

1. Which of these types of nuclear radiation has the greatest penetrating power?

- A) neutron
- B) gamma
- C) alpha
- D) beta

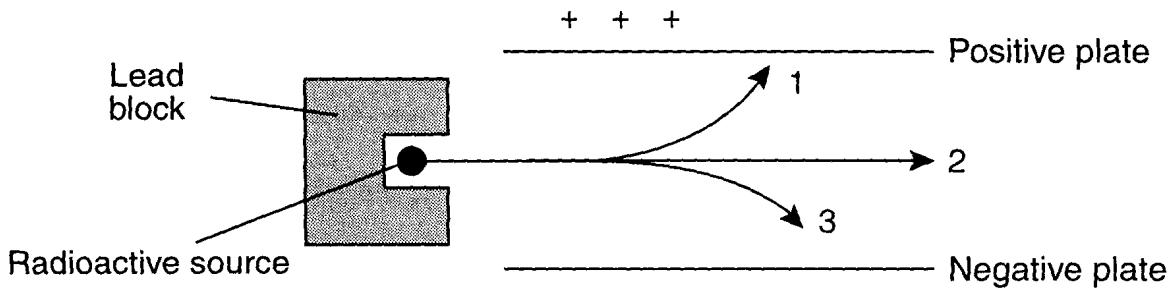
2. What is the name of the process in which the nucleus of an atom of one element is changed into the nucleus of an atom of a different element?

- A) reduction
- B) substitution
- C) transmutation
- D) decomposition

3. Alpha particles and beta particles differ in

- A) mass, only
- B) charge, only
- C) neither mass nor charge
- D) both mass and charge

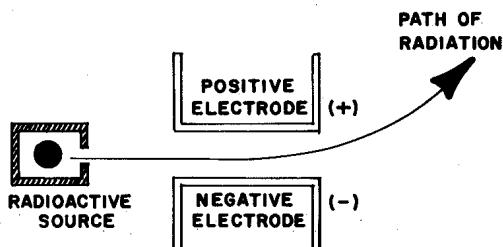
4. The diagram below represents radioactive emanations passing through an electric field.



Which type of emanation is represented by the arrow labeled 1?

- A) alpha particle
- B) positron
- C) beta particle
- D) gamma ray

5. A radioactive source emits radiation which is deflected as shown in the diagram below.



This radiation could be

- A) ${}^1_1\text{H}$
- B) ${}^0_{-1}\text{e}$
- C) ${}^1_0\text{n}$
- D) ${}^4_2\text{He}$

6. A change in the nucleus of an atom that converts the atom from one element to another element is called

- A) transmutation
- B) polymerization
- C) neutralization
- D) combustion

7. A beta particle may be spontaneously emitted from

- A) an excited electron
- B) a stable nucleus
- C) a ground-state electron
- D) an unstable nucleus

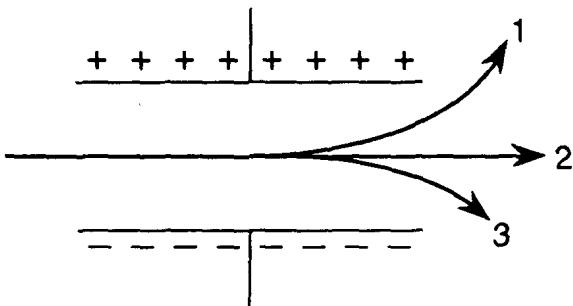
8. Artificial transmutation is brought about by using accelerated particles to bombard an atom's

- A) nucleus
- B) occupied sublevels
- C) inner principal energy levels
- D) valence shells

9. Which nuclear decay emission consists of energy, only?

- A) alpha particle
- B) gamma radiation
- C) beta particle
- D) positron

10. Which particle has the greatest mass?
A) an alpha particle B) a beta particle
C) a positron D) a neutron
11. Which type of radiation is identical in mass and charge to a helium nucleus?
A) positron B) proton
C) beta D) alpha
12. Which nuclear emission has the greatest mass?
A) β^- B) β^+ C) α D) γ
13. Which nuclear emission has no charge and no mass?
A) beta particle B) positron
C) gamma ray D) alpha particle
14. Which of the following particles has the *least* mass?
A) beta particle B) proton
C) alpha particle D) neutron
15. A mixture of emanations from radioactive atoms is passed through electrically charged plates, as shown in the diagram below.



The nuclear emanations 1, 2, and 3 are called, respectively,

- A) beta, gamma, and alpha
- B) alpha, beta, and gamma
- C) gamma, beta, and alpha
- D) gamma, alpha, and beta

16. What is the mass number of an alpha particle?
A) 1 B) 2 C) 0 D) 4
17. Which list of particles is in order of increasing mass?
A) alpha particle → electron → proton
B) electron → proton → alpha particle
C) proton → electron → alpha particle
D) proton → alpha particle → electron
18. Which list of nuclear emissions is arranged in order from the *least* penetrating power to the greatest penetrating power?
A) alpha particle, beta particle, gamma ray
B) beta particle, alpha particle, gamma ray
C) alpha particle, gamma ray, beta particle
D) gamma ray, beta particle, alpha particle
19. Which of these types of radiation has the greatest penetrating power?
A) gamma B) beta
C) alpha D) positron