

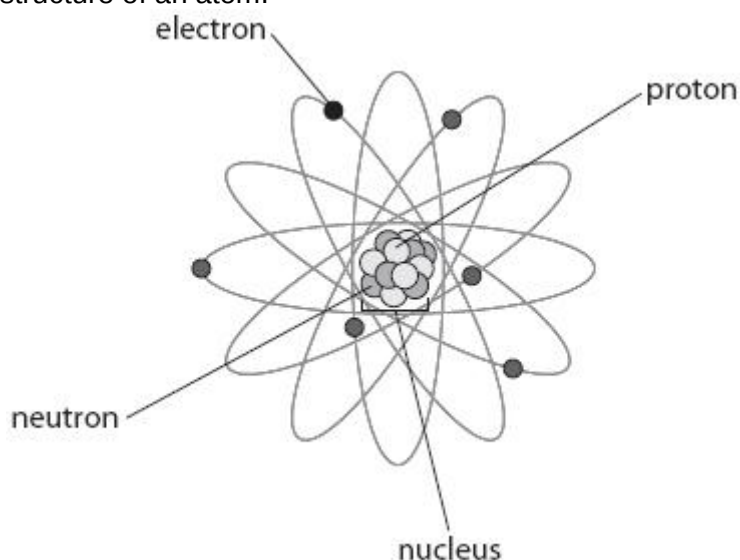
Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

The diagram shows the structure of an atom.



- (a) (i) Complete the sentence by putting a cross (☐) in the box next to your answer.
The size of the charge on each electron is

(1)

- ☐ A a third of the charge on the proton
- ☐ B half the charge on the proton
- ☐ C the same as the charge on the proton
- ☐ D twice the charge on the proton

- (ii) Complete the sentence by putting a cross (☐) in the box next to your answer.

The atomic number of a neutral atom is always the same as the number of

(1)

- ☐ A electrons
- ☐ B electrons and neutrons
- ☐ C protons and neutrons
- ☐ D neutrons

- (b) The element radium has a radioactive isotope, radium-226.

82	84	86	90	222	224	228	230
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This can be written as

This radioactive isotope emits alpha particles.

The alpha particle has a mass number of 4 and contains two protons.

Using the numbers in the box complete the following sentences.

82	84	86	90	222	224	228	230
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(i) When an alpha particle is emitted by mass number becomes the

(1)

82	84	86	90	222	224	228	230
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(ii) When an alpha particle is emitted by atomic number becomes the

(1)

(c) Describe how the emissions from radioactive substances can be dangerous to living things.

(2)

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(d) Explain **one** precaution that is taken in hospitals to limit the risks of exposure to radiation.

(2)

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.....

(Total for Question = 8 marks)

Q2.

The mass of a proton is 1.6726×10^{-27} kg.

The mass of an electron is 9.1094×10^{-31} kg.

Calculate how many times the mass of a proton is greater than the mass of an electron.

Give your answer to two significant figures.

(3)

..... times

(Total for question = 3 marks)

Q3.

Iodine-131 is a radioactive isotope with a half-life of 8 days.

The activity of a sample of iodine-131 is 480 Bq.

Calculate the activity of the sample after 16 days.

(2)

activity = Bq

(Total for question = 2 marks)

Q4.

A sample of a radioactive isotope has a mass of 520 g.

The half-life of the radioactive isotope is 18 days.

(i) Calculate the mass of the original radioactive isotope remaining after 18 days.

(1)

mass after 18 days g

(ii) Calculate the mass of the original radioactive isotope remaining after 54 days.

(2)

mass after 54 days g

(Total for question = 3 marks)

Q5.

Both U-235 and oil can be used as energy sources for generating electricity.

1 kg of natural uranium can result in the generation of 45 000 units of electricity.

1 kg of oil can result in the generation of 5.0 units of electricity.

Calculate the mass of oil needed to generate the same amount of electricity as 1kg of natural uranium.

(2)

mass of oil = kg

(Total for question = 2 marks)