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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **1** | States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b | 3rd  Use integration to find volumes of revolution about the *x*-axis |
| Correctly finds | **M1** | 1.1b |
| Makes an attempt to substitute the limits. For example: | **M1** | 1.1b |
| Correctly finds . Accept | **A1** | 1.1b |
| (4 marks) | | | | |
| Notes | | | | |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **2** | States | **M1** | 2.2a | 3rd  Use integration to find volumes of revolution about the *x*-axis |
| States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b |
| Correctly finds | **M1** | 1.1b |
| Makes an atempt to substitute the limits. For example: | **M1** | 1.1b |
| Correctly finds | **A1** | 1.1b |
| (5 marks) | | | | |
| Notes | | | | |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **3** | Writes  as | **M1** | 2.2a | 4th  Use integration to find volumes of revolution about the *y*-axis |
| Correctly finds | **M1** | 3.1a |
| States , using the formula for volume of revolution about the *x*-axis. | **M1** | 1.1b |
| Integrates to find | **M1** | 1.1b |
| Makes an attempt to substitute: | **M1** | 1.1b |
| Correctly finds *V* = 88π cm3. | **A1** | 3.4 |
| (6 marks) | | | | |
| Notes | | | | |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **4** | States, or subsequently implies, that when *x* = 9, | **M1** | 2.2a | 5th  Find the sum and difference of volumes of revolution |
| Uses the fact that  to write  or | **M1** | 2.2a |
| States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b |
| Integrates to find: | **M1** | 1.1b |
| Makes an attempt to substitute: | **M1** | 1.1b |
| Correctly finds | **A1** | 1.1b |
| Finds the volume of the cone using | **M1** | 2.2a |
| Subtracts to find: | **A1** | 3.4 |
| (8 marks) | | | | |
| Notes | | | | |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **5** | Uses the fact that  to write | **M1** | 2.2a | 5th  Find the sum and difference of volumes of revolution |
| States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b |
| Integrates to find: | **M1** | 1.1b |
| Makes an attempt to substitute: | **M1** | 1.1b |
| Correctly finds | **A1** | 1.1b |
| Finds the volume of the cylinder using | **M1** | 2.2a |
| Subtracts to find | **A1** | 3.4 |
| (7 marks) | | | | |
| Notes | | | | |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **6a** | States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b | 6th  Solve problems using volumes of revolution |
| Correctly finds | **M1** | 1.1b |
| Substitutes the limits and correctly finds | **A1** | 3.4 |
| States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b |
| Correctly finds | **M1** | 1.1b |
| Substitutes the limits and correctly finds | **A1** | 3.4 |
| Subtracts to find | **A1** | 3.4 |
|  | **(7)** |  |  |

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| **6b** | States or implies that the scale factor is 20 | **M1** | 3.1a | 6th  Solve problems using volumes of revolution |
| Finds the volume: | **A1** | 3.1a |
|  | **(2)** |  |  |
| **6c** | Must use their values to approximate the percentage error:  and  states that this is a reasonable estimate as it is less than 2% out  or  states that the actual capacity of the floatation device will be less than the model. | **B1** | 3.5a | 6th  Solve problems using volumes of revolution |
|  | **(1)** |  |  |
| (10 marks) | | | | |
| Notes | | | | |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **7a** | Uses the fact that  to write: , so | **M1** | 2.2a | 6th  Solve problems using volumes of revolution |
| States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 1.1b |
| Correctly finds | **M1** | 1.1b |
| Substitutes the limits and correctly finds | **A1** | 2.1 |
|  | **(4)** |  |  |

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| **7b** | States , using the formula for volume of revoltuion about the *y*-axis. | **M1** | 3.1a | 6th  Solve problems using volumes of revolution |
| Correctly finds | **M1** | 1.1b |
| Substitutes the limits and correctly finds | **M1** | 1.1b |
| States that the volume of each cylinder is | **M1** | 3.4 |
| Finds the volume of the model: | **A1** | 3.4 |
| Finds the volume of the actual candlestick: | **A1** | 3.1a |
|  | **(6)** |  |  |
| (10 marks) | | | | |
| Notes | | | | |