Take Home Exam III

Decays

1)a) Which of the following decays occurs and which does not. Please explain why one of them does not.(10 pts)

$\Lambda^o \rightarrow p + \pi^-$

$\Lambda^o \rightarrow \overline{p} + \pi^+$

b)Can the following decays occur? If not, why not?(4 pts each)

$\tau^+ \rightarrow \pi^+ + \pi^- + \pi^+ + \overline{\nu}_\tau$

$\overline{\Xi}^o \rightarrow \overline{\Lambda}^o + \pi^o$

$\nu_e + \overline{\nu}_e \rightarrow \nu_\mu + \overline{\nu}_\mu$

$\nu_e + \overline{\nu}_\mu \rightarrow \nu_\mu + \overline{\nu}_e$

$\Sigma^- \rightarrow K^- + K^+ + K^-$

$\overline{p} + \Sigma^- \rightarrow K^- + K^+ + K^- + \pi^+$

$\Xi^- \rightarrow \Xi^o + e^- + \overline{\nu}_e$

c) Please draw the Feynman diagram for the following 2 interactions: (you may find your notes or the homework solutions helpful)(6 pts each)

$\mu^+ \rightarrow e^+ + \nu_e + \overline{\nu}_\mu$

$\pi^+ \rightarrow \mu^+ + \nu_\mu$