6 **(a)** A lepton is an example of a fundamental particle.

State what is meant by fundamental particle.

.....

..... [1]

(b) A lambda particle Λ^0 is a hadron that consists of an up (u) quark, a down (d) quark and a strange (s) quark.

Show that the charge on the Λ^0 particle is zero.

[2]

(c) The Λ^0 particle is unstable. It can decay into a neutron (n) and a pion (π^0) as shown by

$$\Lambda^0 \longrightarrow n + \pi^0.$$

The π^0 particle consists of an up quark and an up antiquark.

(i) Compare the properties of an up quark and an up antiquark.

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..... [2]

(ii) Explain why the neutron is classed as a baryon and the π^0 particle is classed as a meson.

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..... [2]

[Total: 7]