**S5 Exercise 1 Oct 2014 (2001 Q2)**

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| **Code** | **Points to score** | **Marks** |
| A1  A2  A3  A4  A5  A6  A7  A8 | Columnar table of *i*, r, *l*, sin *i*, sin r, sin2*i*, *l*-2 ……. At least 6 ⇒ 1, at least 4 ⇒½  Units for the columns: (o), (o), (cm), \_, \_, \_, (cm-2) … At least 6 ⇒ 1, at least 4 ⇒½  Values of r: (5 – 7), (11 – 14), (17 – 20), (23 – 26), (28 – 31), (31 – 36) @½  *l* increasing: 6.1 – 7.7, recorded to 1 dp in cm @½  sin *i*: 0.174, 0.342, 0.500, 0.643, 0.766, 0.866 @¼  sin r: correctly read to 3dp @¼  sin2*i*: calculated to 4dp @¼  *l*-2 calculated to 3dp @¼ | 1  1  3  3  1½  1½  1½  1½ |
|  |  | **14** |
| B1  B2  B3  B4  B5  B6  B7  B8 | Title of the graph: *A graph of l-2 against sin2i*  Axes: Each drawn with an arrow in the increasing direction, each labeled with quantity and unit ……….. ½ + ½    Scales: Uniform, each spanning at least ½ pg, demarcations marked, starting values  indicated ………... ½ + ½  Points correctly plotted: no shading ……….@½  Best fit : marked if at least 4 points were correctly plotted  Indication of triangle or equivalent for calculating S1, covering all points  S1 correctly calculated if the coordinates were correctly read and  - 0.0125 ≤ S1 ≤ -0.0097cm-2, calculated to 4 decimal places …….. ½ + ½  Intercept, C, correctly read and 0.025 ≤ C ≤ 0.028cm-2, recorded 3 or 4 dp ….. ½ + ½ | ½  1  1  3  ½  ½  1  1 |
|  |  | **8½** |
| C1  C2 | W correctly calc. if substitution into W =  is correct and 6.0 ≤ W ≤ 6.3 cm …. 1 + ½  n correctly calc. if substitution into W =  is correct and 1.5 ≤ W ≤ 1.6 …. 1 | 1½  1 |
|  |  | **2½** |
| D1  D2  D3  D4  D5  D6  D7  D8 | Title of the graph: *sin i against sin r*  Axes: Each drawn with an arrow in the increasing direction, each labeled with quantity and unit ……….. ½ + ½    Scales: Uniform, each spanning at least ½ pg, demarcations marked, starting values  indicated ………... ½ + ½  Points correctly plotted: no shading ……….@½  Best fit : marked if at least 4 points were correctly plotted  Indication of triangle or equivalent for calculating S1, covering all points  S2 correctly calculated if the coordinates were correctly read and  1.5 ≤ S2 ≤ 1.6 calculated to 1 or 2 decimal places …….. ½ + ½  Ratio calculated 1or 2 dp and is (0.9 – 1.1)….. ½ | ½  1  1  3  ½  ½  1  ½ |
|  |  | **8** |
| ***Total = 33*** | | |