7 **(a)** A nucleus of sodium-22 ($^{22}_{11}$Na) decays by emitting a β^+ particle. A different nucleus is formed by the decay.

(i) State the name of another lepton that is produced by the decay.

..... [1]

(ii) Determine the nucleon number and the proton number of the nucleus that is formed by the decay.

nucleon number = ...

proton number = ...
[2]

(iii) The quark composition of a nucleon in the sodium-22 nucleus is changed during the decay.

Describe the change to the quark composition of the nucleon.

.....

..... [1]

(b) A baryon consists of quarks that are the same flavour (type). The charge of the baryon is –2*e*, where *e* is the elementary charge.

(i) Calculate, in terms of *e*, the charge of each quark.

charge = ... *e* [1]

(ii) State a possible flavour (type) of the quarks.

..... [1]

[Total: 6]