

Nuclear #1

A: Particles within the nucleus
i.e. protons and neutrons

Nuclear #2

A: The strong force

Nuclear #3

A: Nuclei of the same element (i.e. same number of protons) with different masses (i.e. different number of neutrons)

Nuclear #4

A: U_{92}^{235}

Mass number: 235

Atomic number: 92

Nuclear #5

A: Au_{79}^{197}

$$197 - 79 = 118 \text{ neutrons}$$

Nuclear #6

A: A becquerel is a unit to measure radioactivity, where 1 Bq = 1 decay per second.

Nuclear #7

A: Match the following...

- | | |
|---------------------|--------------------------|
| A) Alpha decay | Nucleus too big |
| B) Beta minus decay | Too many neutrons |
| C) Beta plus decay | Too many protons |
| D) Gamma Decay | Nucleus in excited state |

Nuclear #8

A: A neutrino is formed when a positron is formed.

Nuclear #9

A:

It is heavier in a helium nucleus (the closer you get to iron(26 protons), the lighter the nucleons.

Nuclear #10

A: *Iron-56 (26 protons, 30 neutrons)*

Nuclear #11

A:

A positron and a neutrino.

Nuclear #12

A:

An electron and an anti-neutrino

Nuclear #13

A:

A helium nucleus – two protons and two neutrons

Nuclear #14

A:

Fusion is where things are joined together and fission is where things are split apart

Nuclear #15

A: *Total annihilation (no more mass)*

They are converted into raw energy in the form of EM waves (two identical photons that move in opposite directions)

Nuclear #16

A:

*Up/Down
Top/Bottom
Charm/Strange*

Nuclear #17

A: Uranium with a higher percentage of U-235 (needed for induced fission).

Nuclear #18

A: When nuclear fission occurs, mass is lost and converted to energy.

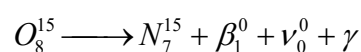
Nuclear #19

A:



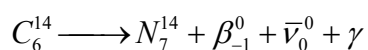
Nuclear #20

A:



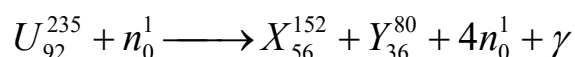
Nuclear #21

A:



Nuclear #22

A:



Nuclear #23

A: 8 hours is 2 half-lives.
So activity halves twice.
i.e. activity = $90 / 2 / 2 = 22.5$ Bq

Nuclear #24

A: $600 / 2 / 2 / 2 = 75$ Bq
So 3 half-lives needed.
 $9 \text{ hours} / 3 = 3 \text{ hours}$.

i.e. half-life is 3 hours

