Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 6_Radioactivity

Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

Nuclear fusion provides the energy source for stars including the Sun.

Describe what happens during nuclear fusion.

(3)

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(Total for question = 3 marks)

Q2.

This question is about nuclear reactions.

Nuclear fusion is a nuclear reaction that takes place in the Sun.

Describe what happens during a nuclear fusion reaction.

(2)

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(Total for question = 2 marks)

Q3.

Figure 8 shows two types of force that act in the Sun.

One type of force acts inwards, towards the centre of the Sun.

The other type of force acts outwards, away from the centre of the Sun.

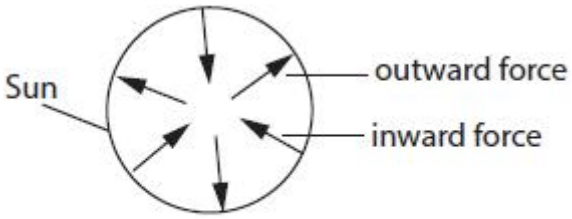

Figure 8

Nuclear fusion reactions take place in the Sun.

Describe what happens in a nuclear fusion reaction.

(2)

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(Total for question = 2 marks)

Q4.

Carbon-14 is radioactive and has a half-life of 5 700 years.

The number of radioactive carbon-14 atoms in a very old piece of wood is found to have decreased from 1 000 000 to 125 000.

Determine the age of the piece of wood.

(2)

age of wood = ... years

(Total for question = 2 marks)

Q5.

(i) X-rays can be used in diagnosis and treatment from outside the body. Some x-rays are absorbed by bone as they travel through the body.

Figure 4 shows how the intensity of the x-ray beam gets less as the x-rays travel further through the bone.

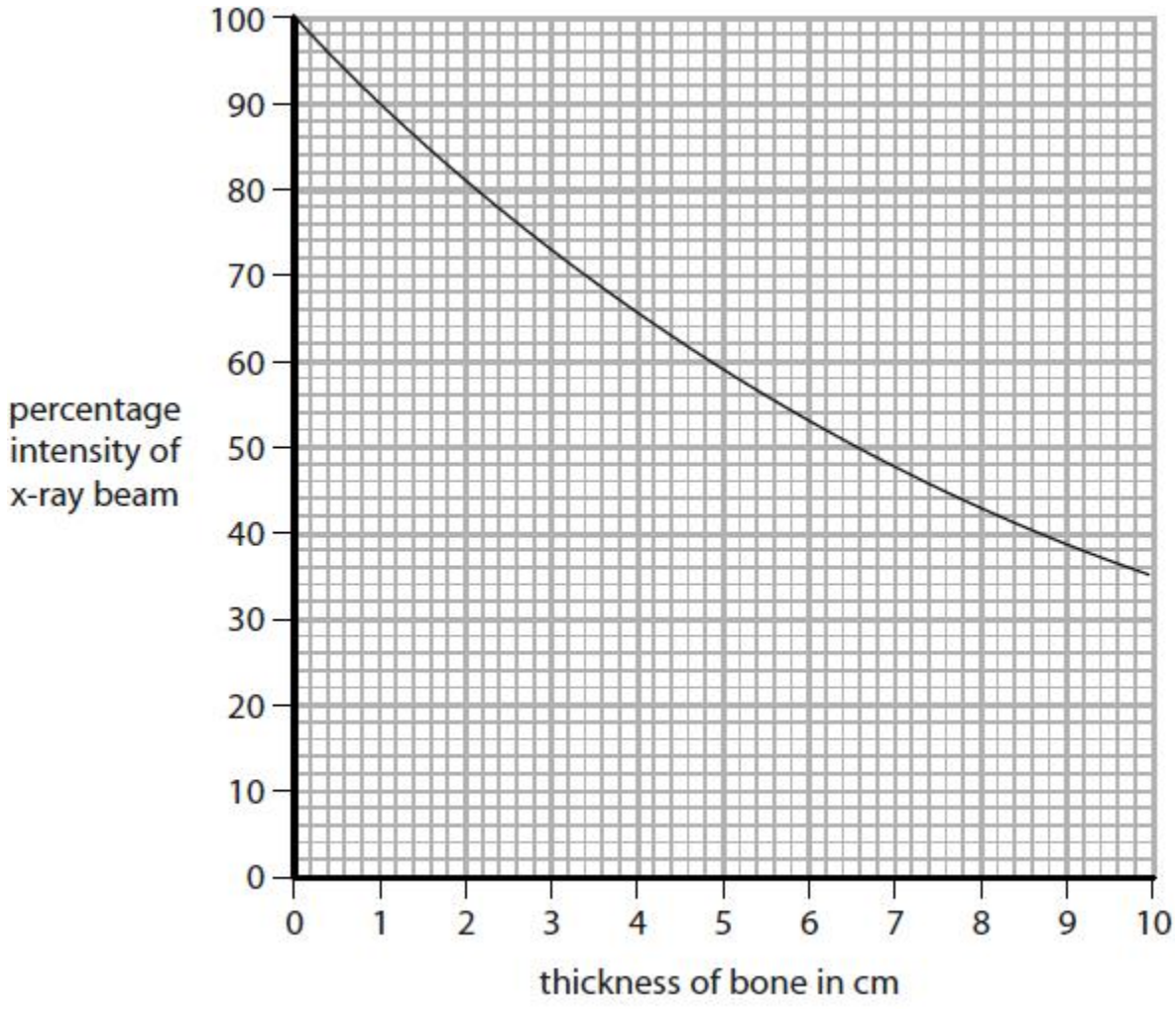

Figure 4

Use the graph to determine the thickness of bone that will reduce the percentage intensity of the x-ray beam by half.

(2)

thickness = ... cm

(ii) Radioactive isotopes may be placed inside the body for treatment.
The energy absorbed by tissue in the body needs to be known.

The number of joules of energy absorbed by each kilogram of tissue is measured in one of the units shown.

This unit is

(1)

☒ **A** kg/W

- ☒ **B** J/kg
- ☒ **C** kg/J
- ☒ **D** W/kg

(Total for question = 3 marks)

Q6.

Figure 8 shows a helium nucleus.

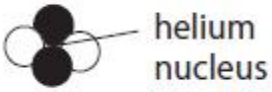

Figure 8

(i) Describe the difference between a fusion reaction and a fission reaction.

(2)

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(ii) Nuclear fusion does not happen at low temperatures because of electrostatic repulsion between

(1)

- ☒ **A** beta particles
- ☒ **B** electrons
- ☒ **C** neutrons
- ☒ **D** protons

(Total for question = 3 marks)

Q7.

Beryllium-9 is a stable isotope of beryllium.

(a) (i) State the meaning of the term **stable.**

(1)

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(ii) Beryllium-9 has an atomic number of 4 and a mass number of 9.

A nucleus of this isotope can be described using this symbol.

$$^{9}_{4}\mathrm{Be}$$

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

The number of neutrons in this nucleus is

(1)

A 4

B 5

C 9

D 13

(iii) Which one of these symbols describes the nucleus of a different isotope of beryllium?

Put a cross (☒) in the box next to your answer.

(1)

$^{8}_{4}\mathrm{Be}$ ☐ **A**

$^{8}_{5}\mathrm{Be}$ ☐ **B**

$^{9}_{4}\mathrm{B}$ ☐ **C**

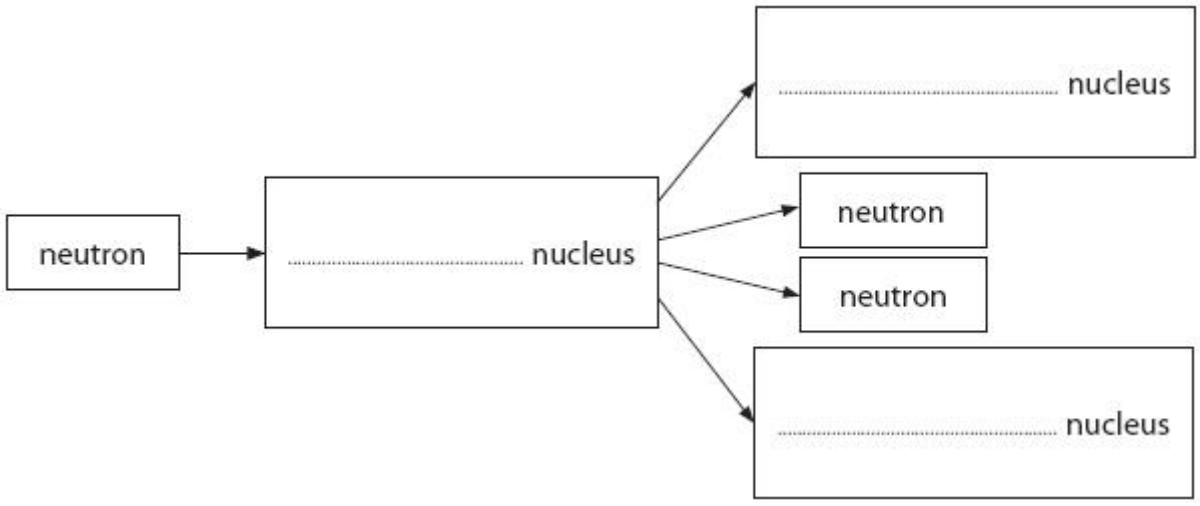
$^{9}_{5}\mathrm{Be}$ ☐ **D**

(b) A beryllium-9 nucleus absorbs a neutron.

After a short time the new nucleus splits into two neutrons and two alpha particles.

(i) Complete the flow chart for this reaction.

(2)



(ii) Compare this nuclear reaction with the fission of a uranium nucleus.

(3)

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(iii) A fission reaction can be the start of a chain reaction.

Describe what needs to happen next to produce a chain reaction.

(2)

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(Total for Question = 10 marks)