

# Questions about the structure of an atom

## Question 1

Which one of the following is emitted by some radioactive nuclei and is also classed as an electromagnetic wave? A. Infrared radiation. B. Gamma radiation. C. Alpha radiation. D. Neutron radiation. E. Ultraviolet radiation.

# Questions about absorption, penetration and ionisation

## Question 2

An ionised material differs from one that isn't ionised in that: A. It has had electrons knocked out of its atoms. B. It contains radioactive atoms. C. It is a gas as opposed to a solid. D. It emits beta radiation. E. It has a shorter half-life.

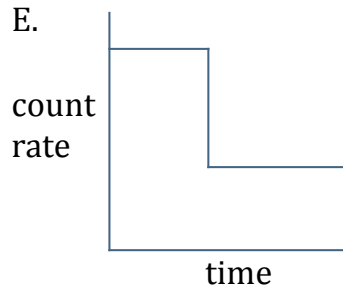
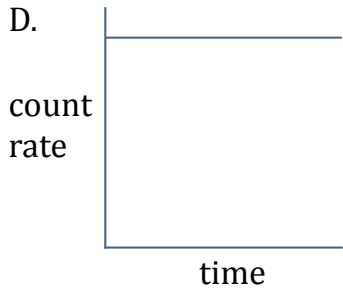
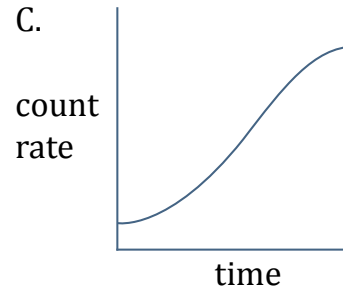
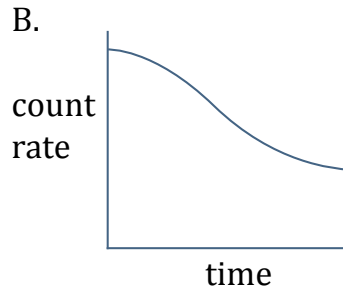
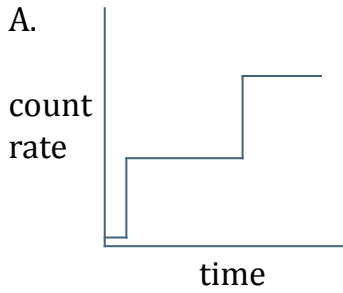
## Question 3

A student has been given an old watch. It has radioactive paint on its dial. He puts the watch close to a radiation detector and then puts sheets of different materials between the watch and the detector. A sheet of paper makes little difference to the count rate. A sheet of lead, 1 mm thick, reduces the count rate considerably. What is the watch emitting? A. alpha radiation B. beta radiation C. microwaves D. neutrons E. X-rays

# Two more about absorption, penetration and ionisation

## Question 4

A radioactive beta source is placed at the top of a glass tank full of water and a radiation detector is placed at the bottom. A plug is removed from the bottom of the glass box and the water drained out. If the count rate is continually recorded during this process, which sketch graph below best represents the count rate against time?



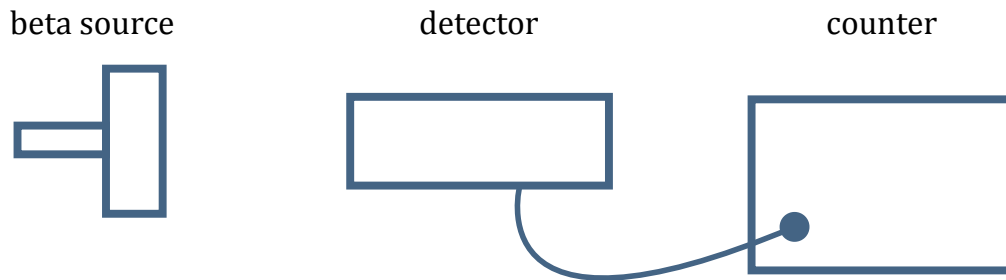
## Question 5

Radioactive xenon-133 is a gas used to check for blockages inside the lungs. It is put in the lungs and a radiation detector outside the body takes readings. Which statement best describes why it is important in this situation that the source gives off gamma and not alpha radiation? A. Gamma radiation is absorbed more easily than alpha radiation. B. Gamma radiation is more densely ionising than alpha radiation. C. Gamma radiation is unaffected by an electric field unlike alpha radiation. D. Gamma radiation is more penetrating than alpha radiation. E. Gamma radiation is unaffected by a magnetic field unlike alpha radiation.

# Two more about absorption, penetration and ionisation

## Question 6

The drawing shows a source of beta radiation about 20 cm from a radiation detector and electronic counter.



What is the best action to take to increase a 10 s count on the electronic counter? A. Move the source further from the detector. B. Place a mirror behind the beta source. C. Put a thin sheet of metal between the source and the detector. D. Reduce the amount of air between the source and the detector. E. Wait for a time equal to the half-life of the source.

## Question 7

Ionisation paths are caused by alpha radiation passing through air. If a source producing alpha radiation at the same rate but with less energy replaces the original, what description will best describe the new tracks? A. No change. B. Similar number but longer. C. Similar number but shorter. D. Less in number and shorter. E. More in number and shorter.

# A final question about absorption, penetration and ionisation

## Question 8

Which description best describes what happens inside a sheet of metal when it stops beta radiation? A. The beta radiation energy is trapped in the nuclei of the metal atoms. B. The beta radiation energy is lost by knocking electrons out of metal atoms. C. The beta radiation energy cancels out with the metal protons. D. The beta radiation energy sticks to the metal atoms. E. The beta radiation energy evaporates the metal atoms.

# Questions about irradiation and contamination

## Question 9

In step 1 an apple is exposed to radiation from a radioactive source. In step 2 the source is then removed to leave the apple on its own. Some students are talking about this and make the following comments: 1. In step 1 the apple has been contaminated. 2. In step 2 the apple will not be a source of radiation. 3. In step 2 the apple will be a radioactive source.

Which of the suggestions are correct? A. 3 only B. 2 only C. 1 & 3 D. 1 only E. 1, 2 and 3