

Ph 252 Problem Set IV Solutions

February 23, 2009

Note: There may be additional reasons why some of these decays are forbidden, but the most obvious reasons should be listed here.

1) Bettini 3.4

1) Allowed by strong interaction. 2) Allowed by weak interaction. 3) Forbidden: Violates lepton number. 4) Allowed by EM. 5) Forbidden: Violates C-parity. 6) Forbidden: Violates energy-momentum conservation. 7) Forbidden: Violates baryon number and S. 8) Forbidden: Violates baryon number and S. 9) Forbidden: Violates lepton number and J. 10) Forbidden: Violates energy conservation.

2) Bettini 3.5

1) Forbidden: Violates lepton family number. 2) Forbidden: Violates charge conservation. 3) Forbidden: Violates B. 4) Forbidden: Violates charge conservation and S. 5) Forbidden: Violates B. 6) Forbidden: Violates charge conservation and S. 7) Forbidden by strong interaction (violates S), but allowed (albeit highly suppressed) by weak interaction. 8) Forbidden by strong interaction (violates S), but allowed (albeit highly suppressed) by weak interaction. 9) Forbidden: Violates energy conservation. 10) Forbidden: Violates lepton number.

3) Bettini 3.6

a) Violates lepton number and J. b) Violates lepton number and B. c) Violates energy conservation. d) Violates charge conservation.

4) Bettini 3.7

a) Violates S. b) Does not violate S. c) Does not violate S. d) Violates S.