Thomson 1.3

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1.3.a

$\mu^- \rightarrow e^+ e^- e^+$
This decay cannot happen due to it requiring a particle to change into an antiparticle. A weak decay or an electromagnetic decay could yield an electron and a positron, but there is no way within the standard model for that second positron to be created.

1.3.b

$\nu_\tau + p \rightarrow \mu^- + n$
This decay cannot happen since it would require a flavor change from a tau neutrino to a muon. There is no way in the standard model for that to happen.

1.3.c

$\nu_\tau + p \rightarrow \tau^+ + n$
This decay cannot happen due to it requiring a flavor change from a tau neutrino to an antitauon. There is no standard model process that can achieve this.

1.3.d

$\pi^+(u\bar{d}) + \pi^-(d\bar{u}) \rightarrow n(udd) + \pi^0(u\bar{u})$
This decay cannot happen as the difference between particles and antiparticles changes. When a particle is created from the decay of a virtual force carrying boson, it is created with an antiparticle. This proposed reaction would break that symmetry so it cannot occur.