6 **(a)** Complete Table 6.1 to show the masses (in terms of the unified atomic mass unit u) and charges (in terms of the elementary charge *e*) of α, β^+ and β^- particles.

Table 6.1

	mass / u	charge / *e*
α-particle		
β^+ particle		
β^- particle		

[4]

(b) Carbon-14 is radioactive and decays by emission of β^- particles.

(i) Nuclei do not contain β^- particles.

Explain the origin of the β^- particle that is emitted from the nucleus during β^- decay.

.....

.....

..... [1]

(ii) State the change in the quark composition of a carbon-14 nucleus when it emits a β^- particle.

..... [1]

(iii) Suggest why the β^- particles are emitted with a range of different energies.

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.....

.....

..... [2]

[Total: 8]