

- | | | |
|----|-----------|---|
| 1. | giant | 1 |
| | supernova | 1 |
| | neutron | 1 |

[3]

- | | | |
|----|---------------------------|---|
| 2. | (a) converted into helium | 1 |
|----|---------------------------|---|

accept helium created
accept converted into heavier elements
accept used up in nuclear fusion / to produce energy
do not accept any reference to burning

- | | | |
|-----|---|---|
| (b) | turns / expands into a <u>red giant</u> | 1 |
|-----|---|---|

contradictions negate mark

- | | |
|-------------------------------|---|
| contracts and explodes | 1 |
|-------------------------------|---|

or

becomes a supernova

- | | |
|--|---|
| may form a (dense) <u>neutron star</u> | 1 |
|--|---|

or

(if enough mass shrinks to) form a black hole

accept forms a neutron star and (then) a black hole

- | | |
|---|---|
| Quality of written communication | 1 |
|---|---|

correct points must be in sequence

- | | | |
|---------|-----------|---|
| (c) (i) | supernova | 1 |
|---------|-----------|---|

or

remains of an earlier star

ignore super nebula

- | | | |
|------|---------|---|
| (ii) | younger | 1 |
|------|---------|---|

or

not formed at the time of the Big Bang

[7]

3. Quality of Written Communication

The answer to this part of the question requires ideas in good English, in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the marking scheme.

max 2 if ideas not well expressed

- (a) the Sun is subject to two **balancing** forces 1
or 2 forces in equilibrium
 (the forces are) **gravity** making it contract 1
accept:
inward force due to gravity
and a force due to energy making it expand 1
or outward force due to energy
accept:
*force due temperature **or** heat **or** radiation pressure*

Quality of Written Communication

The answer to this part of the question requires continuous prose. Quality of written communication should be considered in crediting points in the marking scheme. In order to gain credit, answers must be expressed in clear scientific terms.

max. 2 if ideas not well expressed

- (b) any **three** from:
allow points in either section
- (i) hydrogen/fuel used up 3
 the star will expand
 and become a red giant
 it will contract under gravity
 become a white dwarf
- (ii) any **three** from: 3
 it may explode
 and become a supernova
 throwing dust and gas into space
 leaving a dense neutron star/black hole

[9]

4. (a) gravitational attraction 1
for 1 mark
- (b) gravitational (in); 2
 high internal temperature generates force (out)
for 1 mark each

- (c) star expands; 4
to form red giant;
then contracts/collapses;
to form white dwarf/neutron star/black hole/pulsar;
they may explode/become supernova

any four for 1 mark each

- (d) engulfed by red giant/blown up by star/ 1
hit by debris from star;
sucked into black hole

for 1 mark

[8]