<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>16a</td><td>(the particle is) ionising
Or
it knocks electrons out of atoms in its path (1)

A track is formed by the ionised particles produced (1)</td><td>2</td></tr>
<tr><td>16bi</td><td>A baryon is three quarks (or three antiquarks) (1)

A meson is an anti-quark and a quark (1)</td><td>2</td></tr>
<tr><td>16bii</td><td>into the page/paper (1)</td><td>1</td></tr>
<tr><td>16biii</td><td>charge:
applies charge conservation (1)

omega baryon charge −1 (1)

baryon number:
before = 1 identified as the proton so the omega particle = 1 (1)</td><td>3</td></tr>
<tr><td>*16c</td><td>This question assesses a student’s ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.

Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.

The following table shows how the marks should be awarded for indicative content.

<table>
<tr><th>Number of indicative marking points seen in answer</th><th>Number of marks awarded for indicative marking points</th><th>Max linkage mark available</th><th>Max final mark</th></tr>
<tr><td>6</td><td>4</td><td>2</td><td>6</td></tr>
<tr><td>5</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td>4</td><td>3</td><td>1</td><td>4</td></tr>
<tr><td>3</td><td>2</td><td>1</td><td>3</td></tr>
<tr><td>2</td><td>2</td><td>0</td><td>2</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table></td><td>6</td></tr>
</table>

The following table shows how the marks should be awarded for structure and lines of reasoning.

	Number of marks awarded for structure of answer and sustained line of reasoning
Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout	2
Answer is partially structured with some linkages and lines of reasoning	1
Answer has no linkages between points and is unstructured	0

Guidance on how the mark scheme should be applied: The mark for indicative content should be added to the mark for lines of reasoning. For example, an answer with five indicative marking points which is partially structured with some linkages and lines of reasoning scores 4 marks (3 marks for indicative content and 1 mark for partial structure and some linkages and lines of reasoning). If there are no linkages between points, the same five indicative marking points would yield an overall score of 3 marks (3 marks for indicative content and no marks for linkages).

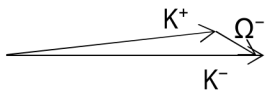
Indicative content:
Energy:
IC1 As (Rest) mass-energy of proton and kaon + Initial E_k = (rest) mass-energy of omega and kaon + kinetic energies of both particles
Or (Total) mass-energy conserved

IC2 Incoming K^- had **high** kinetic energy

IC3 some of this initial kinetic energy converted to mass of the omega particle (– mass of proton)

IC4 $\Delta E = \Delta mc^2$

momentum:
IC5 momentum of K^- = sum of x components of $K^+ + \Omega^-$
Or vector sum of momentum of $K^+ + \Omega^-$ = momentum of K^-
Or an attempt to sketch a triangle of vectors
eg



IC6 y component of K^+ equals y component Ω^-
Or
all vectors correctly labelled

	Total for question 16	**14**