C2) Consider the decay

$$\Lambda^0 \rightarrow n + \pi^0$$

followed by

$$\pi^0 \rightarrow 2\gamma.$$

a) (2 points) Identify the type of interaction that causes each of these decays.

b) (2 points) Which of the following quantum numbers are conserved and which are not conserved in each process ?

- electric charge Q
- izospin component T_z
- baryon number B
- Strangeness S

c) (3 points) Given the rest masses M_Λ, M_n, M_π of the three particles involved in the first process, find the energies of the decay products n, π^0 in the rest frame of the Λ^0.

d) (3 points) The two γ's from the decay of π^0 are observed to have equal energies in the rest frame of Λ^0. Find the angle between the two γ's in this frame, in terms of the masses of the particles involved.