

Particles

Question Paper

Level	GCSE
Subject	Physics
Exam Board	Edexcel IGCSE
Module	Double Award (Paper 1P)
Topic	Radioactivity & Particles
Sub-Topic	Particles
Booklet	Question Paper

Time Allowed: 52 minutes

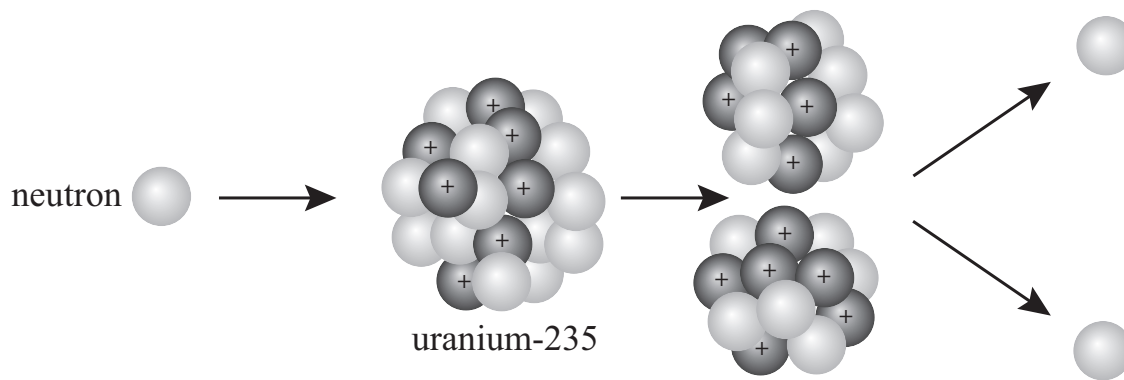
Score: /43

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

1. The diagram shows a neutron colliding with a nucleus of uranium-235, producing a number of products.



(a) Name the process shown in the diagram.

(1)

(b) Explain how the process shown in the diagram can lead to a chain reaction.

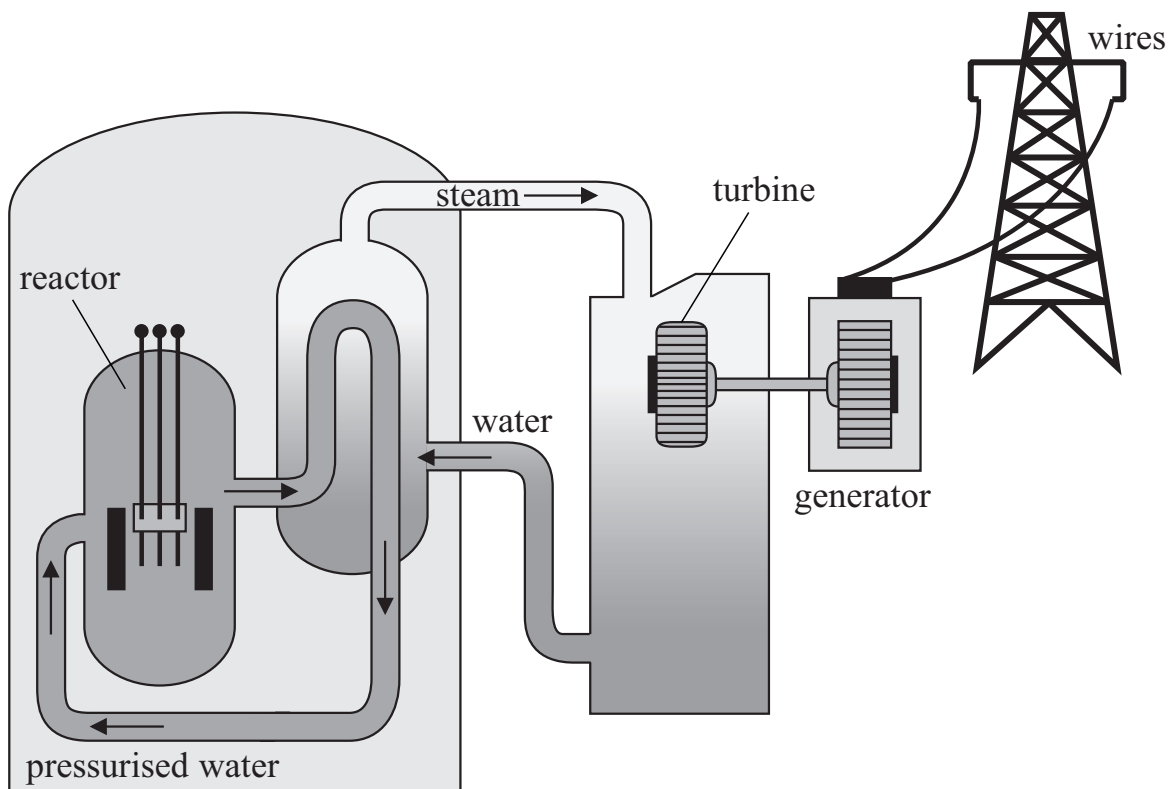
(3)

(c) This process releases energy.

Explain the form that this energy takes.

(2)

(d) The energy released in this process can be used in a nuclear power station.



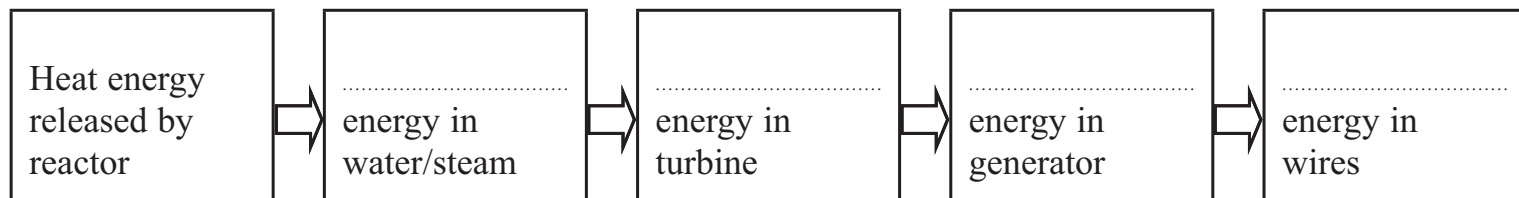
(i) The pressurised water acts as a coolant. It also acts as a moderator.

What is the purpose of a **moderator**?

(1)

(ii) Complete the chart below to show the main useful energy transfers in a nuclear power station.

(4)



(Total for Question 1 = 11 marks)

2. The table shows information about three isotopes of uranium.

Isotope	Proton number	Neutron number	Half-life	Amount in natural uranium
Uranium-234	92	142	0.0002 billion years	0.005%
Uranium-235		143	0.7 billion years	0.7%
Uranium-238	92		4.5 billion years	99%

(a) (i) Complete the table by filling in the missing numbers.

(2)

(ii) Explain what is meant by the term **half-life**.

(2)

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(iii) Suggest why uranium-238 is the most common isotope of uranium.

(1)

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(b) Nuclear power stations use a uranium isotope as fuel.

What are the products of the fission of uranium nuclei?

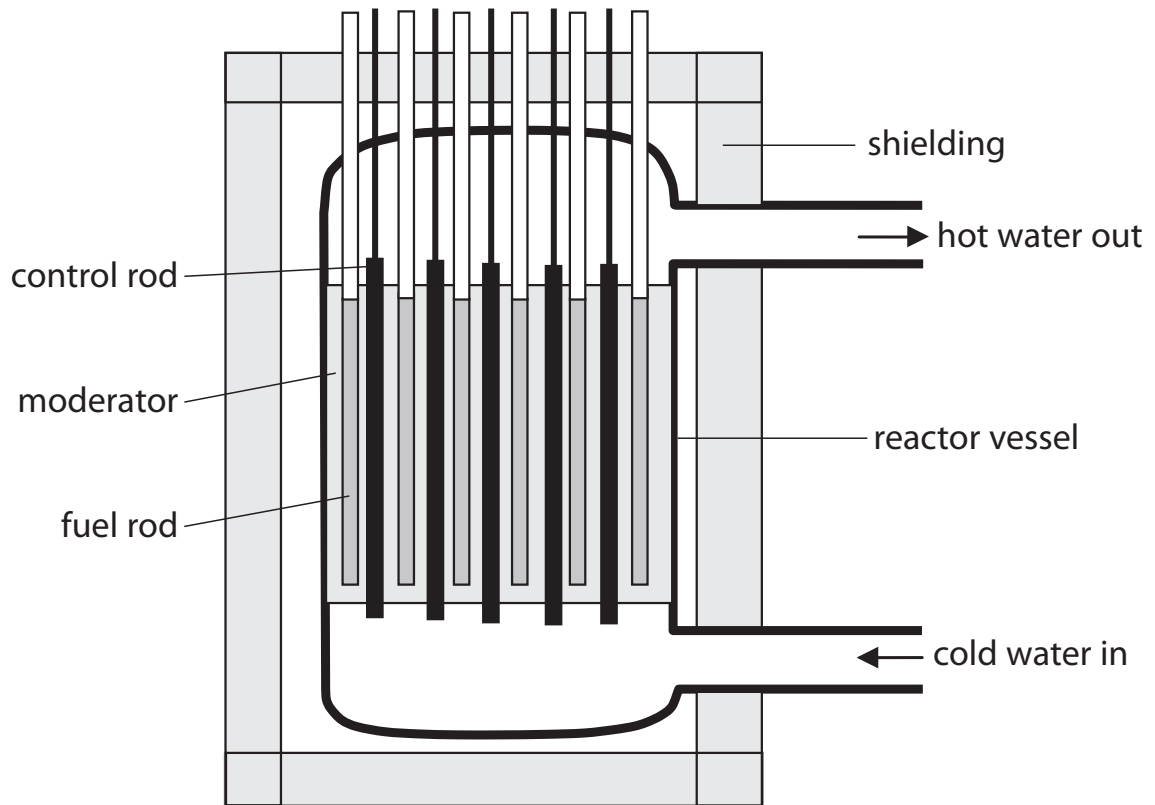
(3)

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(c) The diagram shows the reactor in a nuclear power station.



(i) What is the purpose of the moderator?

(1)

(ii) Describe what happens in the reactor when a control rod is removed.

(2)

(b) State the form of energy that is released during fission.

(1)

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(c) How does the shielding improve safety?

(1)

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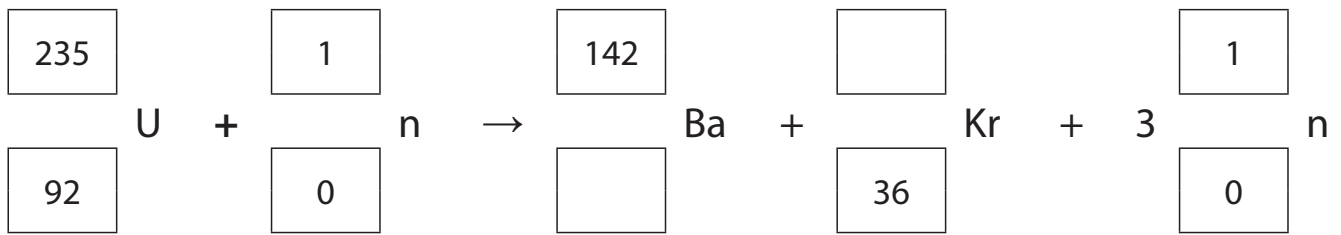
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(Total for Question 3 = 7 marks)

4. In a nuclear reactor, a uranium-235 nucleus absorbs a neutron and fission occurs.

(a) Complete the equation below that shows a typical fission reaction.

(2)



(b) Explain how nuclear fission can lead to a chain reaction.

(3)

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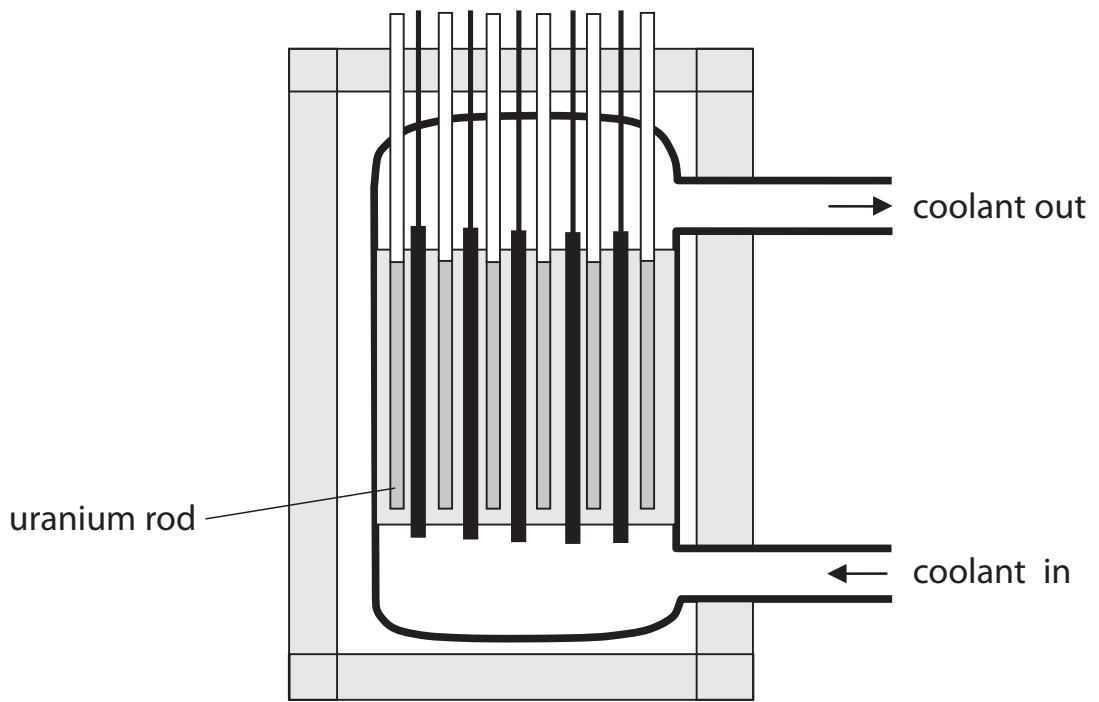
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(c) The diagram shows a nuclear reactor.



(i) On the diagram, label the control rods and the shielding.

(2)

(ii) Explain why the shielding is needed.

(2)

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(Total for Question 4 = 9 marks)