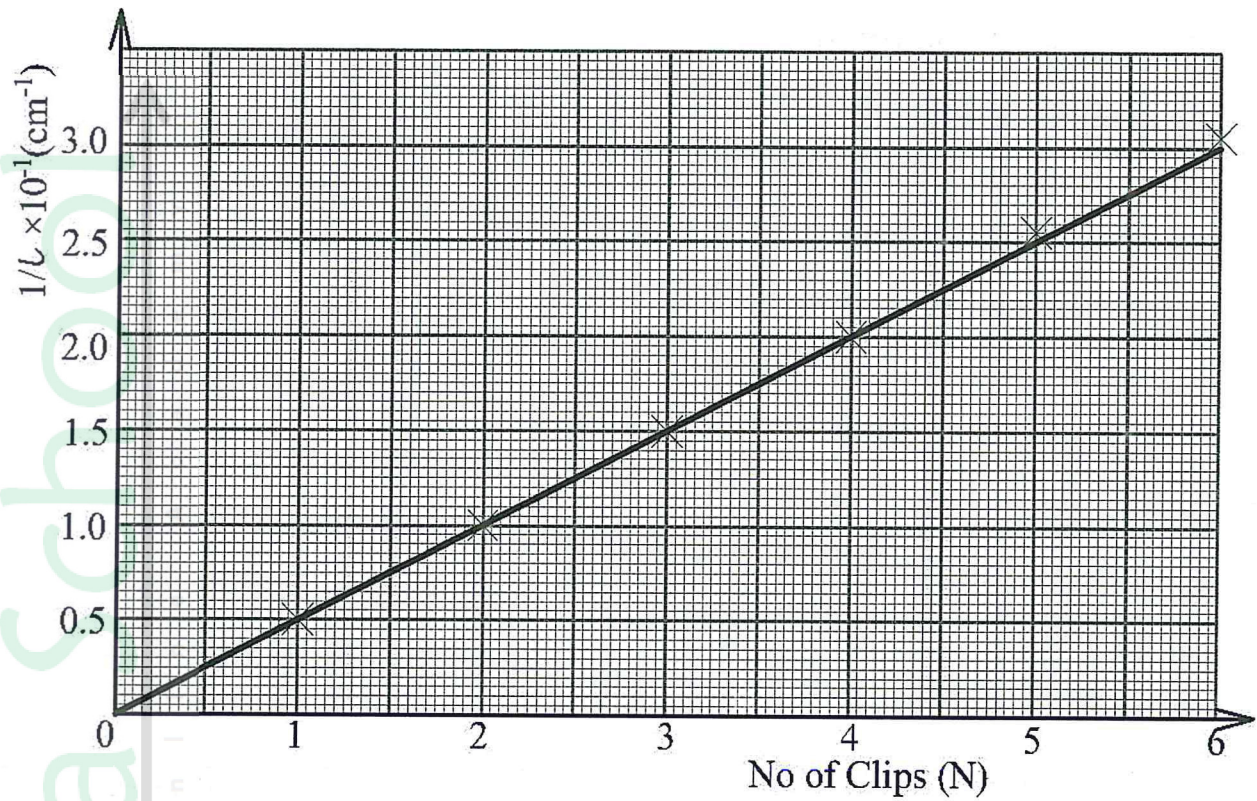


4.6.3 Physics Paper 3 (232/3)

|          |  |      |      |      |      |      |           |           |
|----------|--|------|------|------|------|------|-----------|-----------|
| 1.<br>a) | $V = 3.4 \text{ cm}^3 \pm 0.2$   |      |      |      |      |      | (1 mark)  |           |
| b)       | $C = 25.3 \text{ cm} \pm 0.1$  |      |      |      |      |      | (1 mark)  |           |
| c)       | $X = 2.2 \text{ cm} \pm 0.1$   |      |      |      |      |      | (1 mark)  |           |
| d)       | (i) $10 \times 2 = m \times 2.2$<br><br>$M = \frac{m}{v} \frac{10 \times 2}{2.2}$<br><br>$= 9.1 \text{ g} \pm 1$ |      |      |      |      |      | (2 marks) |           |
|          | (ii) $\rho = \frac{m}{v}$<br><br>$= \frac{9.1}{3.4}$<br><br>$= 2.68 \text{ g cm}^{-3}$                           |      |      |      |      |      | (2 marks) |           |
| f)       | Number of clips N  | 1    | 2    | 3    | 4    | 5    | 6         | (4 marks) |
|          | CM mark of P cm  | 45   | 35.2 | 32.1 | 30.2 | 29.2 | 28.5      |           |
|          | Distance L = CP (cm)   | 19.7 | 9.9  | 6.8  | 4.9  | 3.9  | 3.2       |           |
|          | $\frac{l}{l} \frac{l}{l} = \text{cm}^{-1}$   | 0.05 | 0.10 | 0.15 | 0.20 | 0.26 | 0.31      |           |

h.



|    |   |           |
|----|---|-----------|
| i) | $\left( \frac{2.0 - 1.0}{4 - 2} \right) \times 10^{-1}$ <p>Slope <math>S = \frac{1}{2} \times 10^{-1}</math><br/> <math>= 0.05</math></p> $\left( \frac{2.0 - 1.0}{4 - 2} \right) \times 10^{-1}$ $= \frac{1}{2} \times 10^{-1}$ $= 0.05$ | (3 marks) |
| j) | $\frac{1}{l} = 0.05 \text{ kN}$ $\frac{1/l}{N} = 0.05 \text{ k}$ $\frac{0.05}{0.05} = k$ $k = 1$  | (2 marks) |

**QUESTION 2****PART A MARKING SCHEME**

|    |  |           |
|----|--|-----------|
| a) | $d = 0.36 \text{ mm} \pm 0.05$<br>$= 3.6 \times 10^{-4} \text{ m}$   | (1 mark)  |
| b) | (i) $V_1 = 1.7 \text{ V} \pm 0.2$  | (1 mark)  |
|    | (ii) $I = \frac{V}{R}$<br>$= \frac{1.7}{10}$<br><br>$= 0.17 \text{ A}$   | (2 marks) |
| c) | (i) $V_2 = 1.0 \text{ V} \pm 0.2$  | (1 mark)  |
|    | (ii) $R = \frac{V}{I}$<br>$= \frac{1}{0.17}$<br>$= 5.88 \Omega$  | (2 marks) |
|    | (iii) $K = 5.88 \times 2$<br>$= 11.76 \Omega \text{m}^{-1}$<br>Or<br>$\frac{5.88}{0.5} = 11.76 \Omega \text{m}^{-1}$ | (1 mark)  |
|    | (iv) $Q = \pi \frac{Kd^2}{4}$<br>$= \pi \frac{11.76 \times (3 \times 10^{-4})^2}{4}$<br>$= 119.7 \times 10^{-8}$     | (2 marks) |

**PART B**

|  |  |                                   |        |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
|--|--|-----------------------------------|--------|---|---|-----------------------|------|------|------|--|------|------|------|--|------|------|------|--------------------------|--------|--------|--------|-----------|
| d)   | (i) $W = 5.0\text{cm} \pm 0.10$  | (1 mark)                          |        |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
|  | (ii) Area = $5 \times 5.0$<br>$= 25.00\text{cm}^2$   | (1 mark)                          |        |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
| h)   | <p><b>Table 2</b></p> <table border="1"> <tr> <td>Plate separation distance(s) (cm)</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>Balance Length l (cm)</td> <td>79.5</td> <td>82.4</td> <td>86.2</td> </tr> <tr> <td>Resistance <math>R = \left( \frac{10 \times 10^3 L}{100 - L} \right)</math></td> <td>38.8</td> <td>46.8</td> <td>62.5</td> </tr> <tr> <td>Resistance per unit length <math>K = \frac{R}{S}</math></td> <td>12.9</td> <td>11.7</td> <td>12.5</td> </tr> <tr> <td>Constant <math>Z = A \cdot K</math></td> <td>325.73</td> <td>295.43</td> <td>315.63</td> </tr> </table> | Plate separation distance(s) (cm) | 3      | 4 | 5 | Balance Length l (cm) | 79.5 | 82.4 | 86.2 | Resistance $R = \left( \frac{10 \times 10^3 L}{100 - L} \right)$ | 38.8 | 46.8 | 62.5 | Resistance per unit length $K = \frac{R}{S}$ | 12.9 | 11.7 | 12.5 | Constant $Z = A \cdot K$ | 325.73 | 295.43 | 315.63 | (6 marks) |
| Plate separation distance(s) (cm)                                | 3  | 4                                 | 5      |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
| Balance Length l (cm)  | 79.5   | 82.4                              | 86.2   |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
| Resistance $R = \left( \frac{10 \times 10^3 L}{100 - L} \right)$ | 38.8   | 46.8                              | 62.5   |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
| Resistance per unit length $K = \frac{R}{S}$                     | 12.9   | 11.7                              | 12.5   |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
| Constant $Z = A \cdot K$   | 325.73   | 295.43                            | 315.63 |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |
| i)   | $Z \text{ average} = \frac{325.73 + 295.43 + 315.63}{3}$<br>$= 312.26$   | (2marks)                          |        |   |   |                       |      |      |      |  |      |      |      |  |      |      |      |                          |        |        |        |           |