

























| Qu No. |   | Extra Information       | Marks                                  |
|--------|---|-------------------------|--|
| 5.1    | (same) number of protons  |                         | 1                                      |
| 5.2    | beta<br><br>atomic / proton number increases (by 1)<br><br><b>or</b><br><br>number of neutrons decreases / changes by 1   |                         | 1<br><br>1                             |
| 5.3    | nuclei split  |                         | 1                                      |
| 5.4    | the reactor   |                         | 1                                      |
| 5.5    | time taken for number of radioactive nuclei to halve<br><br><b>or</b><br><br>(average) time taken for count-rate / activity to halve  |                         | 1                                      |
| 5.6    | 1 half-life = 2.6 days<br><br>number of days = 7.8 days   |                         | 1<br><br>1                             |
| 5.7    | Number of half-lives = $13/2.6$<br>fraction = $(\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2})$<br>or $(\frac{1}{2})^5$<br>100 000 / 32<br>3125<br><br>safe<br>number is comparatively low, so low activity<br>unlikely to be substantial risk of<br>contamination/irradiation.<br><b>or</b><br>unsafe<br>There are still some atoms of molybdenum<br>left so some radiation emitted<br>therefore still a small risk. | no mark for safe/unsafe | 1<br><br>1<br>1<br>1<br><br>1<br><br>1 |