Radioisotope Safety and Methodology Course Activity Worksheet

Name: _____

Date: _____

ID #: _____

1. How many neutrons are in the nucleus of the following radioisotopes:

Co-60 _____

P-32 _____

I-125 _____

Am-241 _____

Kr-85 _____

Sr-90 _____

Sm-152 _____

2. List the daughter nuclides formed by the following parent nuclides:

P-32 decays by beta particle emission to _____

Pu-240 decays by alpha particle emission to _____

Th-232 decays by alpha particle emission to _____

Ar-41 decays by beta particle emission to _____

Cs-137 decays by beta particle emission to _____

Po-212 decays by alpha particle emission to _____

U-239 decays by beta particle emission to _____

3, To answer the following question insert in the blank spaces below either "increase, decreases or no change" also indicate how much change.

Decay Type	Change in atomic mass of (A)	Change in atomic number of atom (Z)
Alpha		
Beta		
Gama		

4. Convert the following units:

74 GBq _____ Ci

555 MBq _____ mCi

125 mCi _____ MBq

100 Ci _____ GBq

640 MBq _____ Ci

2.5 kBq _____ dps

150 nCi _____ dpm

5. In 1979 there was an accident at the Three Mile Island nuclear power plant that released 50,000 Ci of Kr-85 ($T_{1/2}$ = 10.8 years). Calculate the current activity in GBq.

6. a. What type of nuclear radiation has the smallest range in air?

b. Name a type of beta radiation, What would be an effective shield?

7. Polonium-210 ($T_{1/2}$ = 138 days) was the radioisotope used in the murder of Alexander Litvinenko about two years ago. Assuming the “lethal dose” given was 5000 uCi, what would the current activity be in MBq?

8. Explain the difference between absorbed dose, equivalent dose and effective dose?

9. Specify whether the following effects are stochastic or deterministic. In each case the effect is followed by the exposure that could cause it.

Effect	Stochastic	Deterministic
A person with a sun burn (exposure to the sun)		
Fatal lung cancer (smoking)		
Electrical burns (electrical current)		
Congenital Health problems with a future child (radiation exposure)		
Radiation sickness (acute radiation exposure)		
Cancer (radiation exposure)		

10. What is the estimated risk of developing a fatal cancer from exposure to 1 mSV radiation?

b. What is the occupational radiation exposure limit at UNBC?