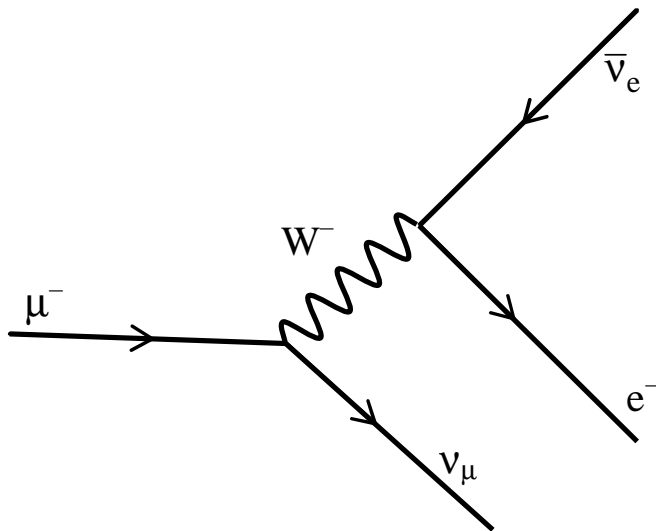


It is not departmental policy to provide complete specimen answers to past examination papers. However, to help you in revision, numerical values and similar information are given below so that you can check your attempts. If you have attempted past questions and wish to discuss the descriptive questions or the details of your calculations, please see me!

Dr Booth

Question 1

- d) $\Sigma^- = s d d$; $\Delta^- = d d d$
- e) Weak interaction (change in strangeness).
- f)



- h) Pion energy is 748 MeV.

Question 2

c)
$$F(q) = 2\pi A \frac{\frac{\pi\hbar}{qR} \sin \frac{qR}{\hbar} - 2}{\left(\frac{\pi}{2R}\right)^2 - \left(\frac{q}{\hbar}\right)^2}$$

Question 3

- c) Mass is $0.1396 \text{ GeV}/c^2$.

Question 4

- c)i) Forbidden – violation of muon lepton number.
- c)ii) Weak – involvement of neutrinos.
- c)iii) Weak – change of strangeness by 1 unit.
- c)iv) Forbidden – change of strangeness by 3 units.
- c)v) Strong – hadrons involved, all QN conserved.
- c)vi) Electromagnetic (electroweak at high energy) – charged leptons involved.
- c)vii) Strong – all QN conserved.
- c)viii) Forbidden – change of strangeness (and hadron collision, not decay).

Question 5

- c) Lightest state $p \pi^0 e$; minimum electron energy $145 \text{ MeV}/c$.