

Question 1

- What is an atomic number?
- The number of protons in an atom's nucleus.

Question 2

- What number consists of protons plus neutrons?
- Mass number

Question 3

- What are isotopes?
- Atoms with the same number of protons, but a different number of neutrons

Question 4

- Define average atomic mass and give the formula.
- The weighted average of all isotopes of an element.
- Avg atomic mass = $(\text{mass}_1 \times \text{abundance}_1) + (\text{mass}_2 \times \text{abundance}_2) \dots$

Question 5

- How many protons, neutrons, and electrons does Oxygen-18 have?
- Protons = 8, electrons = 8, and neutrons = 10

Question 8

- How can you find the number of neutrons in an isotope?
- Mass number – atomic number or mass number – number of protons

Question 9

- Why are atoms neutral?
- The number of protons with + charges matches the number of electrons with – charges.

Question 10

- An element has 2 naturally occurring isotopes: ^{14}X and ^{15}X . ^{14}X has a mass of 14.00307 amu and a relative abundance of 99.63%. ^{15}X has a mass of 15.00011 amu and a relative abundance of 0.37%. Calculate the average atomic mass and identify the element.
- 14.0067 amu, Nitrogen

Question 11

- What is the difference between fusion and fission?
- Fusion is the combining of lightweight nuclei to form heavier nuclei and fission is the splitting of heavy nuclei into lighter nuclei.

Question 12

- What are the most common elements in younger stars?
- Hydrogen and helium

Question 13

- How do stars form the elements up to and including iron?
- Through the fusion of lighter nuclei, mostly hydrogen and helium.

Question 14

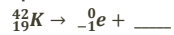
- Which elements are more abundant in the universe?
 - Elements with smaller masses

Question 15

- What is a supernova?
 - A massive explosion that results in the creation of the remaining naturally occurring elements heavier than iron.

Question 16

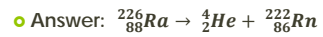
- Complete the nuclear reaction below:



- Answer: ${}_{19}^{42}\text{K} \rightarrow {}_{-1}^0\text{e} + {}_{20}^{42}\text{Ca}$

Question 17

- Write the complete balanced nuclear equation for the alpha decay of Radium-226.



Question 18

- Which type of radiation is the least penetrating?

- Alpha particles

Question 19

- Which type of radioactive decay results in the gain of a proton?

- Beta decay

Question 20

- Which type of radiation has a charge of +2?
- Alpha particle

Question 21

- What type of subatomic particle is emitted during beta decay?
- An electron

Question 22

- Why are alpha particles and beta particles deflected in opposite directions in an electric field?
- Both alpha and beta particles are charged. Alpha particles have a positive charge and beta particles have a negative charge. Since their charges are opposite, they will deflect in opposite directions.