PHYSICS

SpeedLabs
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An Innovative Learning Methodology by IITians.

Board – ICSE	Class – 10th	Topic – Radioactivity	Max. Marks – 40	Time – 1.5 Hrs.

1. Explain the following :   [5]

   (a) What do you understand by :

      (i) atomic number,

      (ii) atomic mass.

   (b) What are isotopes? Give one example.

   (c) Define the term radioactivity.

2. A radioactive source emits three types of radiation   [5]

   (i) Name the radiations which are charged.

   (ii) Name the radiations which have maximum penetrating power.

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

   (iv) Name the radiations which have largest mass.

   (v) Name the radiations consisting of same kind of particles as the beam of electrons.

3. Explain :   [3]

   (a) What kind of change takes place in the nucleus, when a β-particle is emitted?

   (b) What kind of change takes place in the nucleus, when an alpha particle is emitted.

   (c) What kind of change takes place in the nucleus, when gamma radiations are emitted.

4. The nucleus of radioactive sodium has atomic number 11 and mass number 24.   [6]

   (i) If the stable isotope of above mentioned nucleus has one neutron less, what is the mass number and atomic number of the isotope.

   (ii) If the radioactive isotope above emits a β-particle, what are the mass number and atomic number of new nucleus.

   (iii) Represent the change in (ii) by writing a nuclear equation.

5. Explain :   [6]

   (i) What are radioisotopes? State one use of a radioisotope.

   (ii) Why are the alpha particles not used in radiotherapy?

   (iii) State two safety precautions while handling the radioactive substance.

6. A radioactive element decays as follows: [3]

   $_aP^b - 2\alpha \longrightarrow _cQ^d \longrightarrow _eR^f + _{-1}e^0$

   What is the relation between a, b, e, & f?

7. State giving reasons if the following disintegration reactions are allowed or not [2]

 (i) $_zX^A \longrightarrow \ _{z-2}Y^A + \alpha$

 (ii) $_zX^A \longrightarrow \ _{z-1}P^A + \beta$

8. How is the radioactivity affected if a radioactive substance is oxidized? [2]

9. A radioactive element $_{88}X^{240}$ emits a few radiations to become $_{90}Y^{220}$ Calculate the number of alpha & beta particles emitted. [3]

10. What is formed when an α- particle gains [2]

 (i)   one electron

 (ii)   two electrons.

11. (i) What are beta rays and gamma rays? [3]

 (ii) Explain briefly what changes take place within the nuclei, when the beta particle is emitted by radioactive substance.