Quiz 11.1 – Nuclear Chemistry

Name: Key

Question 1

Complete the following table of radionuclides and daughter nuclei/products

Decay Type	reactants		products
α emission	$^{32}_{15}P$	$\longrightarrow$	$^{28}_{13}Al + ^{4}_{2}\alpha$
β emission	$^{131}_{53}I$	$\longrightarrow$	$^{131}_{54}Xe + ^{0}_{-1}\beta$
positron emission	$^{23}_{12}Mg$	$\longrightarrow$	$^{23}_{11}Na + ^{0}_{1}\beta$
electron capture	$^{59}_{28}Ni + ^{0}_{-1}e$	$\longrightarrow$	$^{59}_{27}Co$

Question 2

^{89}Sr has a half-life of $50.5d$. If a sample decays for $80d$, what fraction of the original sample will remain?

$n = \frac{80\,d}{50.5\,d} = 1.58$ fraction $= 0.5^{n} = 0.5^{1.58} = 0.334$ (33.4%)

Question 3

Describe the difference between *fission* and *fusion*

Fission: Large nuclei split apart into 2 or more smaller daughter nuclei

Fusion: Small nuclei combine to form 1 larger nucleus

Question 4

What type of radiation corresponds to each elementary particle?

- A high energy photon of light γ radiation
- An electron β radiation
- A helium nucleus α radiation