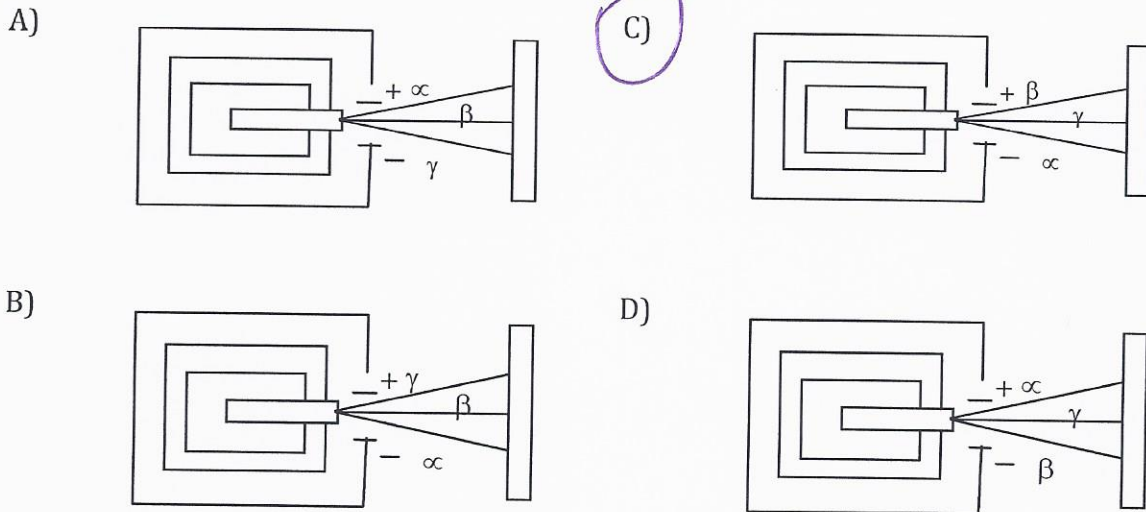
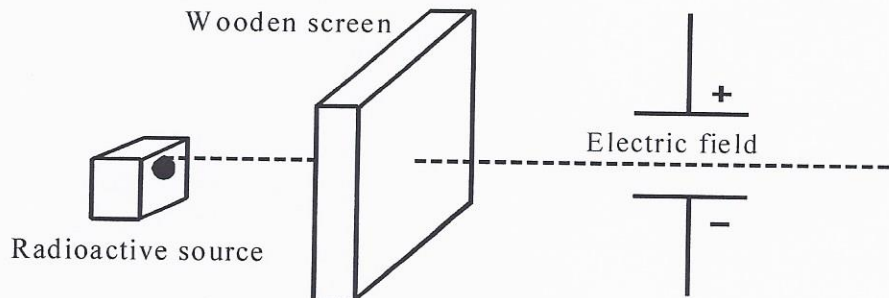


## Isotope and Radiation Worksheet

1. The following diagrams illustrate the paths of particles emitted from a radioactive source as they pass between charged plates. Which diagram shows the correct paths?



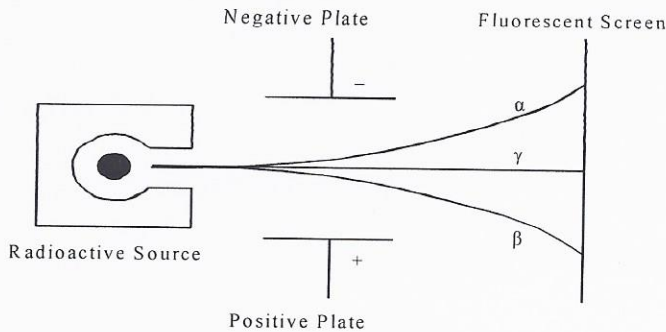
2. The apparatus illustrated below is used to study the behaviour of alpha, beta and gamma radiation.



The radiation that passed through the wooden screen was not deflected as it passed through the electric field. Which of the following types of radiation passed through the wooden screen?

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

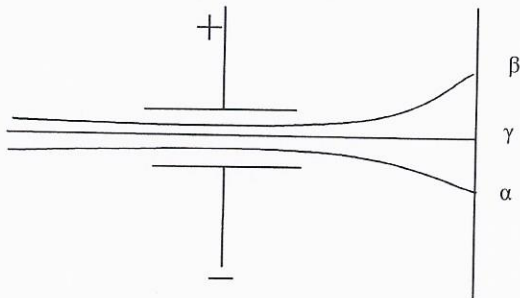
3. The results of an experiment dealing with radioactivity are illustrated below.



What can you conclude from this experiment?

- A) The atom consists of a nucleus and electrons.
- B) The alpha and beta radiation is electrically charged.
- C) The alpha and beta particles and the gamma rays have different masses.
- D) The alpha, beta and gamma radiation is able to penetrate matter.

4. The diagram below illustrates three types of radiation directed between two electrically charged plates toward a screen.



What can be concluded from the results?

- A) Only alpha radiation has an electric charge.
- B) Both alpha and beta radiation have electric charges.
- C) Only beta radiation has an electric charge.
- D) Alpha, beta, and gamma radiation have electric charges.

5. The following statements describe characteristics of alpha, beta, or gamma rays.

1. They are attracted by the negative plate of an electric field.
2. They are attracted by the positive plate of an electric field.
3. They are associated with electrons.
4. They are the weakest ray.

Which of the characteristics above are associated with alpha rays?

- A) 1 and 3
- B) 1 and 4
- C) 2 and 3
- D) 2 and 4

6. Radioactive substances emit three types of radiation : alpha, beta and gamma radiation. Scientists have observed that alpha radiation is attracted towards a negatively charged electrode and beta radiation is attracted towards a positive electrode. What do these observations permit us to conclude?
- A) Radioactive substances contain only radiation with a negative charge.  
 B) Radioactive substances contain only radiation with a positive charge.  
 C) Radioactive substances contain radiation with no charge.  
 D) Radioactive substances contain radiation charged positively and radiation charged negatively.

7. Food irradiation is a process that kills harmful microorganisms and prolongs the shelf life of the food. Isotopes like cobalt-60 are used. Since ionizing radiation must travel a certain distance and penetrate the food completely, which type of radiation would be the most appropriate for this application? Explain your answer.

*Gamma- must be able to pass metal container*

8. Natural silver is made up of two isotopes in almost equal proportions. Their atomic masses are 107 u and 109 u, respectively. What is the relative atomic mass of silver?

*108 u*

9. Boron, which has an atomic mass of 10.81 u, is a mixture of two isotopes, which occur in a ratio of 20 to 80 percent. The mass number of one of these isotopes is 11.
- a) What is the mass number of the other isotope? *10*
- b) Which of the two isotopes is more common? *11*

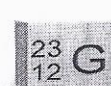
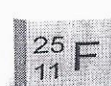
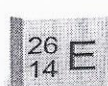
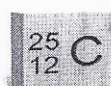
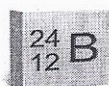
10. Neon is an element with the atomic number 10 and a relative atomic mass of 20.28 u. Neon has three natural isotopes:

- neon-20, with a relative atomic mass of approximately 20 u
- neon-21, with a relative atomic mass of approximately 21 u
- neon-22, with a relative atomic mass of approximately 22 u

Which of these three isotopes is most commonly found in nature?

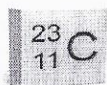
*Neon 20*

11. Among the elements below, which are isotopes of the same element? Explain your answer.



*B, C & G  
Same atomic #*

12. Which of these representations is impossible? Explain your answer.



*A*