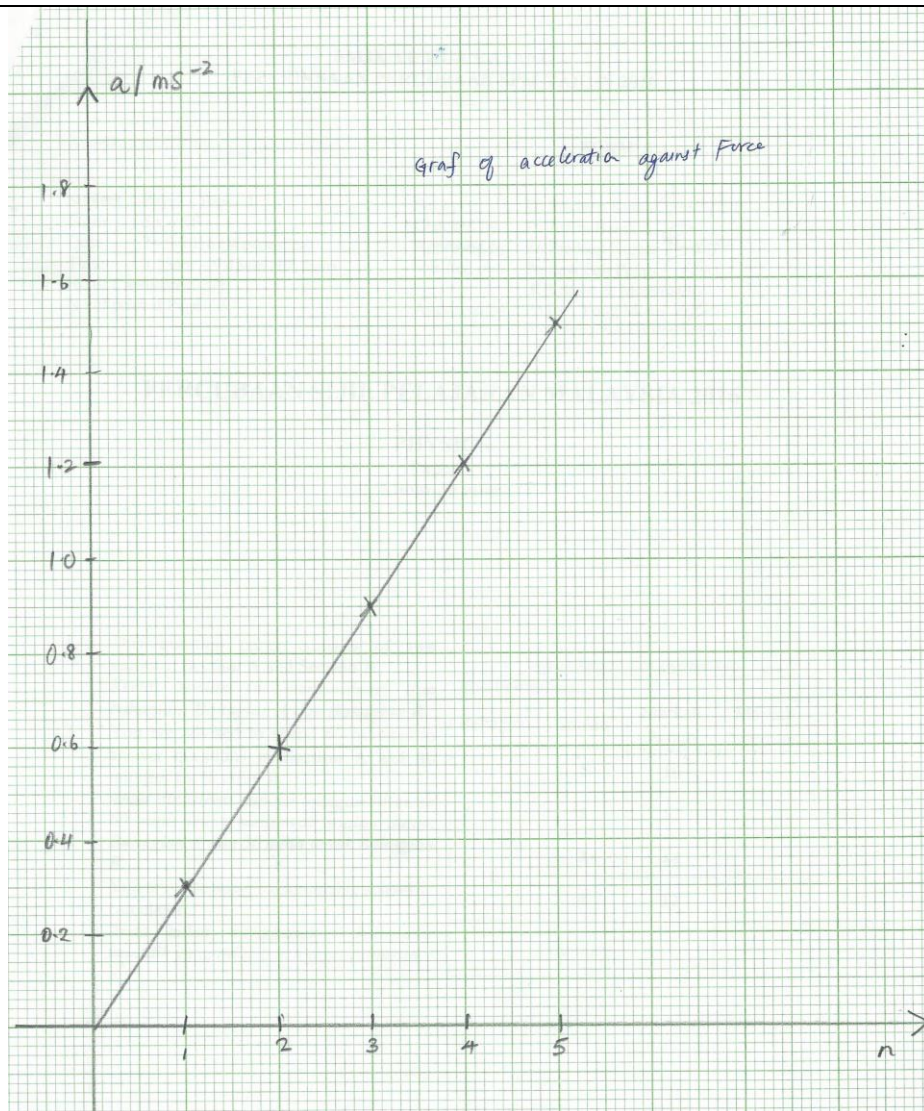


**SMJK YU HUA KAJANG**  
**SKEMA JAWAPAN KERTAS 3 PERCUBAAN SPM FIZIK 2016**  
**BAHAGIAN A**

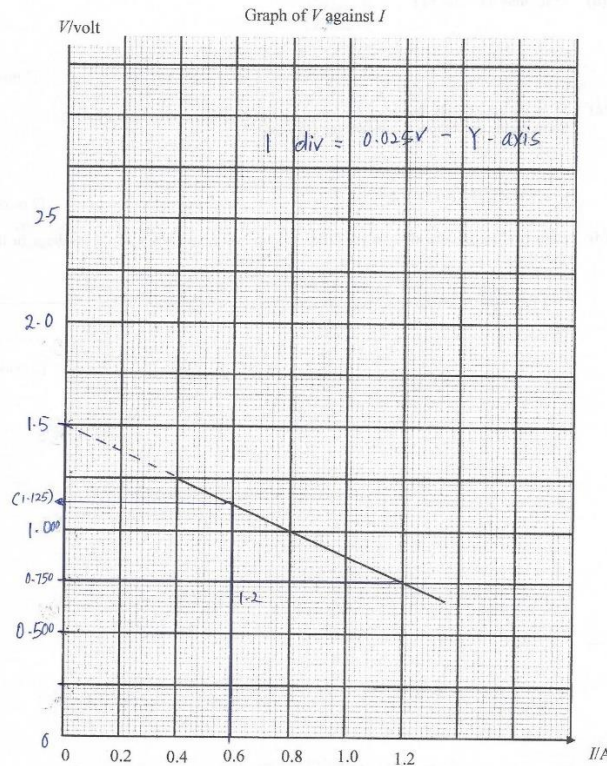
|                            | Suggested answer / Revised 24/9/16   | Marks                      |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
|----------------------------|--|----------------------------|---|-------------|---|-------|-----|-------|------|-----|---|------|-----|---|------|-----|---|------|-----|
| <b>1</b>                   |  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| (a) (i)                    | number of elastic bands/ n   | 1                          |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| (ii)                       | acceleration of trolley/ a   | 1                          |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| (iii)                      | mass of trolley// extension of elastic bands   | 1                          |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
|                            |  | <b>3</b>                   |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| (b)                        | n, a and F <span style="color: red;">✓<sup>1</sup></span><br>unit correct/ <span style="color: red;">✓<sup>2</sup></span>  | <b>1</b>                   |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
|                            | <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 33%;">Number of elastic bands, n</th> <th style="width: 33%;">Acceleration of trolley, a (m s<sup>-2</sup>)</th> <th style="width: 33%;">Force, F/ N</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0.30</td> <td style="text-align: center;">0.6</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center; color: red;">0.60</td> <td style="text-align: center; color: red;">1.2</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">0.90</td> <td style="text-align: center;">1.8</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">1.20</td> <td style="text-align: center;">2.4</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">1.50</td> <td style="text-align: center;">3.0</td> </tr> </tbody> </table> <div style="text-align: right; margin-right: 20px;"> <span style="color: red;">✓<sup>3</sup>✓<sup>4</sup></span>      <span style="color: red;">✓<sup>5</sup>✓<sup>6</sup></span> </div> <p>→ All 5 values of a correct with 1 decimal place – 2 marks<br/> → 3 or 4 values of a correct with 1 decimal place – 1 mark<br/> → All 5 values of F correct without 1 decimal place – 1 mark<br/> → values of a and F constant</p>  | Number of elastic bands, n | Acceleration of trolley, a (m s <sup>-2</sup> ) | Force, F/ N | 1 | 0.30  | 0.6 | 2     | 0.60 | 1.2 | 3 | 0.90 | 1.8 | 4 | 1.20 | 2.4 | 5 | 1.50 | 3.0 |
| Number of elastic bands, n | Acceleration of trolley, a (m s <sup>-2</sup> )  | Force, F/ N                |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 1                          | 0.30   | 0.6                        |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 2                          | 0.60   | 1.2                        |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 3                          | 0.90   | 1.8                        |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 4                          | 1.20   | 2.4                        |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 5                          | 1.50   | 3.0                        |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
|                            | <b>total</b>   | <b>6</b>                   |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| (c)                        | <p><b>Graph of a against n</b></p> <ul style="list-style-type: none"> <li>- a paksi-y dan n paksi-x <input type="checkbox"/> <span style="color: red;">✓<sup>1</sup></span></li> <li>- unit a / ms<sup>-2</sup> pada paksi-y <input type="checkbox"/> <span style="color: red;">✓<sup>2</sup></span></li> <li>- skala seragam dan tidak ganjil (gandaan 3, 7, 9) <span style="color: red;">✓<sup>3</sup></span> <input type="checkbox"/> <input type="checkbox"/> - 5 titik di plot dengan betul <span style="color: red;">✓<sup>4</sup>✓<sup>5</sup></span></li> <li>@ - 3@4 titik di plot dengan betul <span style="color: red;">✓<sup>4</sup>✓<sup>5</sup></span> <input type="checkbox"/></li> <li>- garis lurus yang licin dan melalui 4 titik yang betul. Satu titik adalah diluar garis. <b>Jika pelajar lukis garis lurus tidak melalui origin, salah lukisan</b> ) <input type="checkbox"/> <span style="color: red;">✓<sup>6</sup></span></li> <li>- minima saiz graf adalah 5 x 4 petak besar (2cm x 2cm) <span style="color: red;">✓<sup>7</sup></span> <b>Marks awarded / markah diberi:</b></li> </ul> <table style="margin-left: 40px;"> <tr> <td style="text-align: right;">Number of ✓</td> <td style="text-align: left;">Marks</td> </tr> <tr> <td style="text-align: right;">7 ✓</td> <td style="text-align: left;">5</td> </tr> <tr> <td style="text-align: right;">5-6 ✓</td> <td style="text-align: left;">4</td> </tr> <tr> <td style="text-align: right;">3-4 ✓</td> <td style="text-align: left;">3</td> </tr> <tr> <td style="text-align: right;">2 ✓</td> <td style="text-align: left;">2</td> </tr> <tr> <td style="text-align: right;">1 ✓</td> <td style="text-align: left;">1</td> </tr> </table> | Number of ✓                | Marks   | 7 ✓         | 5 | 5-6 ✓ | 4   | 3-4 ✓ | 3    | 2 ✓ | 2 | 1 ✓  | 1   |   |      |     |   |      |     |
| Number of ✓                | Marks  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 7 ✓                        | 5  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 5-6 ✓                      | 4  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 3-4 ✓                      | 3  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 2 ✓                        | 2  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |
| 1 ✓                        | 1  |                            |   |             |   |       |     |       |      |     |   |      |     |   |      |     |   |      |     |



|     |  |           |
|-----|--|-----------|
|     |  | 5         |
| (d) | a is directly proportional to F<br>(According to the graph drawn by candidates )   | 1         |
| (e) | Repeat measurement several time and find out mean value<br>Observer's eye must perpendicular to the scale<br>When pulling the elastic cord, make sure the extension length is constant for all the cords | 1         |
|     | <b>TOTAL</b>   | <b>16</b> |

## NO 2: The Y-axis was corrected to 0.25V / Div starting from 0V

| no      | Cadangan jawapan  | markah      |
|---------|---|-------------|
| 2(a)(i) | V decreases linearly with I. ✓ <sup>1</sup>   | 1           |
| (ii)    | Extrapolate the graph to cut the y-axis ✓ <sup>1</sup><br>1.5 V / <b>3.0V</b> ✓ <sup>2</sup>  | 1<br>1      |
| (iii)   | Electromotive force ✓ <sup>1</sup>  | 1           |
| 2(b)(i) | Suitable $\Delta$ ( at least 8cm x 8 cm) ✓ <sup>1</sup><br>Correct $\frac{y_2 - y_1}{x_2 - x_1}$<br>= $\frac{(1.5 - 0.75)}{(1.2 - 0)}$ or $\frac{(3.0 - 1.5)}{(1.2 - 0)}$ ✓ <sup>2</sup><br>m = -0.625 / <b>-1.25</b> ( V A <sup>-1</sup> ) or $\Omega$ with correct unit ✓ <sup>3</sup>  | 1<br>1<br>1 |
| (ii)    | r = 0.625 $\Omega$ / 1.25 $\Omega$ ✓ <sup>1</sup>   | 1           |
| (c)     | Lines shown on graph ✓ <sup>1</sup><br>1.125 / <b>2.25 V</b> ✓ <sup>2</sup><br><b>Note:</b> (10 small Divisions on Y-axis = 0.25V) or<br>( 10 small division = 0.5V)<br>⇒ 1 small division = 0.025V / <b>0.05V</b><br>⇒ Students answers can be either one division up or<br>1 division down<br>⇒ Accepted answers = 1.100 or 1.150V<br><b>Or 2.20 V – 2.30 V</b> |             |



|     |  |             |
|-----|--|-------------|
|     | The graph above is for Y axis scale: 1cm = 0.25V<br>For 1 cm = 0,5V scale also accept  |             |
| (d) | All the connecting points must be tight. ✓ <sup>1</sup><br>When reading the voltmeter/ammeter , avoid parallax error by looking at the mirror behind the pointer. Image of pointer should overlap the pointer ✓ <sup>1</sup><br>After taking a reading of voltmeter and ammeter the switch is turn off before repeating the experiment. ✓ <sup>1</sup><br>( any two answer ) | 1<br>1<br>1 |
|     | <b>JUMLAH MARKAH</b>   | <b>12</b>   |

**BAHAGIAN B****QUESTION 3**

|    |     |  |        |  |
|----|-----|--|--------|--|
| 3. | (a) | <u>Inference:</u><br>The distance/depth of the image observed on the block depends on the material used for the block/ or depends on density of block / the type of block ✓ <sup>1</sup>   | 1      |  |
|    | (b) | <u>Hypothesis:</u><br>When the density ( of material) increase, the apparent depth decrease/ depth of image decreases ✓ <sup>1</sup>   | 1      |  |
|    | (c) | (i) <u>Aim:</u><br>To investigate the relationship between density and apparent depth/ depth of the image ✓ <sup>1</sup>   | 1      |  |
|    |     | (ii) <u>Variables in the experiment:</u><br>Manipulated Variable : density// mass of salt ✓ <sup>2</sup><br>Responding Variable : apparent depth/ depth of image<br>Fixed Variable : real depth, volume water (ignore the change of volume of water + salt) ✓ <sup>3</sup> | 1<br>1 |  |
|    |     | (iii) <u>List of apparatus</u><br>Tall beaker/ cylinder, pin, retort stand, water, salt, meter, ruler, triple beam balance ✓ <sup>4</sup>  | 1      |  |
|    |     | (iv) <u>Arrangement of apparatus</u><br>Set up apparatus ✓ <sup>5</sup>  | 1      |  |

The diagram illustrates the experimental setup for measuring the apparent depth of an object submerged in water. An observer (Pemerhati/Observer) is positioned above a beaker (Bikar/Beaker) containing water (Air/Water). A ruler (Pembaris/Ruler) is placed vertically next to the beaker. A pin (Pin O/Pin O) is placed at the bottom of the beaker. The apparent image of the pin (Imej ketara/Apparent image) is observed through the water. The distance between the pin and its apparent image is labeled as 'd'.

(v)

Procedure:

Fill the beaker with ( $V=1000\text{ cm}^3$ ) water.

Put the 20g of salt into the beaker and stir.

Place a pin O into the water. ✓<sup>6</sup>

Adjust the position of the pin I ( at the retort stand) by observing above the beaker until it appears in line with the image. ✓<sup>7</sup>

1

1

(vi)

Data Tabulation:

Measure the apparent depth of the straight line, d. ✓<sup>8</sup>

Repeat the experiment with (different four densities of liquids) by mixing the mass of salts,  $m=30\text{g}, 40\text{g}, 50\text{g}$  and  $60\text{g}$ . ✓<sup>9</sup>

1

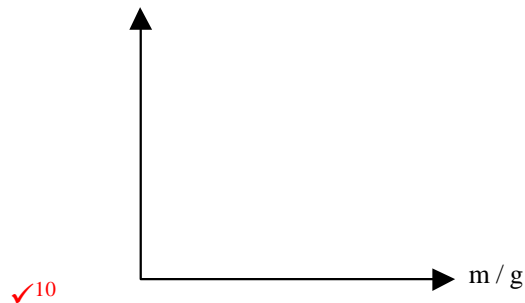
1

| Mass of salts, m/g | Apparent depth, d/ cm |
|--------------------|-----------------------|
| 30                 |                       |
| 40                 |                       |
| 50                 |                       |
| 60                 |                       |
| 70                 |                       |

| Density of liquid, $\rho/\text{kgm}^{-3}$ | Apparent depth, d/cm |
|---|----------------------|
| P <sub>1</sub>                            |                      |
| P <sub>2</sub>                            |                      |
| P <sub>3</sub>                            |                      |
| P <sub>4</sub>                            |                      |
| P <sub>5</sub>                            |                      |

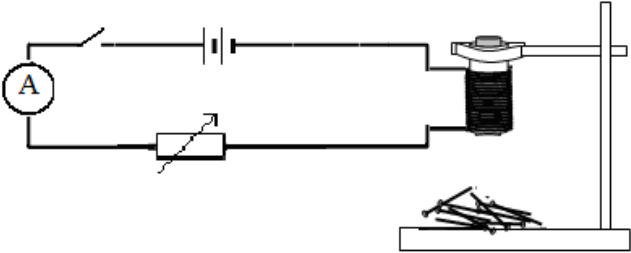
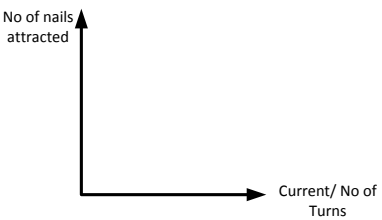
Analyse Data:

(vii)



1

## QUESTION 4

| 4                      | (a)                   | <b>Inference :</b><br>Crane in Diagram 4.2 had attracted more scrapped irons than the crane in Diagram 4.1. or<br>The type of solenoid used has effect on the strength of magnet produced by crane   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|------------------------|-----------------------|--|------------------------|-----------------------|-----|--|-----|--|-----|--|-----|--|-----|--|-----------------|-----------------------|----|--|----|--|----|--|----|--|----|--|---|
|                        | (b)                   | <b>Hypothesis</b><br>The larger size of current / number of turns , the stronger the magnetic field.   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        | (c)                   | <b>Aim</b><br>To investigate the relationship between the size of current / number of turns and the strength of the magnetic field.  | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Variables :</b> <b>Manipulated :</b> Size of current flow / number of turns in the solenoid<br><b>Responding :</b> no. of nails attracted   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Constant Variable :</b> no. of turns / current flow ; soft iron core .  | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>List of apparatus :</b><br>D.C power supply, iron rod, switch, retort stand, insulated wire, iron nails, ammeter and rheostat.  | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | Arrangement of apparatus:<br>   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Control of Manipulated Variable</b><br>The rheostat is adjusted to obtain the value of current , $I = 0.5 \text{ A}$ / Starting with 20 turns of wire insulated wire around the iron rod.   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Measurement of Responding Variable</b><br>The number of iron nails attracted to the iron rod is counted.  | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Repeat :</b> Repeated for the value of current 1.0A, 1.5A, 2.0A and 2.5A. / Repeated for coil with number of turns, $N =, 25, 30, 35, 40$ and 45.   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Tabulation of data (Either table)</b><br><table border="1"> <thead> <tr> <th>Size of current, I / A</th> <th>No of nails attracted</th> </tr> </thead> <tbody> <tr><td>0.5</td><td></td></tr> <tr><td>1.0</td><td></td></tr> <tr><td>1.5</td><td></td></tr> <tr><td>2.0</td><td></td></tr> <tr><td>2.5</td><td></td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>No. of turns, N</th> <th>No of nails attracted</th> </tr> </thead> <tbody> <tr><td>20</td><td></td></tr> <tr><td>25</td><td></td></tr> <tr><td>30</td><td></td></tr> <tr><td>35</td><td></td></tr> <tr><td>40</td><td></td></tr> </tbody> </table> | Size of current, I / A | No of nails attracted | 0.5 |  | 1.0 |  | 1.5 |  | 2.0 |  | 2.5 |  | No. of turns, N | No of nails attracted | 20 |  | 25 |  | 30 |  | 35 |  | 40 |  | 1 |
| Size of current, I / A | No of nails attracted |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 0.5                    |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 1.0                    |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 1.5                    |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 2.0                    |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 2.5                    |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| No. of turns, N        | No of nails attracted |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 20                     |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 25                     |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 30                     |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 35                     |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
| 40                     |                       |  |                        |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>Analysis of data.</b><br>Sketch the graph of no. of nails attracted against size of current/no. of turns<br>   | 1                      |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |
|                        |                       | <b>TOTAL</b>   | <b>12</b>              |                       |     |  |     |  |     |  |     |  |     |  |                 |                       |    |  |    |  |    |  |    |  |    |  |   |