2 This question is about radioactivity.

(a) The nucleus of an atom of carbon has 6 protons and 8 neutrons.

Which row of the table shows the nucleus of an atom that is a different isotope of carbon?

(1)

		Number of protons	Number of neutrons
☒	**A**	6	6
☒	**B**	6	8
☒	**C**	8	6
☒	**D**	8	8

(b) Which type of radiation is a high-energy electron?

(1)

☒ **A** alpha

☒ **B** beta

☒ **C** gamma

☒ **D** neutron

(c) A nucleus emits radiation. This causes the mass number to decrease by one. The atomic number stays the same.

Which type of radiation does the nucleus emit?

(1)

☒ **A** alpha

☒ **B** beta

☒ **C** gamma

☒ **D** neutron

(d) The nucleus of an isotope of uranium can be represented using this symbol.

$$^{238}_{92}U$$

The nucleus forms part of a positively charged ion.

How many electrons could be in this ion?

(1)

- ☒ **A** 90
- ☒ **B** 92
- ☒ **C** 146
- ☒ **D** 238

(e) A radioactive isotope has an initial activity of 400 Bq.

The half-life of the isotope is 8 hours.

What is the activity of the isotope after 16 hours?

(1)

- ☒ **A** 25 Bq
- ☒ **B** 50 Bq
- ☒ **C** 100 Bq
- ☒ **D** 200 Bq

(Total for Question 2 = 5 marks)