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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **1a** | States | **M1** | 2.2a | 5thFind the magnitude of a vector in 3 dimensions. |
| Makes an attempt to solve the equation.For example,is seen. | **M1** | 1.1b |
| States *k* = 2 and *k* = 18 | **A1** | 1.1b |
|  | **(3)** |  |  |
| **1b** | Finds the vector | **M1 ft** | 1.1b | 5thFind the magnitude of a vector in 3 dimensions. |
| Finds | **M1 ft** | 1.1b |
| States the unit vector | **A1 ft** | 1.1b |
|  | **(3)** |  |  |
| (6 marks) |
| Notes**1b**Award ft marks for a correct answer topart **b** using their incorrect answer frompart **a.** |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **2** | Demonstrates an attempt to find the vectors,and | **M1** | 2.2a | 5thFind the magnitude of a vector in 3 dimensions. |
| Finds,and | **A1** | 1.1b |
| Demonstrates an attempt to find,and | **M1** | 2.2a |
| FindsFindsFinds | **A1** | 1.1b |
| States or implies in a right-angled triangle | **M1** | 2.2a |
| States that | **B1** | 2.1 |
| (6 marks) |
| **Notes** |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **3** | Finds | **M1** | 1.1b | 5thFind the magnitude of a vector in 3 dimensions. |
| States | **M1** | 1.1b |
| Solves to find. Accept awrt 101.3° | **A1** | 1.1b |
|  | **(3)** |  |  |
| (3 marks) |
| **Notes** |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **4a** | Demonstrates an attempt to find the vectors,and | **M1** | 2.2a | 6thSolve geometric problems using vectors in 3 dimensions. |
| Finds,and | **A1** | 1.1b |
| Demonstrates an attempt to find,and | **M1** | 2.2a |
| FindsFindsFinds | **A1** | 1.1b |
| Demonstrates an understanding of the need to use the Law of Cosines. Either  (or variation) is seen, or attempt to substitute into formula is made  | **M1 ft** | 2.2a |
| Makes an attempt to simplify the above equation. For example,  is seen. | **M1 ft** | 1.1b |
| Shows a logical progression to state   | **B1** | 2.4 |
|  | **(7)** |  |  |
| **4b** | States or implies thatis isosceles. | **M1** | 2.2a | 6thSolve geometric problems using vectors in 3 dimensions. |
| Makes an attempt to find the missing angles | **M1** | 1.1b |
| States. Accept awrt 56.8° | **A1** | 1.1b |
|  | **(3)** |  |  |
| (10 marks) |
| Notes**4b**Award ft marks for a correct answer topart **a** using their incorrect answer from earlier inpart **a**. |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **5** | States and | **M1** | 2.2a | 6thSolve geometric problems using vectors in 3 dimensions |
| Makes an attempt to solve the pair of simultaneous equations. Attempt could include making a substitution or multiplying the first equation by 5 or by 7. | **M1** | 1.1b |
| Finds *a* = −4 | **A1** | 1.1b |
| Find *b* = 6 | **A1** | 1.1b |
| States −2*abc* = −96 | **M1** | 2.2a |
| Finds *c* = −2 | **A1** | 1.1b |
| (6 marks) |
| **Notes** |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **6a** | Makes an attempt to find the resultant force by adding the three force vectors together. | **M1** | 3.1a | 6thSolve contextualised problems in mechanics using 3D vectors. |
| Finds | **A1** | 1.1b |
|  | **(2)** |  |  |
| **6b** | States  or writes | **M1** | 3.1a | 6thSolve contextualised problems in mechanics using 3D vectors. |
| Finds | **A1** | 1.1b |
|  | **(2)** |  |  |
| **6c** | Demonstrates an attempt to find For example, | **M1** | 3.1a | 6thSolve contextualised problems in mechanics using 3D vectors. |
| Findsm s−2 | **A1** | 1.1b |
|  | **(2)** |  |  |
| **6d** | States | **M1** | 3.1a | 6thSolve contextualised problems in mechanics using 3D vectors. |
| Makes an attempt to substitute values into the equation. | **M1 ft** | 1.1b |
| Findsm | **A1 ft** | 1.1b |
|  | **(3)** |  |  |
| (9 marks) |
| Notes**6d**Award ft marks for a correct answer topart **d** using their incorrect answer frompart **c**. |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress descriptor |
| **7** | Findsvia *M*  | **M1** | 3.1a | 6thSolve geometric problems using vectors in 3 dimensions. |
| Findsvia *N* | **M1** | 3.1a |
| Finds | **M1** | 3.1a |
| Finds | **M1** | 3.1a |
| Equates the two ways of moving from *O* to *P*. | **M1** | 2.2a |
| Equates coefficients of *a:* | **M1** | 2.2a |
| Equates coefficients of *b*. OR equates coefficients of *c*.  | **M1** | 1.1b |
| Solves to find | **A1** | 1.1b |
| Concludes that at this value the lines intersect. | **B1** | 2.1 |
| Concludes that the lines must bisect one another asand | **B1** | 2.1 |
| (10 marks) |
| Notes |