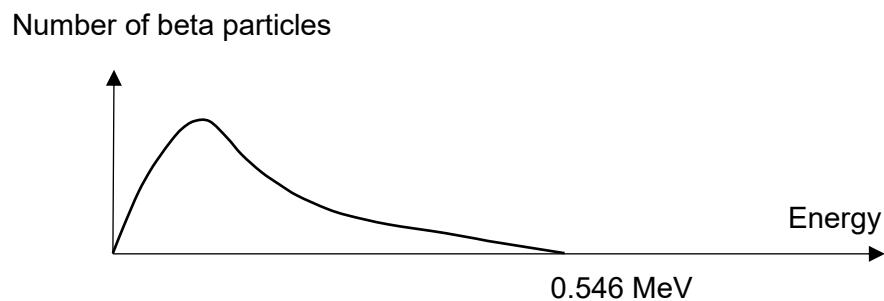**7** The radioactive isotope strontium-90 decays into yttrium-90, emitting a beta-particle. Strontium-90 has a half-life of 28.0 years and the energy produced in each decay is 0.546 MeV.

(a) The beta-particles produced from the decay of strontium-90 are found to possess a range of kinetic energies as shown in Fig. 7.1.

Number of beta particles

Fig. 7.1

Explain why this suggests an extra particle is emitted.

....

....

....

....

.... [2]

(b) **(i)** Explain what is meant by half-life.

....

.... [1]

(ii) Determine the decay constant, λ of Strontium-90,

λ = ………………………… s^{-1} [2]

(iii) Determine the mass of strontium-90 present, for an activity of 6.40 × 10^9 Bq.

mass = ……………………… g   [3]

Section B

Answer **one** question from this Section in the space provided.