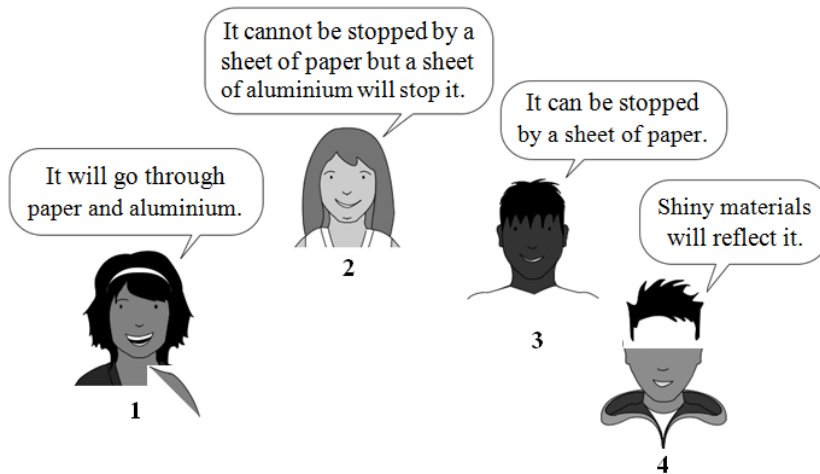


# Nuclear Radiations and Isotopes 4

**Q:1** Some students are talking about radiation



Match words, A, B, C and D, with the students' statements 1–4.

- A alpha
- B beta
- C gamma
- D visible light

**Q:2** A radioactive material gives out radiation all the time.

Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A alpha
- B beta
- C electron
- D gamma

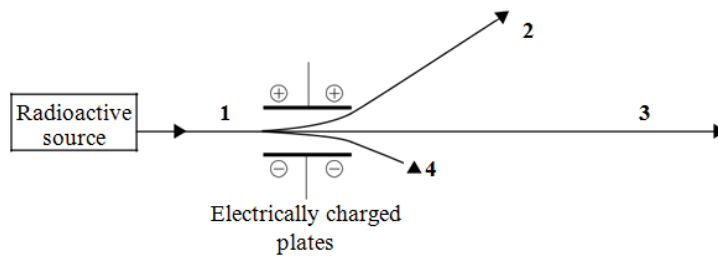
The radiation that is most penetrating is . . . 1 . . . .

The radiation that is stopped by a sheet of paper is . . . 2 . . . .

The radiation that passes through a sheet of paper but is stopped by aluminium foil is . . . 3 . . . .

A beta particle is an . . . 4 . . . .

**Q:3** A beam of radiation from a radioactive source is passed between two electrically charged plates. The paths taken by the radiation are shown in the diagram.



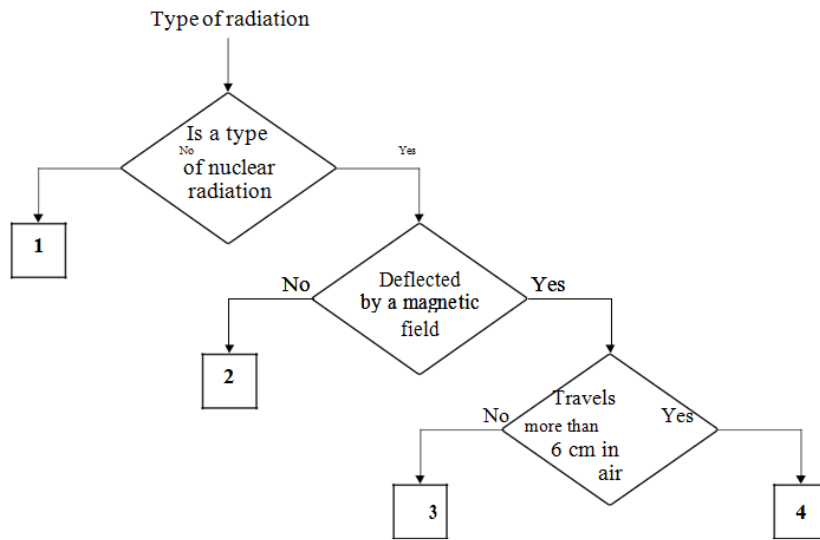
Match the types of radiation, A, B, C and D, with the paths 1– 4 in the diagram.

- A alpha particles
- B beta particles
- C gamma rays
- D alpha, beta and gamma radiation

**Q:4** This question is about types of radiation.

Match radiations, A, B, C and D, with the boxes 1– 4 on the flow diagram.

- A alpha
- B beta
- C gamma
- D X-rays



**Q:5** This question is about gamma radiation.

Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A bacteria
- B cells
- C isotopes
- D particles

Gamma radiation is emitted by the nuclei of radioactive . . . 1 . . . .

Gamma radiation can be used by doctors to kill cancer . . . 2 . . . .

Gamma radiation can be used to kill . . . 3 . . . that cause food to rot.

Unlike alpha and beta radiation, gamma radiation does not consist of . . . 4 . . . .

**Q:6** Radioactive isotopes have many uses.

The table gives the types of radiation emitted and the half-lives of four radioactive isotopes, A, B, C and D.

Isotope	Radiation emitted	Half-life
<b>A</b>	alpha	432 years
<b>B</b>	beta	29 years
<b>C</b>	gamma	6 hours
<b>D</b>	gamma	5 years

Match isotopes, A, B, C and D, with the most appropriate uses 1– 4 in the table below.

	Use
<b>1</b>	controlling the thickness of aluminium foil as it is produced
<b>2</b>	sterilising medical instruments used in an operating theatre
<b>3</b>	injecting into a patient as a medical tracer
<b>4</b>	used inside a smoke detector

**Q:7** This question is about nuclear radiation and electromagnetic radiation.

Match radiations, A, B, C and D, with the descriptions 1– 4 in the table.

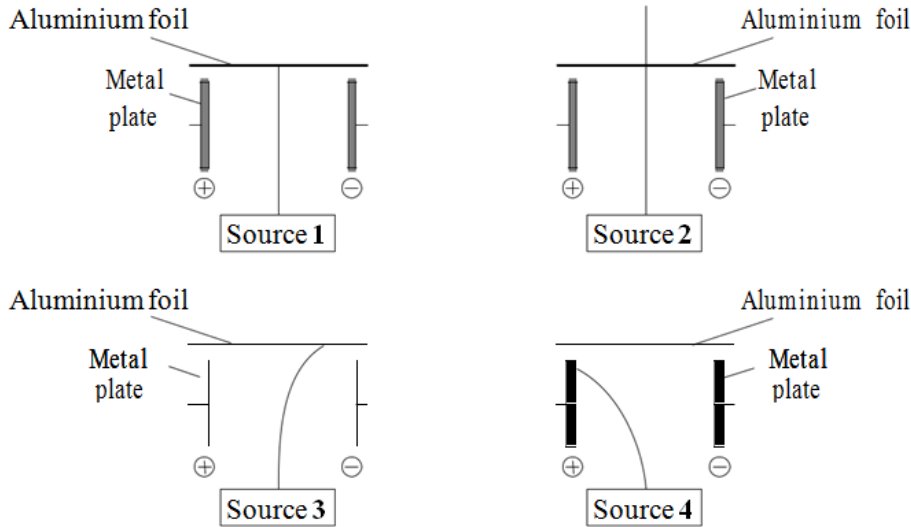
- A alpha
- B beta
- C gamma
- D X-ray

	Description
<b>1</b>	fast moving particle; can travel through a few metres of air before being absorbed
<b>2</b>	travels at the speed of light; emitted by radioactive nuclei
<b>3</b>	travels at the speed of light; not emitted by radioactive nuclei
<b>4</b>	a charged particle; can travel through only a few centimetres of air before being absorbed

**Q:8** Radiation from four sources, 1, 2, 3 and 4, is directed into an electric field between two metal plates.

There is a sheet of aluminium foil after the gap between the metal plates.

Light waves are not deflected in electric fields.



Match the types of radiation, A, B, C and D, with the sources 1–4.

- A alpha radiation
- B beta radiation
- C gamma radiation
- D visible light

**Q:9** This question is about nuclear and electromagnetic radiation.

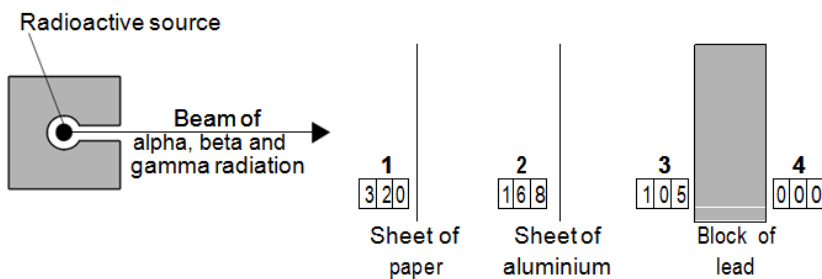
Match words, A, B, C and D, with the statements 1– 4 in the table.

- A alpha particle
- B beta particle
- C gamma ray
- D X-rays

1	an electromagnetic wave emitted from the nucleus of an atom
2	an electron from the nucleus of an atom
3	absorbed by bone but not absorbed by soft tissue
4	very good at ionising the atoms of a gas

**Q:10** A radioactive source gives out a beam of alpha, beta and gamma radiation.

The diagram shows three different absorbers in the path of the beam. The diagram also shows the readings, in counts per second, on radiation detectors at positions 1, 2, 3 and 4.



Match the radiation detected, A, B, C and D, with the positions 1– 4 in the diagram.

- A gamma only
- B gamma and beta only
- C gamma, beta and alpha
- D no radiation

**TOTAL MARKS=40**