

# WORKSHEET 5: RADIOACTIVITY 2027

**1. Which of the following particles has the greatest penetrating power?**

- A) Alpha particle
- B) Beta particle
- C) Gamma ray
- D) Neutron
- E) Proton

**2. What is the mass number and atomic number change when a nucleus emits an alpha particle?**

- A) -2 mass, -1 atomic
- B) -4 mass, -2 atomic
- C) -2 mass, -2 atomic
- D) -4 mass, -1 atomic
- E) No change in mass or atomic number

**3. Which of the following is a correct equation for beta-minus decay?**

- A)  ${}^{14}_6\text{C} \rightarrow {}^{14}_7\text{N} + e^+$
- B)  ${}^{14}_6\text{C} \rightarrow {}^{14}_5\text{B} + e^-$
- C)  ${}^{14}_6\text{C} \rightarrow {}^{14}_7\text{N} + e^-$
- D)  ${}^{14}_6\text{C} \rightarrow {}^{14}_6\text{C} + \gamma$
- E)  ${}^{14}_6\text{C} \rightarrow {}^{10}_5\text{B} + \alpha$

**4. Which radiation type travels at the speed of light in a vacuum?**

- A) Alpha radiation
- B) Beta radiation
- C) Positron radiation
- D) Neutron radiation
- E) Gamma radiation

**5. Which instrument is commonly used to detect and measure radioactivity?**

- A) Geiger-Müller counter
- B) Colorimeter
- C) Thermocouple
- D) pH meter
- E) Spectrophotometer

**6. Which of the following best describes gamma radiation?**

- A) A high-energy electron
- B) A helium nucleus
- C) A neutron
- D) An electromagnetic wave
- E) A hydrogen nucleus

**7. When alpha ( $\alpha$ ), beta ( $\beta$ ), and gamma ( $\gamma$ ) radiations pass through a magnetic field perpendicular to their path, what is observed?**

- A) All three are deflected in the same direction
- B) Alpha and beta are deflected in opposite directions; gamma is not deflected
- C) Beta and gamma are deflected in opposite directions; alpha is unaffected
- D) Only gamma is deflected; alpha and beta are not
- E) Alpha and beta are deflected in the same direction; gamma in the opposite

**8. What causes the deflection of beta particles in an electric or magnetic field?**

- A) Their mass only
- B) Their high energy
- C) Their positive charge
- D) Their negative charge
- E) The presence of neutrons

**9. Which of the following is true regarding alpha radiation compared to beta radiation?**

- A) Alpha particles are more penetrating than beta particles
- B) Alpha particles move faster than beta particles
- C) Alpha particles have a greater ionizing power than beta particles
- D) Alpha particles are negatively charged
- E) Alpha particles are unaffected by electric or magnetic fields

**10. Which of the following best explains why gamma rays are not deflected by electric or magnetic fields?**

- A) They travel too fast
- B) They have very low energy
- C) They consist of neutral atoms
- D) They have no mass or charge
- E) They are heavier than alpha particles

**11. Which statement about radioactive decay is true?**

- A) It can be controlled chemically
- B) It can change the number of protons in the nucleus
- C) It is reversible under high pressure
- D) It stops at absolute zero
- E) It depends on external temperature

**12. Which of the following correctly lists the relative speeds of alpha ( $\alpha$ ), beta ( $\beta$ ), and gamma ( $\gamma$ ) radiation in a vacuum?**

- A)  $\alpha > \beta > \gamma$
- B)  $\beta > \alpha > \gamma$
- C)  $\gamma > \beta > \alpha$
- D)  $\gamma > \alpha > \beta$
- E)  $\alpha = \beta = \gamma$

**13. The SI unit of radioactivity is:**

- A) Becquerel
- B) Curie
- C) Gray
- D) Sievert
- E) Roentgen

**14. Why do beta particles move faster than alpha particles?**

- A) Beta particles have more mass
- B) Beta particles are positively charged
- C) Beta particles have less charge
- D) Beta particles have much less mass
- E) Beta particles are made of neutrons

**15. Which type of radiation causes the most ionization but has the least penetrating ability?**

- A) Alpha
- B) Beta
- C) Gamma
- D) X-rays
- E) Neutrons