

Physics 745 - Group Theory
Homework Set 26
Due Wednesday, April 8

1. Below are a list of reactions that are possible. You should know the charge and baryon number of the proton (p), electron (e) and neutron (n). Deduce the charge Q and baryon number B of all listed particles, namely

$$\bar{p}, \pi, K_L, \bar{\pi}, \bar{\nu}, \nu, \mu, Z, \bar{\mu}, \Lambda_c$$

Any particle with a bar over it is the anti-particle of the corresponding particle; for example, \bar{p} is the anti-proton. Comment: In many cases I have done my best to disguise the particles by not giving them standard names.

$$\bar{p} + p \rightarrow \pi + n + \bar{p}$$

$$K_L \rightarrow \pi + \bar{\pi}$$

$$n \rightarrow p + e + \bar{\nu}$$

$$\nu + n \rightarrow \mu + p$$

$$Z \rightarrow \mu + \bar{\mu}$$

$$\Lambda_c \rightarrow p + K_L$$