**Assignment Test Answers**

**Nuclear Energy**

**Question 1**

a) Mass defect = Mass of reactants - Mass of products

**( 1 mark )**

= 31.98403 - 31.98279

= 0.00124 u

**( 1 mark )**

E = mc2 = 0.00124 x 931 = 1.15 MeV

**( 1 mark )**

=0.00124 x 1.67 x 10-27 x ( 3.00 x 108 ) 2

= 1.86 x10-13 J

**( 1 mark )**

b) Energy per second = 2.75 x1017 x 1.86 x10-13

**( 1 mark )**

= 5.12 x 104 W

**( 1 mark )**

**Question 2**

a) 238 Pu 94 ------> 234 U 92 + 4 He 2

**( 1 mark )**

b) Mass defect = Mass of reactants - Mass of products

= 238.0495 - 234.0409 + 4.0026

= 6.00 x10-3 u

**( 1 mark )**

Energy of alpha particle = 6.00 x10 -3 x 931

= 5.59 MeV or 8.94 x10-13 J

**( 1 mark )**

c) 1.45 x1014 Bq = 1.45 x1014 decays per second

**( 1 mark )**

d) 1.45 x1014 decays = 1.45 x1014 x 8.94 x 10-13

= 1.30 x102 Js

**( 1 mark )**

**Question 3**

a) i) Time of exposure.

**( 1 mark )**

1. Type of radiation exposed to.

**( 1 mark )**

b) Quantity of energy absorbed per kg of matter.

**( 1 mark )**

c) The ability of the radiation to cause damage to the living organism being exposed to the

radiation.

**( 1 mark )**

**Question 4**

a) L.D. - 50 The dose of radiation which will kill 50 % of the exposed population.

**( 1 mark )**

b) L.D. - 50 / 25 The dose that will kill 50 % of the exposed population in 25 days.

**( 1 mark )**