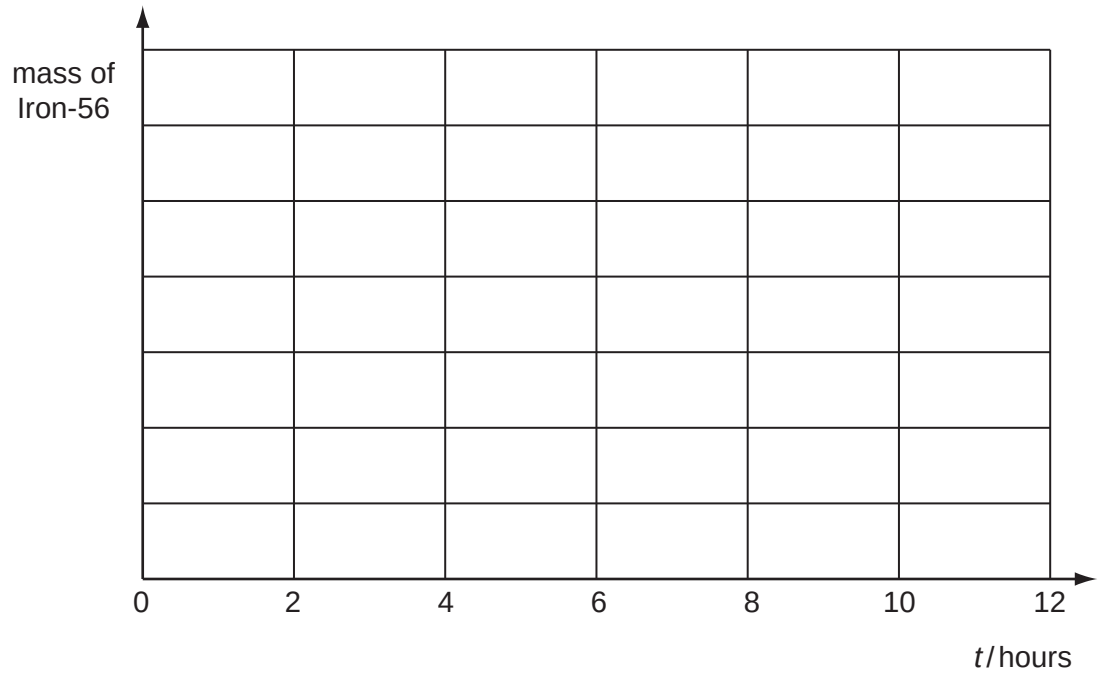
Examiner's Use

7 The isotope Manganese-56 decays and undergoes β-particle emission to form the stable isotope Iron-56. The half-life for this decay is 2.6 hours.
Initially, at time t = 0, a sample of Manganese-56 has a mass of 1.4 μg and there is no Iron-56.

(a) Complete Fig. 7.1 to show the variation with time t of the mass of Iron-56 in the sample for time t = 0 to time t = 11 hours.



[2]

Fig. 7.1

(b) For the sample of Manganese-56, determine

(i) the initial number of Manganese-56 atoms in the sample,

number = ...[2]

(ii) the initial activity.

activity = ... Bq [3]

(c) Determine the time at which the ratio

$$\frac{\text{mass of Iron-56}}{\text{mass of Manganese-56}}$$

is equal to 9.0.

time = ... hours [2]