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| **QUESTION 1** | | |
| **Code** | **Points to score** | **Marks** |
| A1  A2  A3  A4  A5  A6  A7  A8 | Position of G recorded to 1 decimal place in cm and is 49.0 – 51.0 cm  Time for 20 oscillations recorded to 2 decimal places and is 40.00 – 43.00 s ½ + ½  T1 correctly calculated to 3 decimal places ½ + ½  σ1 correctly calculated to 1 dp if the substitution is correct ½ + ½  Time for 20 oscillations recorded to 2 decimal places and is 19.00 – 22.00 s ½ + ½  T2 correctly calculated to 3 decimal places ½ + ½  σ2 correctly calculated to 1 dp if the substitution is correct ½ + ½  σ correctly calculated to 1 dp ½ + ½ | ½  1  1  1  1  1  1  1 |
|  |  | **7½** |
| B1  B2  B3  B4  B5  B6  B7 | Time for 20 oscillations recorded to 2 decimal places and is 8.50 – 10.00 s ½ + ½  T correctly calculated to 3 decimal places ½ + ½  k correctly calculated to 1 dp if the substitution is correct ½ + ½  Time for 20 oscillations recorded to 2 decimal places and is 12.00 – 13.00 s ½ + ½  T correctly calculated to 3 decimal places ½ + ½  k correctly calculated to 1 dp if the substitution is correct ½ + ½  Average value of k correctly calculated to 1 dp ½ + ½ | 1  1  1  1  1  1  1 |
|  |  | **7** |
| C1  C2  C3  C4  C5  C6  C7 | Initial position of the pointer recorded to 1 dp in cm ½  Columnar table of: m, new position of pointer, e, time for 20 oscil, T and T2 - all (at least 4 → ½)  Correct units for columns: kg, cm, m, s, s and s2 - all → 1 (at least 4 → ½)  New position of pointer recorded to 1 dp in cm (or 3 dp in m), difference between consecutive value (3.0 – 5.0) cm or (0.030 – 0.050) m @½  e correctly calculated to 3 dp - all → 1 (at least 4 → ½)  Time for 20 oscillations increasing (7.50 – 22.00)s & recorded to 2 dp, diff between consecutive values 1.00 – 3.00 s @ ½  T correctly calculated to 3 dp - all → 1 (at least 4 → ½)  T2 correctly calculated to 2 or 3 dp consistently - all → 1 (at least 4 → ½) | ½  1  1  3  1  3  1  1 |
|  |  | **11½** |
| D1  D2  D3  D4  D5  D6  D7  D8 | Title of the graph: *A graph of T2 against e*  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 : awarded if at least 4 points were correctly plotted  Indication of triangle or equivalent for calculating s1, covering all points  s correctly calculated if the coordinates were correctly read and  3.9 ≤ s ≤ 4.2 s2 m-1 recorded to 1 or 2 decimal places …….. 1 + ½  σ correctly calculated if correct substitution is available and 9.5 ≤ σ ≤ 10.1 m s-2 -1 , recorded to 0 or 1 decimal place ………….. ½ + ½ | ½  1  1  3  ½  ½  1½  1 |
|  |  | **9** |
| ***Total = 35*** | | |