

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

- (a) plutonium is toxic/large mass of plutonium

B1

harmful if released into atmosphere/explosion occurred

B1

alphas dangerous when ingested/during launch etc

B1

max2

- (b) unaffected

B1

chemical bonding involves electrons (atomic)
radioactivity is nuclear (nuclei)/same number of nuclei
present

B1

2

- (c) (i) $T_{1/2} = \ln 2 / \lambda$

C1

$$2.51 \times 10^{-10}$$

A1

2

- (ii) molar mass calculated (0.270 kg)

C1

use of 33 kg

C1

number of moles in sample (122.2)

C1

multiplication of value by Avogadro's number

C1

$$7.36 \times 10^{25}$$

A1

5

(iii) (c) (i) \times (c) (ii)

C1

$$1.83 \times 10^{16} \text{ cao}$$

A1

Bq

B1

3

(d) (i) uranium correct (234,92)

B1

alpha correct (4,2) – accept He or α symbol

B1

2

(ii) use of 1 g generating 500 mW

C1

16500 W total

C1

recognition that activity \times energy of one alpha = power

C1

$$9.00 \times 10^{-13} \text{ (J)}$$

A1

4

[20]