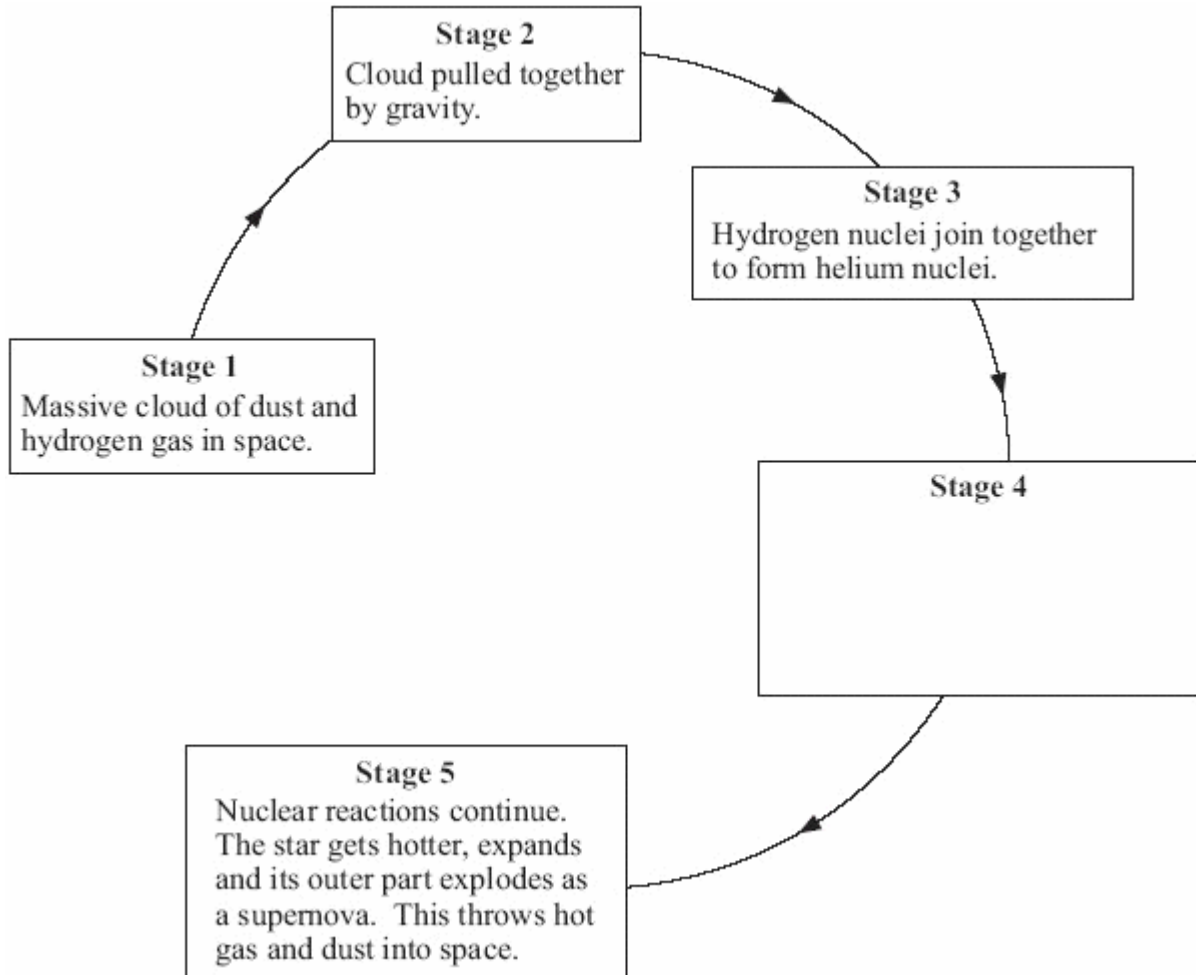


Nuclear fusion

1. The diagram shows part of the life cycle of a star which is much bigger than the Sun.



(a) (i) What is the relationship between the masses of the dust and gas in the cloud in **Stage 2** and the force of gravity between them?

.....

(1)

(ii) What is the relationship between the distance apart of the dust and gas in the cloud in **Stage 2** and the force of gravity between them?

.....

(1)

- (b) In **Stage 3** the star remains stable for millions of years.
Explain why.

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.....

(2)

- (c) What happens in **Stage 4**?

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(2)

(Total 6 marks)

2. Read this statement from a website.

Immediately after the 'big bang', at the start of the Universe, there were only atoms of the element hydrogen (H).
Now the Universe contains atoms of over one hundred elements.

- (a) Explain how atoms of the element helium (He) are formed in a star.

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(2)

- (b) Explain how atoms of very heavy elements, such as gold (Au), were formed.

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(2)

Unit P2, P2.6.2

- (c) Explain how, and when, atoms of different elements may be distributed throughout the Universe.

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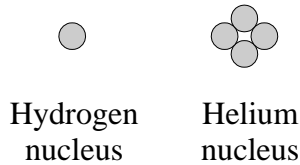
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(2)
(Total 6 marks)

3. At the very high temperatures in the sun, hydrogen is converted into helium. It takes four hydrogen nuclei to produce one helium nucleus.

The table shows the relative masses of hydrogen and helium nuclei.



Nucleus	Relative Mass
hydrogen	1.007825
helium	4.0037

- (a) Use these figures to calculate what happens to the mass of the sun as hydrogen is converted to helium.

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(3)

- (b) Use your answer to part (a) to explain how the sun has been able to radiate huge amounts of energy for billions of years.

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(2)
(Total 5 marks)