**S5 PAPER 3 NOV 2014 Guide**

|  |  |  |
| --- | --- | --- |
| **QUESTION 1** | | |
| **Code** | **Points to score** | **Marks** |
| A1  A2  A3  A4  A5  A6  A7  A8 | b measured at at least 3 places  Value of b: 2.20 ≤ b ≤ 2.50 cm recorded to 2 dp in cm …… 1 + ½  d measured at at least 3 places  Value of d: 0.40 ≤ b ≤ 0.60 cm recorded to 2 dp in cm …… 1 + ½  Value of t: 8.00 ≤ t ≤ 11.00 s recorded to 2 dp in s ……. 2 + ½  T correctly calculated to 3 or 4 dp in s ……….. ½ + ½  Substitution into E =  …. All in SI units  E correctly calculated and (1.00 ≤ E ≤ 2.50) x 1010 N m-2 to 2 dp …... 1 + ½ | ½  1½  ½  1½  2½  1  ½  1½ |
|  |  | **9½** |
| B1  B2  B3  B4  B5  B6 | Centre of gravity: 49.0 ≤ C ≤ 51.0 cm recorded to 1 dp in cm …… 1 + ½  Po recorded to 1 dp in cm …………… ½ + ½  Columnar table of: M, P1 and y ……. @¼  Units for the columns: (kg), (cm), (m) …….. @¼  Values of P1 recorded to 1 dp in cm (or 3 dp in m) ….. @½  y correctly calculated to 3 dp in m, increasing between 0.002 – 0.200 m ……. @½ | 1½  1  1  1  3  3 |
|  |  | **10½** |
| C1  C2  C3  C4  C5  C6  C7  C8 | Title of the graph: *A graph of y against M*  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, no use of stars ……….@½  Best fit : marked if at least 4 points were correctly plotted  Indication of triangle or equivalent for calculating s, covering all points  Correct reading of the coordinates for finding the slope, s.  s correctly calculated if the coordinates were correctly read in C7 and  0.0250 ≤ s ≤ 0.0620 m kg-1, calculated to 4 decimal places …….. 1 + ½ | ½  1  1  3  ½  ½  ½  ½  1½ |
|  |  | **9** |
| D1  D2  D3 | Substitution into E =  …. All in SI units  E correctly calculated and (1.00 ≤ E ≤ 2.50) x 1010 N m-2 to 2 dp …... 1 + ½  Calculation of the average value of E from the two methods to 2 dp …… ½ + ½ | ½  1½  1 |
|  |  | **3** |
| E1  E2 | At least a genuine source of error mentioned  Mention of at least one appropriate precaution for accuratcy | 1  1 |
|  |  | **2** |
| ***Total = 34*** | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **QUESTION 2** | | | |
| **Code** | **Points to score** | **Marks** | |
| A1  A2  A3  A4  A5  A6 | Columnar table of: α, θ, φ, γ and β ……….. @¼  Units for the columns: (o), (o), (o), (o) and (o) ….. @¼  Values of θ increasing between 10o – 55o recorded to 0dp ….. @1  Values of φ decreasing to a minimum and then increasing. No dp ….. @½  γ correctly calculated, no dp ……… @¼  β correctly calculated, no dp ……… @¼ | 1  1  8  4  2  2 | |
|  |  | **18** | |
| B1  B2  B3  B4  B5  B6  B7  B8  B9 | Title of the graph: *Graphs of γ against β and φ against β*  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 for γ against β correctly plotted: no shading, no use of stars ……….@½  Best fit for γ against β : marked if at least 4 points were correctly plotted  Intercept, C, correctly read …….. ½ + ½  Points for φ against β correctly plotted: no shading, no use of stars ……….@½  Best fit for φ against β : marked if at least 4 points were correctly plotted  Correct reading of φo and 30o ≤ φo ≤ 47o m kg-1, no dp …….. ½ + ½ | | ½  1  1  4  ½  1  4  ½  1 |
|  |  | **13½** | |
| C1  C2 | Substitution into **n sin = sin**  n correctly calculated and 1.40 ≤ n ≤ 1.65 | ½  1 | |
|  |  | **1½** | |
| ***Total = 33*** | | | |