DPP – 1   Radioactivity

1. State one difference between a chemical change and a nuclear change.

2. What do you understand by the following terms?

    (a) Nucleus,

    (b) Nucleons.

3. Compare the mass and charge of nucleons of different kinds.

4. What do you understand by the following terms?

    (a) Atomic number,

    (b) Mass number.

5. An element X has a symbol $_AX^Z$. What do A and Z stand for? What is the number of

    (a) electrons in element,

    (b) neutrons in the nucleus?

6. An element is represented by $_{92}U^{235}$. Calculate its

    (a) mass number,

    (b) atomic number,

    (c) number of electrons,

    (d) number of neutrons,

    (e) number of protons,

    (f) Do other isotopes of uranium have the same number of neutrons?

7. What are isotopes? Give two examples of isotopes.

8. What are isobars? Give two examples of isobars. Why do isotopes of an element have the same chemical properties?

9. What do you understand by the following terms?

    (a) Radioactive elements

    (b) Radioactivity

    (c) α – particles

    (d) β – particles

    (e) γ – radiations.

10. A radioactive substance is oxidised. What changes would you expect to take place in the nature of radioactivity? Give a reason for your answer.

11. Who discovered the phenomenon of radioactivity? Name four radioactive substances.

12. What are becquerel rays? State four properties of becquerel rays.

DPP – 2   Radioactivity

1. Diagram below shows a lead cube containing radioactive substance R. A magnetic field is applied perpendicular to the path of nuclear radiations, emitted by radioactive source when the radiations split into three beams X, Y and Z.
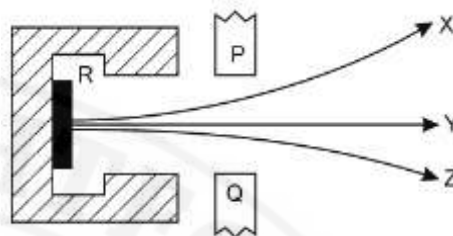
    (a) Identify X, Y and Z.

    (b) State the magnetic polarity at P and Q.

    (c) Which law helped you to identify the polarity?

2. What is an alpha particle? Name the gas formed from these particles.

3. What changes occur in the nucleus of an atom if it emits:

    (a) gamma radiations only?

    (b) beta radiations only?

    (c) alpha radiations only ?

4. What happens to the position of an element, relative to its original position in periodic table when it emits

    (a) γ-radiation,

    (b) β-particle,

    (c) α-particle?

5. State two differences between chemical change and nuclear change.

6. State four properties of **(i)** α -particles, **(ii)** β-particles, **(iii)** γ-radiations.

7. Compare the: **(a)** ionising power, **(b)** penetration power of α, β and γ-particles.

8. When does the nucleus of an atom tends to be radioactive?

9. Answer the following:

    (a) Name three types of radiations emitted by a radioactive substance.

    (b) Name the radiations which have charge.

    (c) Name the type of radiations which are most penetrating.

    (d) Name the type of radiations which travel with the speed of light.

10. How is it possible for an element to decay into another element of higher atomic number?

11. Is it possible for hydrogen atom isotope to emit alpha particle? Explain.

12. Radioactive isotope of sodium $_{11}Na^{24}$, changes to stable $_{12}Mg^{24}$. Which particle does it eject? Represent nuclear reaction in the form of equation.

13. How do infra-red and γ-rays differ in their properties?

14. State two differences and two similarities between X-rays and γ-rays.

15. A radioactive sample is kept in the centre of a large evacuated sphere. How safe will it be? What changes do you suggest for more safety?

16. A radioactive element $_ZX^A$ loses two successive β-particles, followed by an α-particle, such that the resulting nuclides is $_QY^P$ Find the values of P and Q.

17. An imaginary radioactive element $_{92}X^{235}$ decays to form X_1, X_2, X_3, X_4, X_5, and X_6 nuclei, by ejecting two β-particles, followed by α-particle and again two β- particles, followed by an α-particle. Represent the various nuclear changes in the form of an equation. State the mass number and atomic number of X_6. List the isotopes and isobars in the above nuclear equation.

18. Briefly describe Geiger counter.

19. What is background radiation? How can you detect background radiation?

20. How will you count the true rate of emission from a radioactive source by Geiger counter?

21. Why are the alpha particles not used in radiotherapy?

22. Why do we usually use isotopes emitting gamma radiation as radioactive tracers in medical science?

23. What are radio-isotopes? State one use of radio-isotopes.

24. Which radiation produces maximum biological damage? What precautions are necessary while handling the source of their radiation? State safety precautions in handling radioactive material.