| **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 A1  M1 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 |