WJEC 2014 Online Exam Review

GCSE Physics 3 Foundation Tier 4503-01

All Candidates' performance across questions

Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1	1006	2.1	0.9	3	70.1	99.7
2	1008	5.7	1.6	8	70.8	99.9
3	1007	2.1	1.1	5	42.1	99.8
4	1004	1.3	1.1	5	25.2	99.5
5	1008	5.1	1.4	8	63.5	99.9
6	1005	3.7	1.7	7	52.7	99.6
7	1009	8	1.8	12	66.4	100
8	993	1.9	1.3	6	32.4	98.4
9	961	2	1.5	6	33.7	95.2

2

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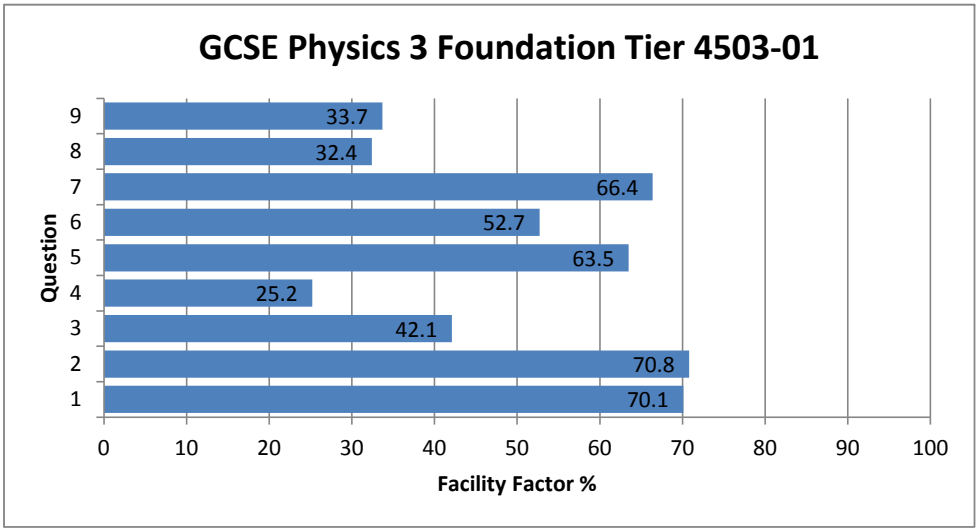

Examiner only

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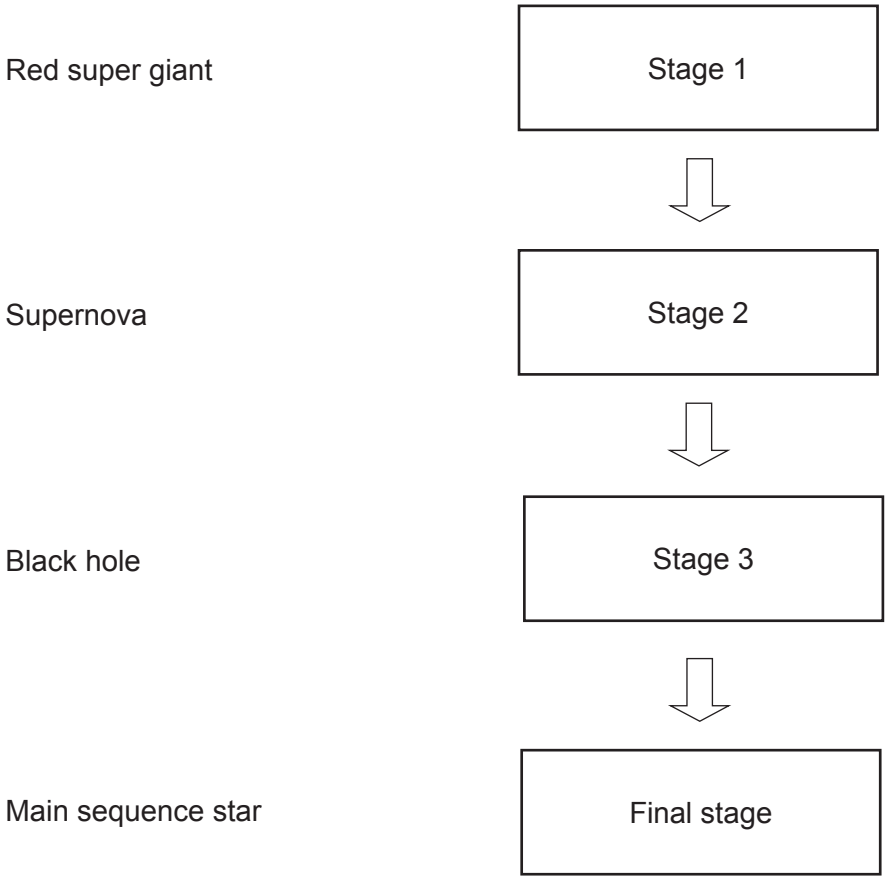
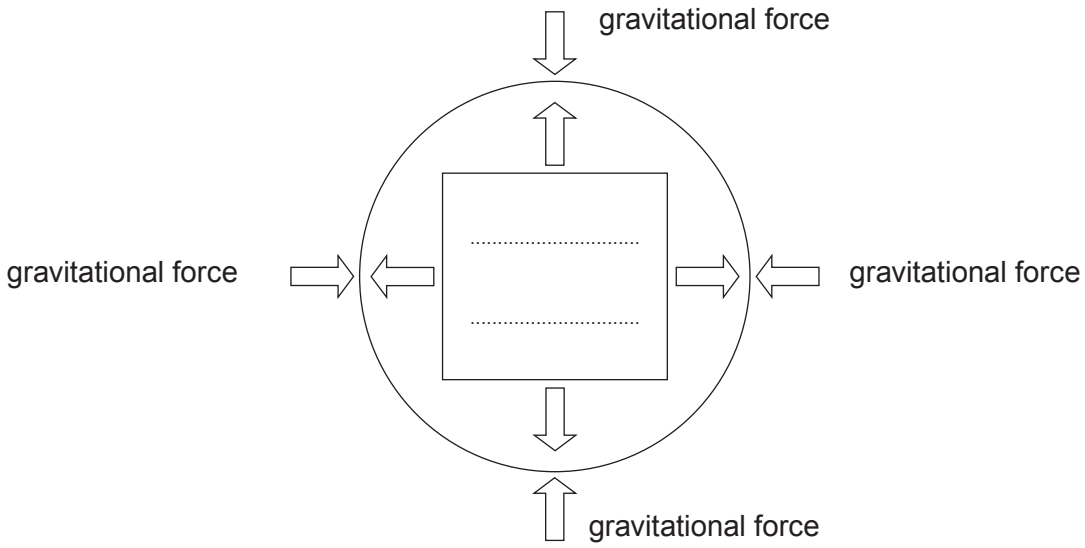


(b) The following diagram shows the major forces acting on a main sequence star.
Label the outward acting force. [1]



Examiner only

(c) Choose words from the box below to complete the sentences that follow. Each word may be used **once, more than once or not at all**. [4]

uranium	iron	fission	fusion	helium

Main sequence stars generate energy by ..... of hydrogen into ..... . Heavier elements are created when stars much larger than our Sun collapse. These heavier elements include ..... which we use in our fission reactors on Earth. We only have elements heavier than ..... because they are created during a supernova explosion.

8

Turn over.

Examiner only

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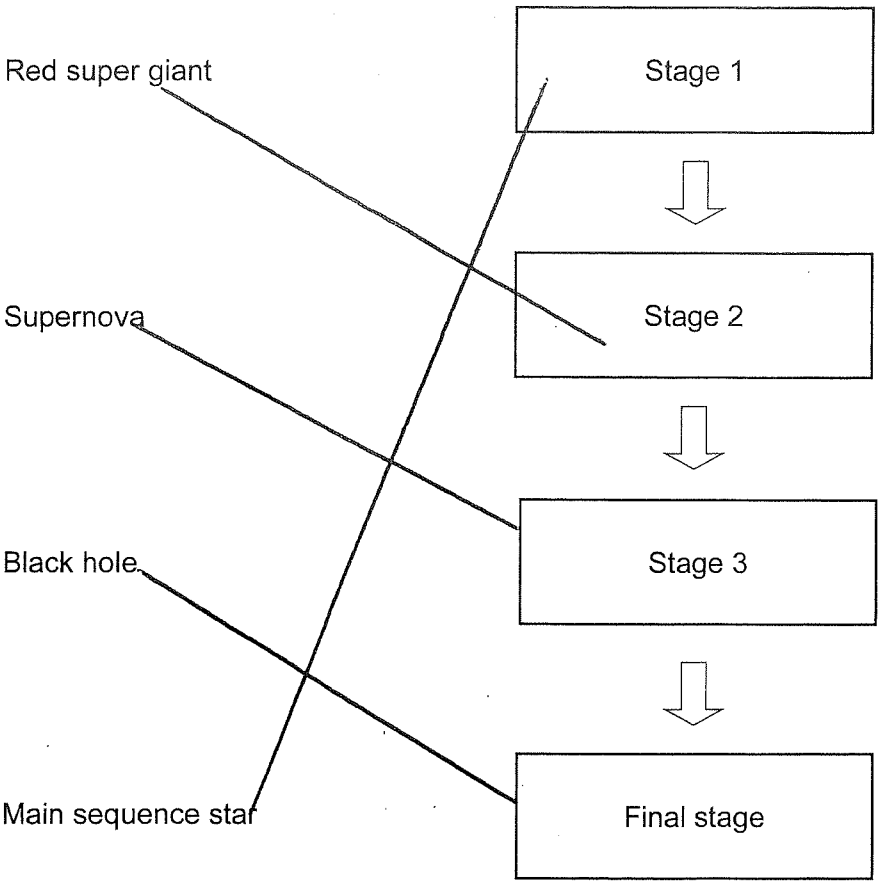

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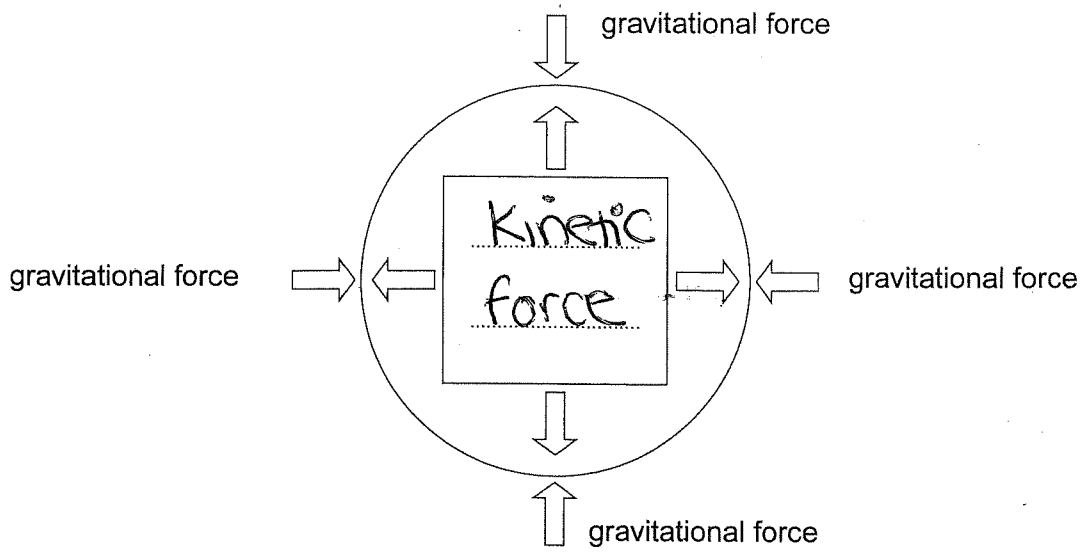

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~~uranium~~	~~iron~~	fission	~~fusion~~	~~helium~~

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8

4503 010005

Examiner only

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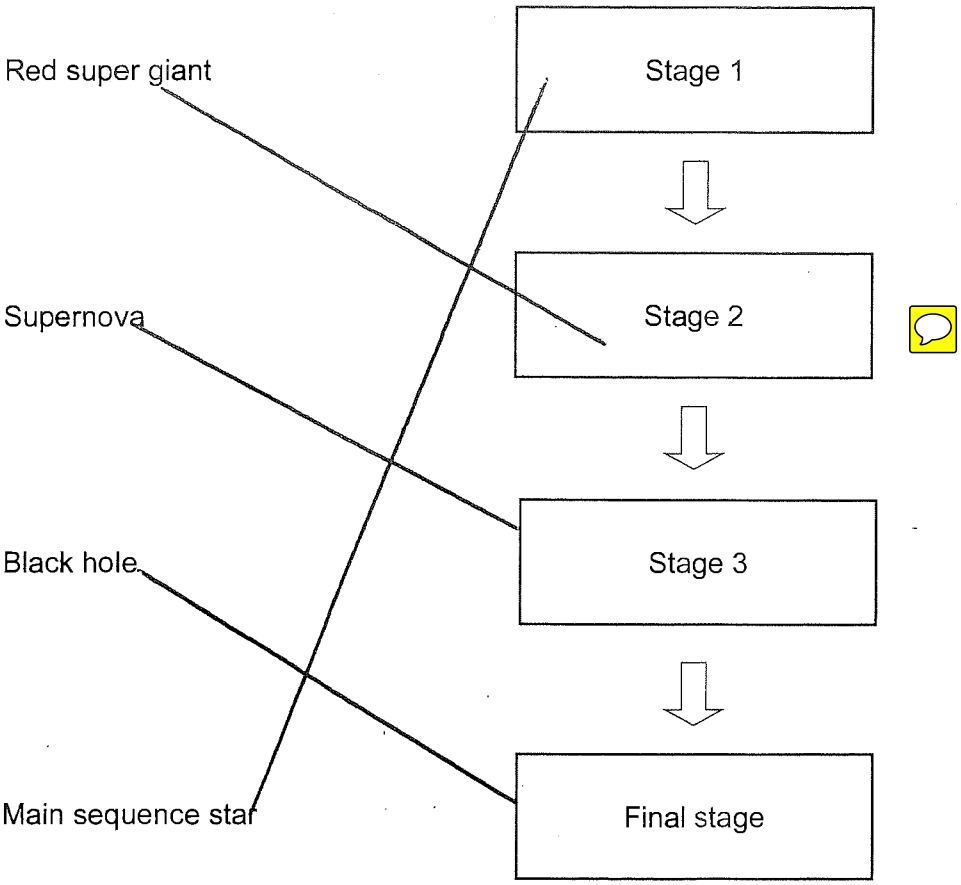

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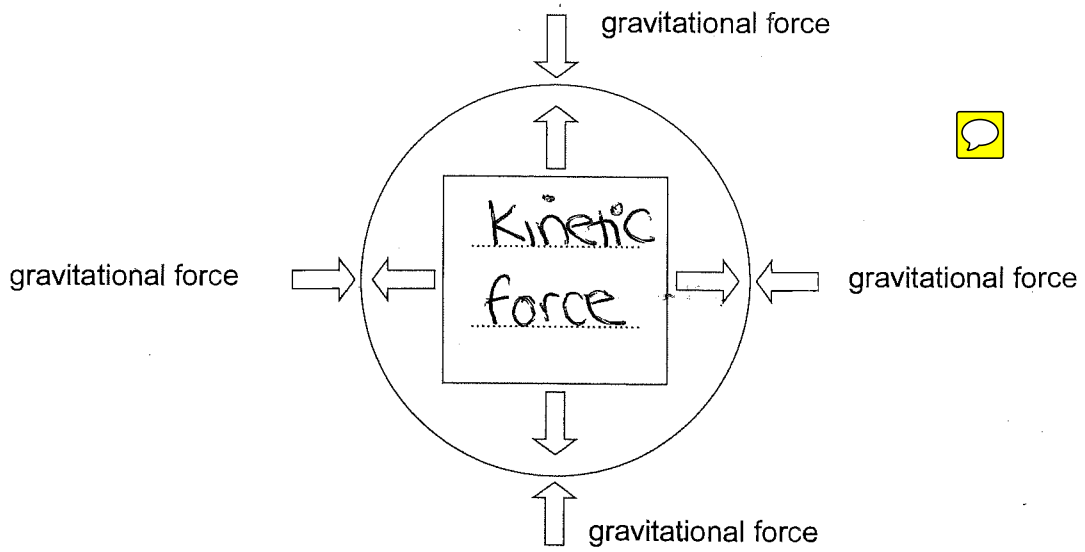

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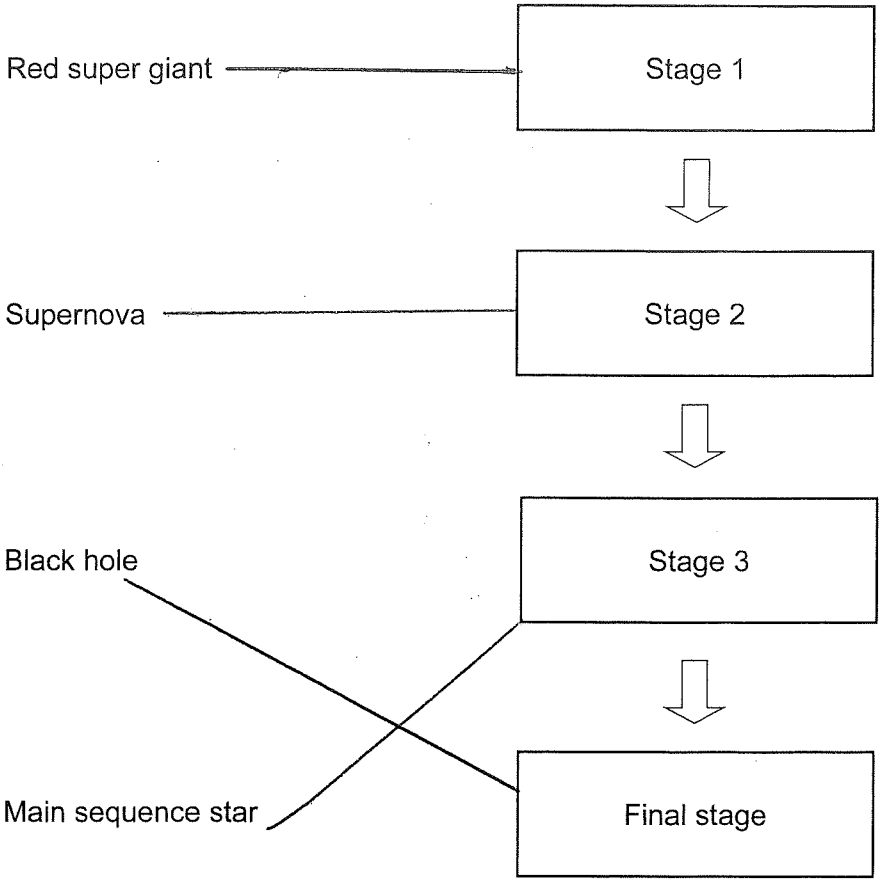

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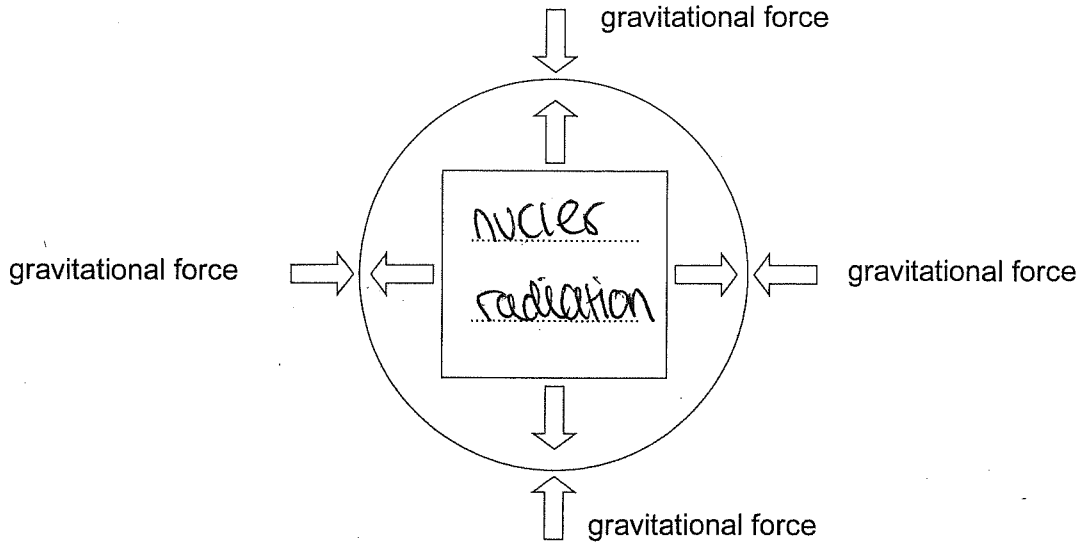

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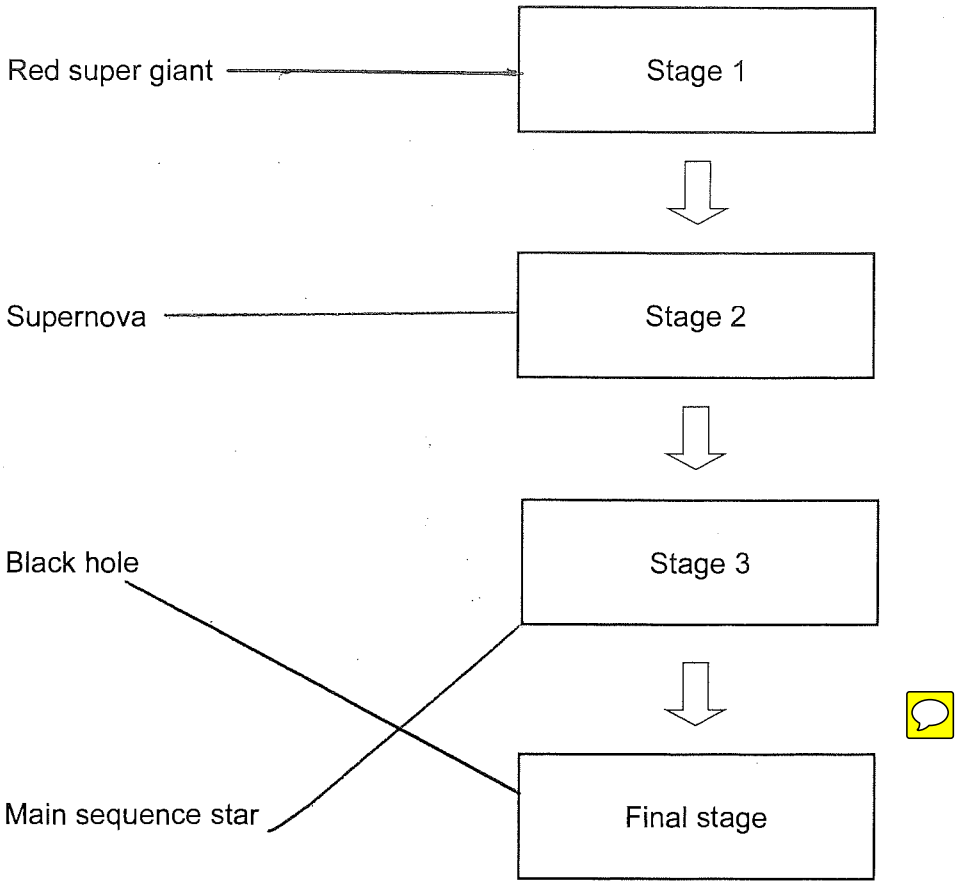

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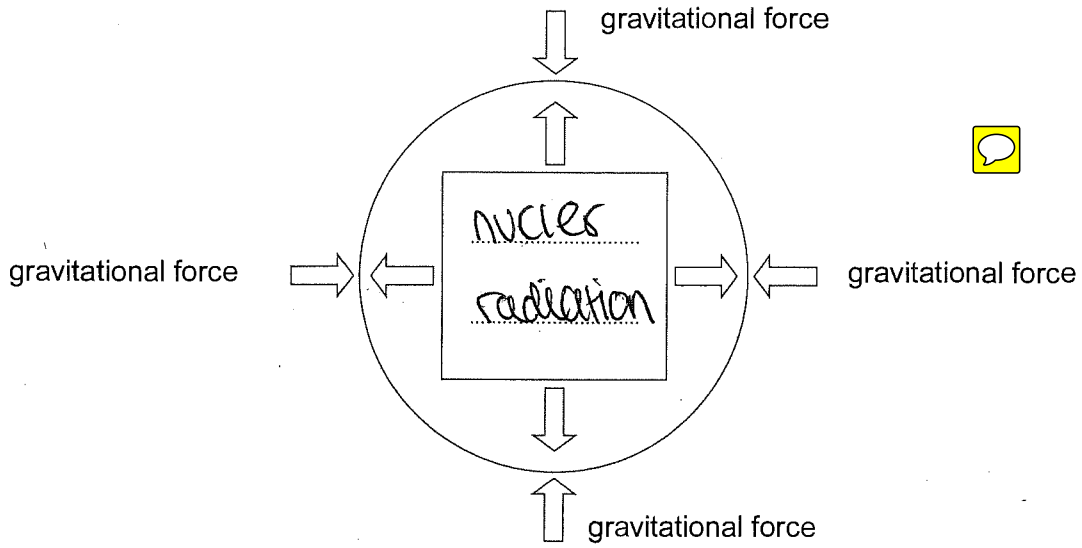

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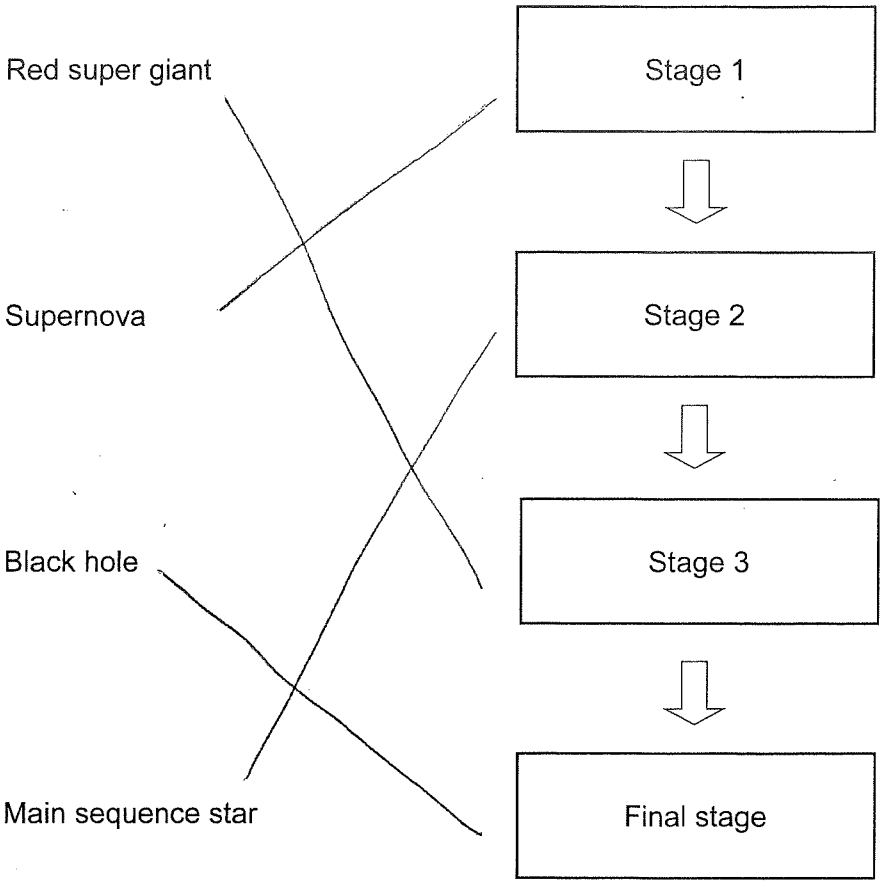

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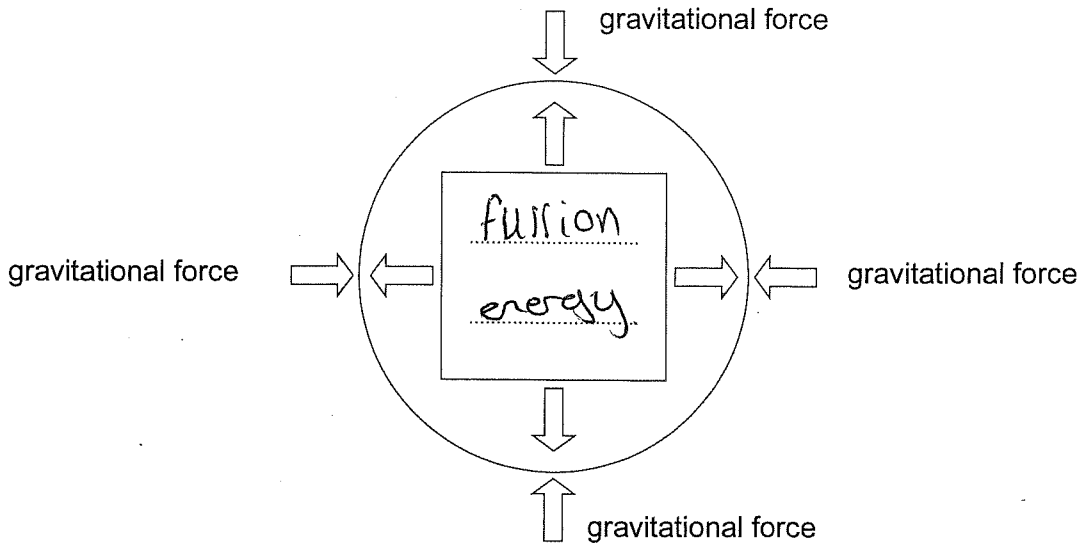

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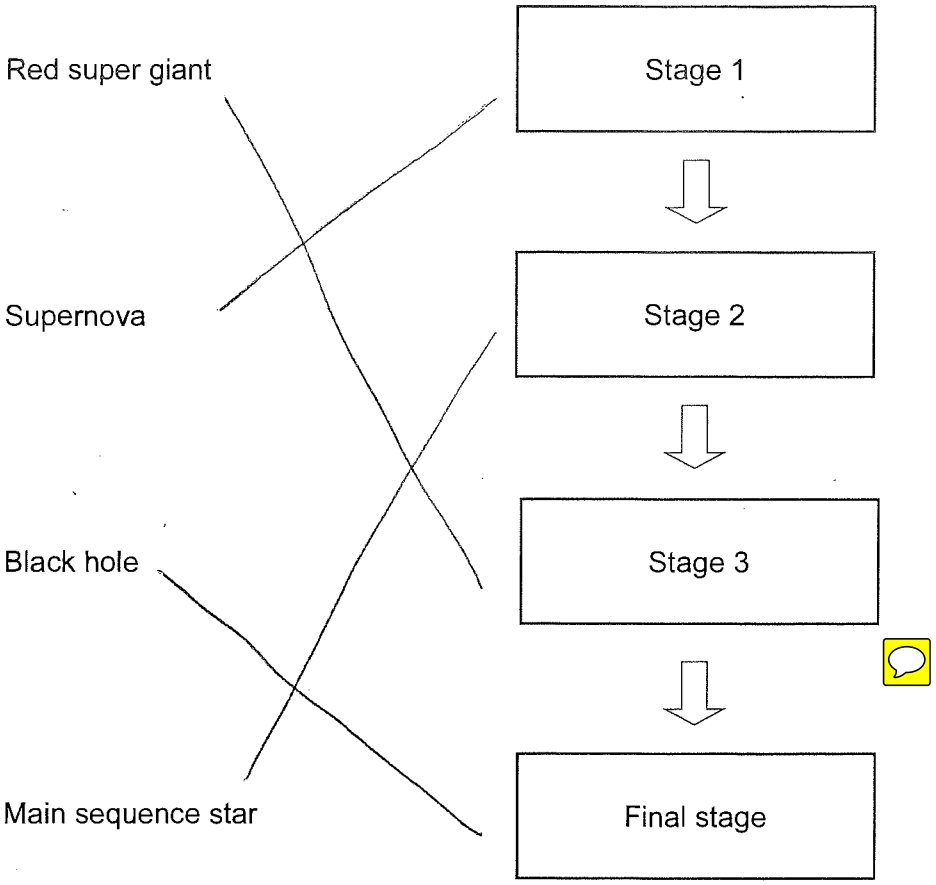

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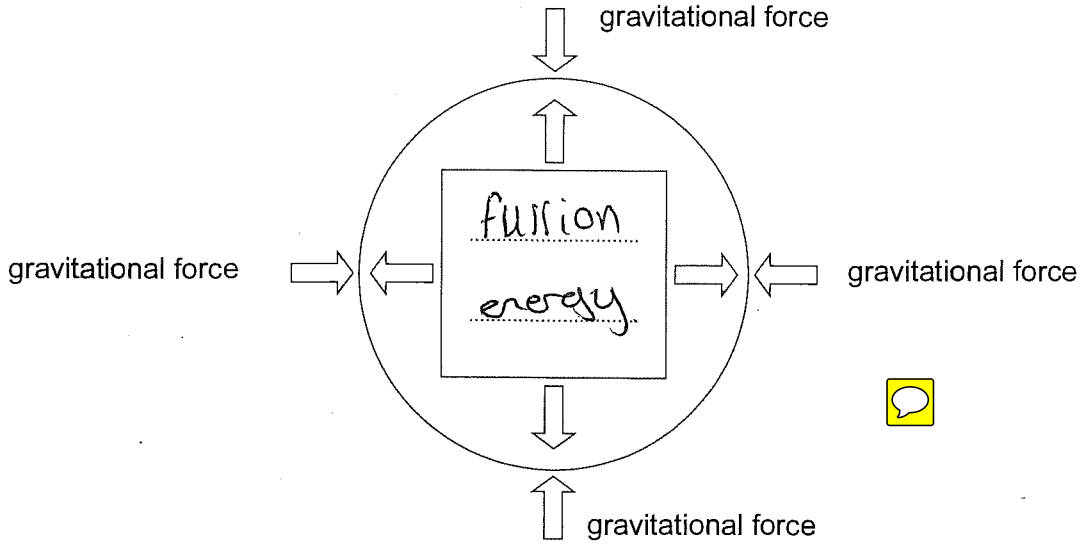

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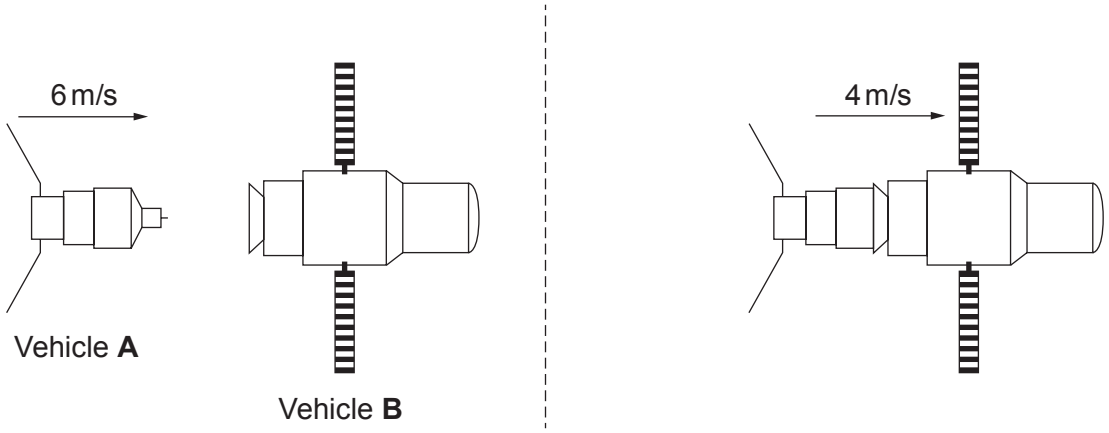
8

4503 010005

Examiner only

5. The diagram shows two space vehicles docking (joining together).



Vehicle **A** has a mass of 50 000 kg.

Vehicle **B** is at rest before the collision and vehicle **A** is moving to the right with a velocity of 6 m/s.

(a) (i) Use the equation:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

to calculate the momentum of vehicle **A** before the collision. [2]

momentum = ... kg m/s

(ii) After the collision **the two vehicles join together** and move with a velocity of 4 m/s. No momentum is lost in the collision.

Use your answer to part (i) and the equation:

$$\text{total mass} = \frac{\text{total momentum}}{\text{velocity}}$$

to calculate the total mass after they join together. [2]

total mass = ... kg

Examiner only

(iii) Use your answer to part (ii) to calculate the mass of vehicle **B**. [1]

mass = ... kg

(b) (i) Calculate the loss of momentum of vehicle **A** in the collision. [2]

momentum lost = ... kg m/s

(ii) **Write down** the **gain** in momentum of vehicle **B**. [1]

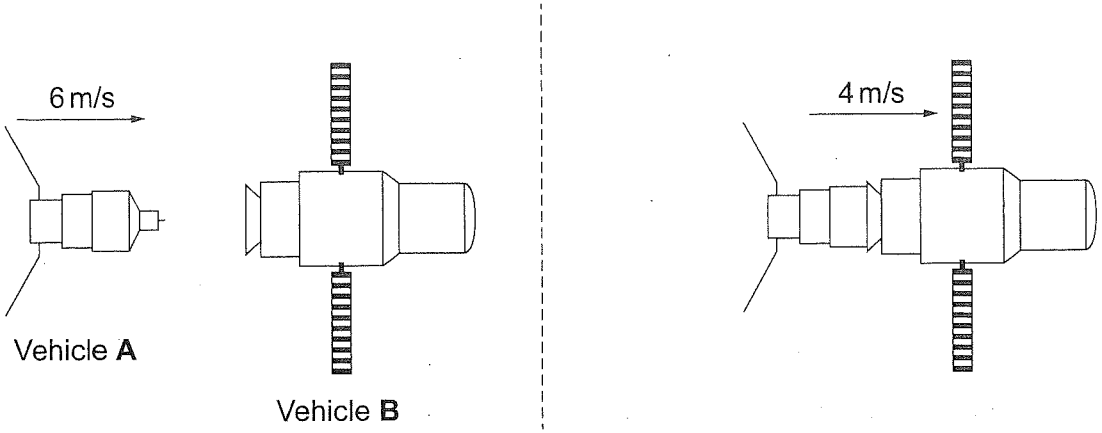
momentum gained = ... kg m/s

8

Turn over.

Examiner only

5. The diagram shows two space vehicles docking (joining together).



Vehicle **A** has a mass of 50 000 kg.

Vehicle **B** is at rest before the collision and vehicle **A** is moving to the right with a velocity of 6 m/s.

(a) (i) Use the equation:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

to calculate the momentum of vehicle **A** before the collision. [2]

momentum = 50000kg x 6

momentum = 300000 kg m/s

(ii) After the collision **the two vehicles join together** and move with a velocity of 4 m/s. No momentum is lost in the collision.

Use your answer to part (i) and the equation:

$$\text{total mass} = \frac{\text{total momentum}}{\text{velocity}}$$

to calculate the total mass after they join together. [2]

total mass = 300000 / 410

30000

total mass = 75000 kg

Examiner only

(iii) Use your answer to part (ii) to calculate the mass of vehicle **B**. [1]

75000

mass = momentum / velocity

* mass = 300000 / 4

mass = 75000 kg

(b) (i) Calculate the loss of momentum of vehicle **A** in the collision. [2]

300000 / 75000

momentum lost = 4 kg m/s

(ii) **Write down** the **gain** in momentum of vehicle **B**. [1]

momentum gained = 4 kg m/s

8

* mass = 300000 / 4

Examiner only

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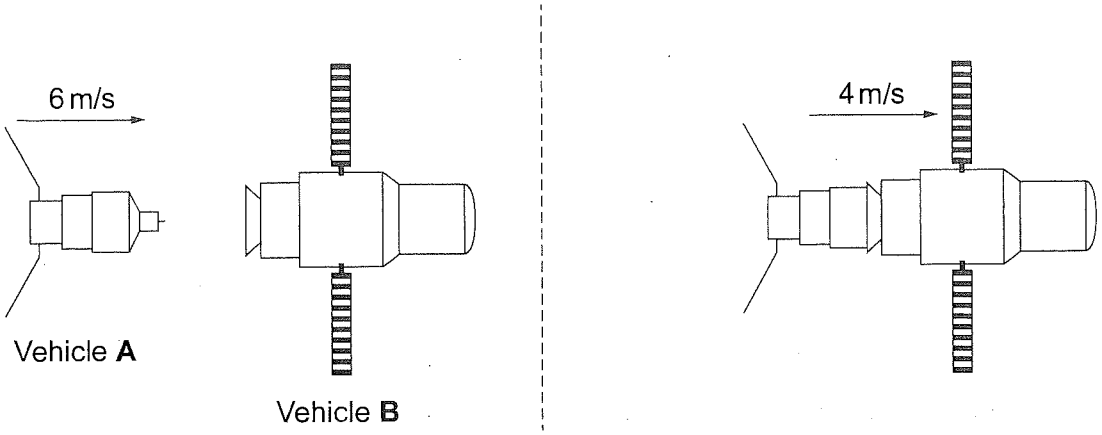

Vehicle **A** has a mass of 50 000 kg.

Vehicle **B** is at rest before the collision and vehicle **A** is moving to the right with a velocity of 6 m/s.

(a) (i) Use the equation:

momentum = mass × velocity

to calculate the momentum of vehicle **A** before the collision. [2]

momentum = 300000 kg m/s

(ii) After the collision **the two vehicles join together** and move with a velocity of 4 m/s. No momentum is lost in the collision.

Use your answer to part (i) and the equation:

$$\text{total mass} = \frac{\text{total momentum}}{\text{velocity}}$$

to calculate the total mass after they join together. [2]

total mass = 75000 kg

Examiner only

(iii) Use your answer to part (ii) to calculate the mass of vehicle **B**. [1]

mass = momentum / velocity

mass = ... kg

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momentum lost = ... kg m/s

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momentum gained = ... kg m/s

8

Examiner only

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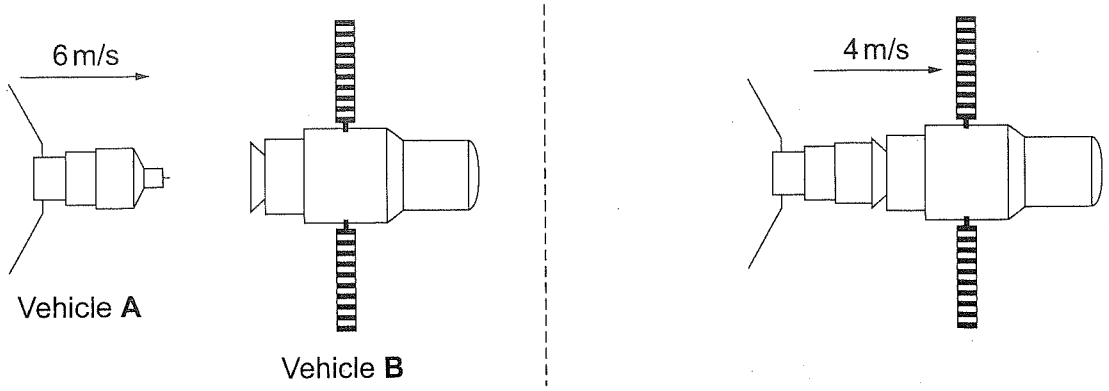

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(a) (i) Use the equation:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

to calculate the momentum of vehicle **A** before the collision. [2]

50,000kg x 6m/s

=

momentum = 300,000 kg m/s

(ii) After the collision **the two vehicles join together** and move with a velocity of 4 m/s. No momentum is lost in the collision.

Use your answer to part (i) and the equation:

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$$\frac{300,000\text{kg m/s}}{4\text{m/s}}$$

total mass = 75,000 kg

Examiner only

(iii) Use your answer to part (ii) to calculate the mass of vehicle **B**. [1]

mass = 75,000 kg

(b) (i) Calculate the loss of momentum of vehicle **A** in the collision. [2]

6 - 4
= 2

momentum lost = 2 kg m/s

(ii) **Write down** the **gain** in momentum of vehicle **B**. [1]

momentum gained = 0 kg m/s

8

Examiner only

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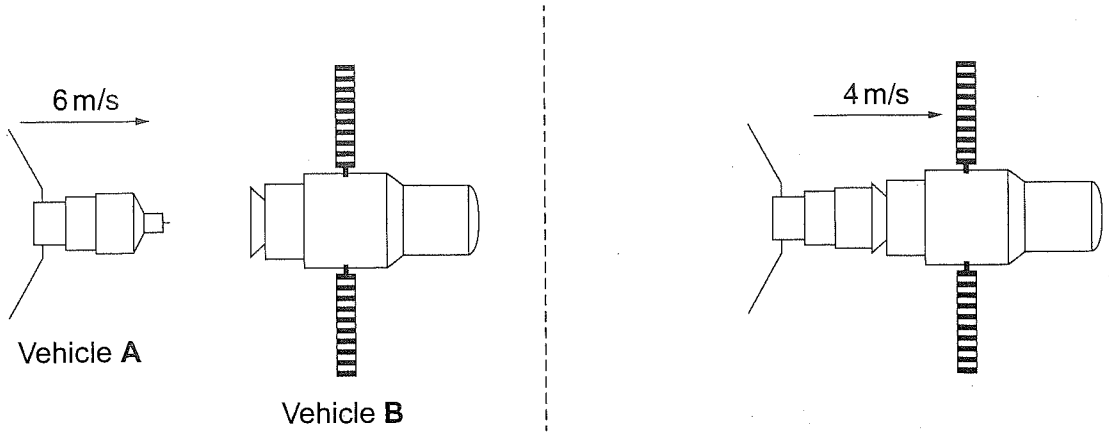

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50,000kg x 6m/s

=

momentum = 300,000 kg m/s

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$$\frac{300{,}000\text{kg m/s}}{4\text{m/s}}$$

total mass = 75,000 kg

Examiner only

(iii) Use your answer to part (ii) to calculate the mass of vehicle **B**. [1]

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Examiner only

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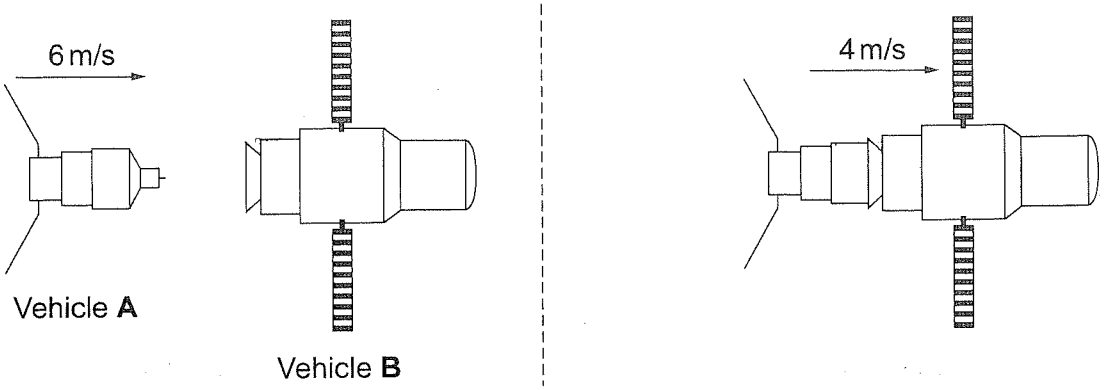

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to calculate the momentum of vehicle **A** before the collision. [2]

momentum = 50000 × 6
= 300000 kg m/s
300000

momentum = ... kg m/s

(ii) After the collision **the two vehicles join together** and move with a velocity of 4 m/s. No momentum is lost in the collision.

Use your answer to part (i) and the equation:

$$\text{total mass} = \frac{\text{total momentum}}{\text{velocity}}$$

to calculate the total mass after they join together. [2]

total mass = 300000 / 4
= kg
75000
75000

total mass = ... kg

Examiner only

(iii) Use your answer to part (ii) to calculate the mass of vehicle **B**. [1]

75000 ÷ 2 = 37500 kg.

mass = 37500 kg

(b) (i) Calculate the loss of momentum of vehicle **A** in the collision. [2]

momentum = 50000 x 4
= 200000

300000 - 200000 = 100000

momentum lost = 100000 kg m/s

(ii) **Write down** the **gain** in momentum of vehicle **B**. [1]

momentum gained = 200000 kg m/s

8

Examiner only

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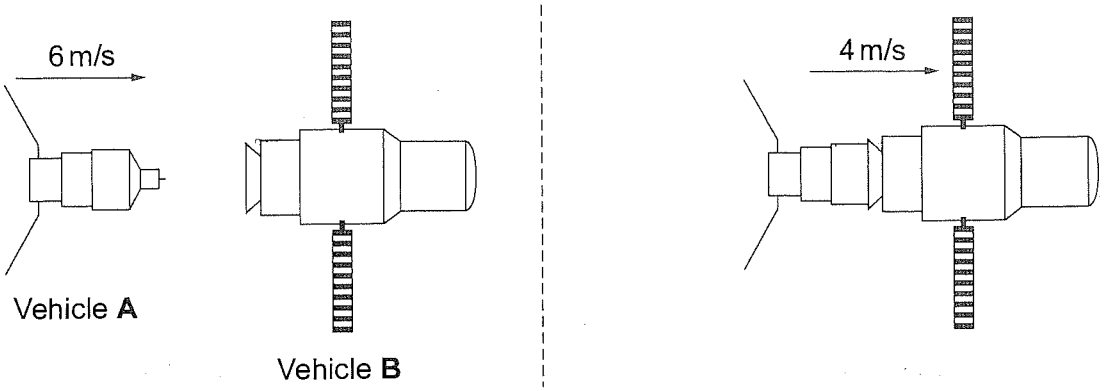

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= 300000 kg m/s
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total mass = 300000 / 4
= kg
75000

75000

total mass = ... kg

Examiner only

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momentum = 50000 x 4
= 200000

300000 - 200000 = 100000

momentum lost = 100000 kg m/s

(ii) **Write down** the **gain** in momentum of vehicle **B**. [1]

momentum gained = 200000 kg m/s

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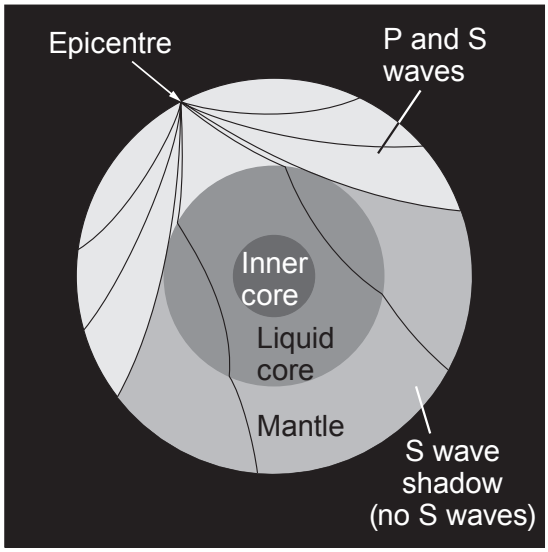
Examiner only

9. Use the diagram below **and** your knowledge to compare the properties of seismic P waves, S waves and surface waves. [6 QWC]



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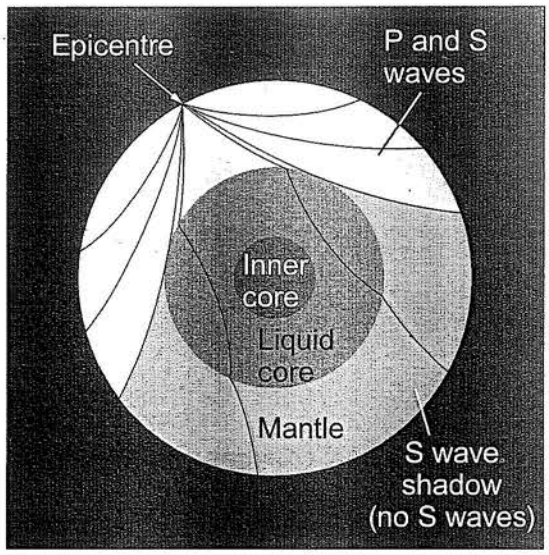
6

Examiner only

9. Use the diagram below **and** your knowledge to compare the properties of seismic P waves, S waves and surface waves. [6 QWC]



P waves and S waves both travel in different. One goes foward and the other side to side. P P waves is always first. P waves and S waves do can go trough certain parts becas they manage. Both waves are what are used to detect an earthquake.

END OF PAPER

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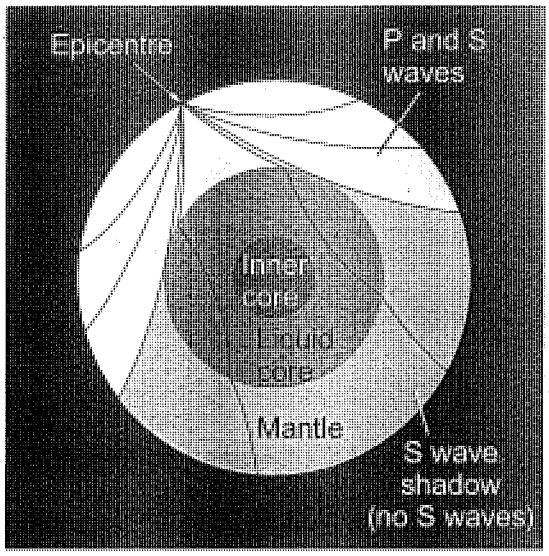

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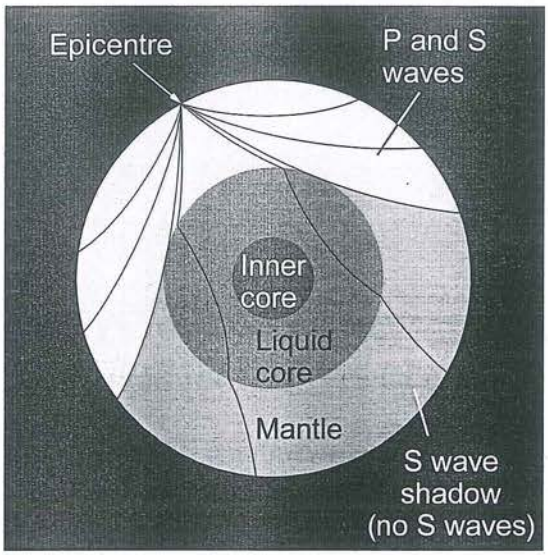

P waves travel faster than S waves and as such they are the first waves to be detected after an Earthquake. P waves can travel through solids and liquids whereas S waves can only travel through solids. For this reason P waves can travel through the liquid outer core and so are detected in certain zones (shadow zones) where there are no S waves detected. P waves are longitudinal waves and so they travel in the same direction as the direction in which the wave oscillates. However S waves are transverse waves and so they travel in a direction which is perpendicular to the direction in which the waves oscillate. Surface waves are the most destructive waves. They are the slowest waves and can either be in the form of Love waves or Rayleigh waves.

Examiner only

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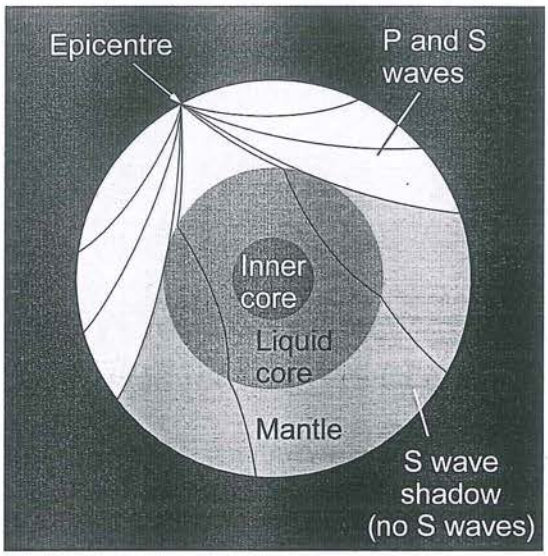

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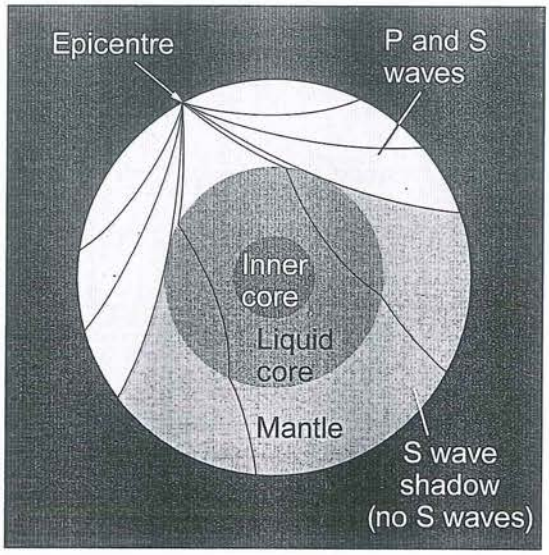

This is *shown in the diagram as

P waves can ~~can~~ travel through solids and liquids. ~~shown in the diagram~~ * ~~they~~ they can travel through the liquid core and the Mantle. However S waves can only travel through solids showing that when the disperse from the Epicentre, they move to the sides and travel through solid. TO prove that S waves cannot travel through liquids, there is a shadow zone. Surface waves only travel along the surface of the Earth whereas P and S waves travel inside the Earth. S waves are transverse meaning they ~~travel~~ are at 90° to the direction of ~~travel~~ travel, whereas P waves ~~travel~~ are parallel to the direction of travel.

END OF PAPER

6

Examiner only

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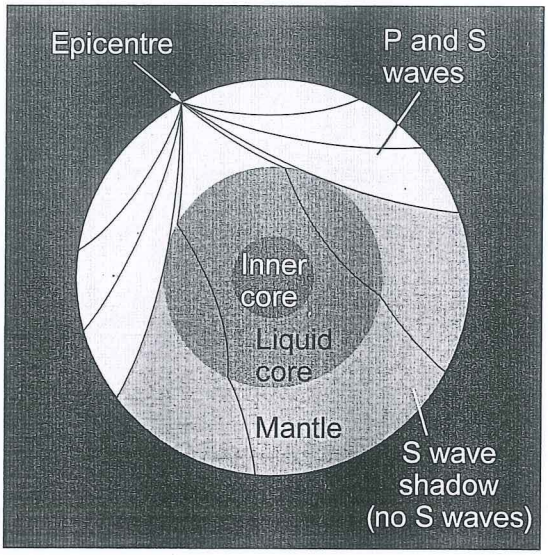

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6