| **Question** | **Scheme** | **Marks** |
| --- | --- | --- |
| **1** |   Can be implied. Ignore integral signs | B1 |
|  = |  |
|   | M1 A1 |
|  |  |
|   | M1 |
| Leading to |  |
|   |  |
|   or equivalent | A1 |
|  |  | **(5 marks)** |
| **2(i)** |  |  | M1 |
|  |  | A1 |
|  |  | A1 |
|  |  | **(3)** |
| **2(ii)** |  |  | M1 |
|  or equivalent. | A1 |
|   | *{Ignore subsequent working}*. |  |
|  |  | **(2)** |
| **2(iii)** |   at  |  |
|  **or**  | B1 oe |
|  | Applying  | M1 |
|   | Integrates to give  | M1 |
|  | A1 |
|  | B1 |
|  **or**   | Use of and  in an integrated equation containing *c* | M1 |
|  giving  |  | A1 |
|  |  | **(7)** |
|  |  | **(12 marks)** |
| **3(a)** |   | B1 |
|    | M1 A1 |
|   or  | A1 **cso** |
|  |  | **(4)** |
| **3(b)** |  or  | M1 |
|    | dM1 |
|  | A1 **cso** |
|  |  | **(3)** |
|  |  | **(7 marks)** |
| **4(a)** |  |  |
|  | M1 |
| so,  | A1 |
|  |  | **(2)** |
| **4(b)** |   | B1 |
|   |  |
|   | M1 |
| A1 |
|  | M1 |
|  | dM1 |
|  or  | A1 cso |
|  |  | **(6)** |
|  |  | **(8 marks)** |
| **5(a)** |  |  |
|  | M1 |
|  | A1 |
| giving   | A1 |
|  |  | **(3)** |
| **5(b)** |  |  |
|  | B1 oe |
|   | M1 |
| A1 |
|    | M1 |
|   |  |
|   |  |
|   | M1 |
|   gives   \* | dM1 |
| A1 \* cso |
|  |  | **(7)** |
| **5(c)** |  | M1 |
|  | M1 |
|  | A1 |
|  |  | **(3)** |
|  |  | **(13 marks)** |
| **6(a)** |   |  |
|   | B1 |
|    | M1 A1 A1 |
| ***then eg either...*** | ***or...*** |  |
|  |  |  |
|  |  |  |
|  |  |  |
| leading to  with **no incorrect working/statements**.  | A1 \* **cso** |
|  |  | **(5)** |
| **6(b)** |   | B1 |
| So and  or  |  |
|  Eg.  | M1 |
|  So  |  |
|  | A1 |
|  | A1 |
|  |  | **(4)** |
| **6(c)** |  |  |
| (fish) (nearest 100) | B1 |
|  |  | **(1)** |
|  |  | **(10 marks)** |
| **7(a)** |  | M1 A1 |
|  |  | **(2)** |
|  |   |  |
| **7(b)** |   | B1 |
|   |  |
|   | M1 |
| Using   | M1 |
| leading to  | A1 |
|   |  |
|   | M1 |
|   or equivalent | A1  |
|  |  | **(6)** |
|  |  | **(8 marks)** |
| **8(a)** |   |  |
|  or  | B1 |
|   or  | M1 A1M1 A1 |
|  | M1 |
|  |  |
| ***then either...*** | ***or...*** |  |
|  |  |  |
|  |  |  |
|  |  | dddM1 |
|  |  | A1 \* |
|  leading to  |
|  |  | **(8)** |
| **8(b)** |   | M1 |
|  | Uses correct order of operations by moving from to give and , where  | dM1 |
|  |  |
| = 161 (s) (nearest second) | awrt 161 | A1 |
|  |  | **(3)** |
|  |  | **(11 marks)** |
| **9(a)** |  or  | B1  |
|   or  | See notes. | M1 A1 |
|   | ***Correct*** completion to. |  |
|   | A1 |
|   \* |  |
|  |  | **(4)** |
| **9(b)** |  ;  | ***See notes.*** | M1 A1 |
|  | Substitutes  into an equation of the form  or equivalent.  | M1 |
|    | Correct algebra to , where *k* is a positive value.  | M1 |
|  | awrt 77 | A1 |
|  |  | **(5)** |
|  |  | **(9 marks)** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Source paper** | **Question number** | **New spec references** | **Question description** | **New AOs** |
| 1 | C4 2012 | 4 | 8.7 | First order differential equations | 1.1b, 2.1 |
| 2 | C4 June 2014 | 6 | 8.2, 8.5, 8.7, 5.6 | Integration, First order differential equations | 1.1b, 2.1, 3.1a |
| 3 | C4 2016 | 4 | 8.8, 6.3, 6.5 | First order differential equations | 1.1b, 2.1, 3.1a, 3.4 |
| 4 | C4 2017 | 7 | 8.7 | First order differential equations | 1.1b, 2.1, 3.1a |
| 5 | C4 2015 | 7 | 2.10, 8.7, 8.8, | First order differential equations | 1.1b, 2.1, 3.1a, 3.2a, 3.4 |
| 6 | C4 June 2014R | 7 | 8.7, 8.8, 6.3 | Differential equations | 1.1b, 3.1a, 3.2a, 3.4 |
| 7 | C4 2011 | 8 | 8.7 | First order differential equations | 1.1b, 2.1 |
| 8 | C4 2013 | 6 | 8.7, 8.8 | Solution of a differential equation  | 1.1b, 2.1, 3.1a, 3.4 |
| 9 | C4 Jan 2013 | 8 | 8.7, 8.8, 6.3 | First order differential equations | 1.1b, 2.1, 3.1a, 3.2a, 3.4 |