CHE 112 - Homework - Ch 20d

OER 20.3 **Radioactive Decay Rates** Score: _____/35

Name: _____ Date: _____

[4 pt] 1. What is the decay constant (in s^{-1}) of gallium-67, a radioisotope used for imaging soft-tissue tumors? The half-life of gallium-67 is 78.25 hours. Explain. 1. _____

[5 pt] 2. How old is a sample of wood whose ^{14}C content is found to be 43% that of a living tree? The half-life of ^{14}C is 5730 years. 2. _____

[6 pt] 3. The half-life of ^{241}Am is 432.2 years. What percentage of a sample remains after:

(a) 65 days? 3(a) _____

(b) 65 years? 3(b) _____

(c) 650 years? 3(c) _____

[5 pt] 4. A sample of ^{37}Ar undergoes 8540 disintegrations/min initially but undergoes 6990 disintegrations/min after 10.0 days. What is the half-life of ^{37}Ar in days? 4. _____

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[5 pt] 5. Polonium-209 is an α emitter with a half-life of 102 years. How many α particles are emitted in 1.0 seconds from a 1.0 ng sample? 5. _____

[5 pt] 6. What is the activity in (a) Bq and (b) Ci of a sample of ^{226}Ra ($t_{1/2}$ = 1600 years) that is emitted by a 50.0 mg sample.

6(a) _____

6(b) _____

[5 pt] 7. A rock sample contains 50.0 mg of ^{238}U and 14.0 mg of ^{206}Pb. What is the age of the rock. (Recall from lecture $t_{1/2} = 4.5 \times 10^9$ years.) 7. _____