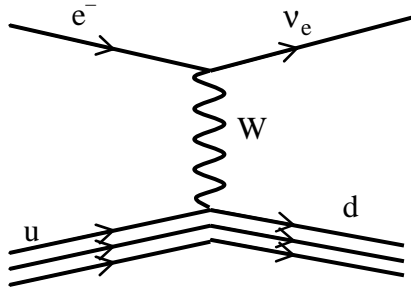


It is not departmental policy to provide complete specimen answers to past examination papers. However, to help you in revision, numerical values and similar information are given below so that you can check your attempts. If you have attempted past questions and wish to discuss the descriptive questions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

Dr Booth

Question 1

d)



e) Electron energy is 52.9 MeV.

i) Weak interaction (change in strangeness).

Question 2

c)i) $A = \frac{3}{\pi R^3}$.

c)ii) $F(\underline{q}) = \frac{12\hbar^3}{q^3 R^3} \left(2 \frac{\hbar}{qR} \left(1 - \cos \frac{qR}{\hbar} \right) - \sin \frac{qR}{\hbar} \right)$.

Question 3

c)i) u d d.

c)ii) $\frac{1}{\sqrt{3}}(udd + dud + ddu)$.

d) Positron energy 581 GeV.

Question 4

- c)i) Weak – involves neutrinos.
- c)ii) Forbidden – violation of tau lepton number.
- c)iii) Strong – hadrons, all quantum numbers conserved.
- c)iv) Forbidden – change of strangeness by 2 units.
- c)v) Forbidden – change of strangeness by 3 units.
- c)vi) Electromagnetic – involves photons, all quantum numbers conserved.
- c)vii) Electromagnetic (electroweak at high energy) – charged leptons involved.
- c)viii) Strong – hadrons, all quantum numbers conserved.

Question 5

- b) Parity of meson is -1 .
- c) Kaon momentum $142.8 \text{ MeV}/c$.