

30Name: *Shanna*

Date:

1. Write T (true) or F (false) for each of the following:

- T a) Natural radioactivity is emitted spontaneously.
- F b) The alpha decay Pu-239 occurs more quickly at higher temperatures.
- T c) Artificial radioactivity is not emitted spontaneously.
- F d) Beta particles are attracted to the negative pole of an electric field.
- T e) Gamma rays do not have mass.
- F f) X-rays are produced by radioactive elements.
- F g) Gamma rays can be stopped by a sheet of paper.
- T h) Alpha particles can be stopped by 2.5cm thickness of wood.
- F i) C-14 present in wood will decay more quickly if the wood is cut into kindling.
- T j) Beta particles have mass.
- T k) Gamma rays and x-rays are not deflected by a magnetic field.
- F l) X-rays have more energy than other forms of radiation.
- F m) Alpha and beta particles travel at the speed of light.
- F n) Transmutations occur more quickly at higher pressures.
- F o) After a radioactive isotope transmutes it is still the same element.
- F p) Nuclear radiation includes alpha and beta particles, gamma rays and x-rays.
- T q) Alpha particles are attracted to the negative pole of a magnetic or electric field.
- F r) In medicine, it is best to use radioisotopes (radioactive isotopes) which have a long half-life.
- F s) The half-life of Co-60 can be altered to meet the needs of different medical procedures.
- F t) All waves in the electromagnetic spectrum are radioactive.

20

2. If 800 kg of U-238 is stored away, how much of the U-238 will remain after  $22.5 \times 10^9$  years?

The half-life of U-238 is  $4.5 \times 10^9$  years.

(years) time	mass
0	800 kg
$4.5 \times 10^9$	400 kg
$9 \times 10^9$	200 kg
$13.5 \times 10^9$	100 kg
$18 \times 10^9$	50 kg
$22.5 \times 10^9$	25 kg

ANS : 25 kg

5

3. A 5-kg bone contains 160 mg of Sr-90. How long will it be until only 5 mg of Sr-90 remains? The half-life of Sr-90 is 29 years.

(yrs) time	mass
0	160 mg
29	80 mg
58	40 mg
87	20 mg
116	10 mg
145	5 mg

ANS : 145 yrs

5

Bonus: The mass of an electron is negligible compared to the mass of the atom.

(+2)