AQA GCSE Physics | 8463

SPECIFICATION POINT 4.8.1.1

Our solar system

Past-paper questions

Tier	**Foundation**
Question groups	**31**
Available paper years	**2003–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.8.1.1 Our solar system

Question 01

June 2003 | 3451F | Original Q15 | Legacy

15 (a) The table gives information about some planets.

Name of planet	Gravitational field strength in N/kg	Diameter of planet in thousands of km	Time for 1 orbit around the sun in years
Mercury	4	4.9	0.2
Venus	9	12.0	0.6
Earth	10	12.8	1.0
Jupiter	26	143.0	12.0

(i) Write down the equation that links gravitational field strength, mass and weight.

.....

(1 mark)

(ii) An astronaut has a mass of 75 kg. Calculate the weight of the astronaut on Venus. Show clearly how you work out your answer.

.....

.....

Weight of astronaut = ...newtons

(2 marks)

(iii) Why would the astronaut weigh more on the Earth than on Venus?

.....

.....

(1 mark)

(iv) The radius of the orbit of Jupiter is greater than the radius of the orbit of Mercury, Venus or the Earth. What evidence is given in the table to show this?

.....

.....

(1 mark)

4.8.1.1 Our solar system

Question 01 · continued

MARGIN BLANK

(b) *To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Explain briefly how stars like the Sun are thought to have been formed.

.....

.....

.....

.....

(2 marks)

7

4.8.1.1 Our solar system

Question 02

June 2003 | 3462F3 | Original Q13 | Legacy

13 (a) The table gives information about some planets.

Name of planet	Gravitational field strength in N/kg	Diameter of planet in thousands of km	Time for 1 orbit around the sun in years
Mercury	4	4.9	0.2
Venus	9	12.0	0.6
Earth	10	12.8	1.0
Jupiter	26	143.0	12.0

(i) Write down the equation that links gravitational field strength, mass and weight.

.....

(1 mark)

(ii) An astronaut has a mass of 75 kg. Calculate the weight of the astronaut on Venus. Show clearly how you work out your answer.

.....

.....

Weight of astronaut = ...newtons

(2 marks)

(iii) Why would the astronaut weigh more on the Earth than on Venus?

.....

.....

(1 mark)

(iv) The radius of the orbit of Jupiter is greater than the radius of the orbit of Mercury, Venus or the Earth. What evidence is given in the table to show this?

.....

.....

(1 mark)

4.8.1.1 Our solar system

Question 02 · continued

MARGIN
BLANK

(b) *To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Explain briefly how stars like the Sun are thought to have been formed.

.....

.....

.....

.....

(2 marks)

7

4.8.1.1 Our solar system

Question 03

June 2004 | 3451F | Original Q1 | Legacy

1 (a) Complete the sentences by choosing the correct word or phrase from the box.

Each word or phrase may be used once or not at all.

circular	**comet**	**elliptical**	**Milky Way**
Moon	**solar system**	**Universe**	

A planet and a ..... both move in ..... orbits around the Sun.

The Sun is part of the ..... galaxy.

The ..... contains at least a billion galaxies. *(4 marks)*

(b) The following sentences describe the stages that a star such as the Sun goes through during its life.

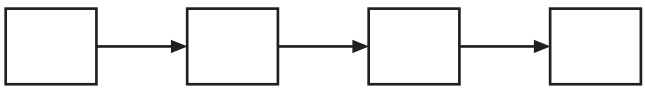
A The star is stable.

B The star contracts to a white dwarf.

C The star expands into a red giant.

D The star is formed when the force of gravity pulls dust and gases together.

(i) Arrange the sentences in the order in which the stages happen.



(3 marks)

(ii) The Sun is at which stage in its life, **A**, **B**, **C** or **D**?

.....

(1 mark)

8

4.8.1.1 Our solar system

Question 04

June 2004 | 3451F | Original Q6 | Legacy

6 Malik uses a camera to photograph the Moon.



(a) Complete each sentence by choosing the correct words from the box.

You may use each word once, more than once or not at all.

converging	**diverging**	**image**	**longer**
object	**real**	**shorter**	**virtual**

In a camera a ..... lens is used to produce an ..... of an ..... on a film. The ..... is smaller than the ..... and it is a ..... distance from the lens.

(6 marks)

(b) The Moon moves in a nearly circular path around the Earth.

(i) What is the name of the force which causes the Moon to move around the Earth?

.....

(1 mark)

(ii) In which direction does this force act?

.....

(1 mark)

4.8.1.1 Our solar system

Question 04 · continued

MARGIN
BLANK

(c) A force is needed to make a car change direction when it goes round a bend.

(i) What is the name of this force and where does it act?

.....

.....

(2 marks)

(ii) Complete the **two** spaces in the sentence.

The force needed is greater if the ..... of the car is greater and the ..... of the bend is smaller. *(2 marks)*

(d) What word is used to describe any force which causes an object to move in a circular path?

.....

(1 mark)

13

4.8.1.1 Our solar system

Question 05

June 2004 | 3462F3 | Original Q1 | Legacy

1 (a) Complete the sentences by choosing the correct word or phrase from the box.

Each word or phrase may be used once or not at all.

circular	**comet**	**elliptical**	**Milky Way**
Moon	**solar system**	**Universe**	

A planet and a ..... both move in ..... orbits around the Sun.

The Sun is part of the ..... galaxy.

The ..... contains at least a billion galaxies. *(4 marks)*

(b) The following sentences describe the stages that a star such as the Sun goes through during its life.

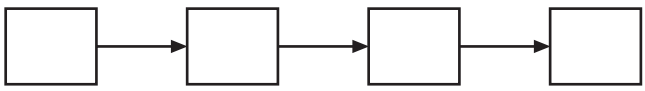
A The star is stable.

B The star contracts to a white dwarf.

C The star expands into a red giant.

D The star is formed when the force of gravity pulls dust and gases together.

(i) Arrange the sentences in the order in which the stages happen.



(3 marks)

(ii) The Sun is at which stage in its life, **A**, **B**, **C** or **D**?

.....

(1 mark)

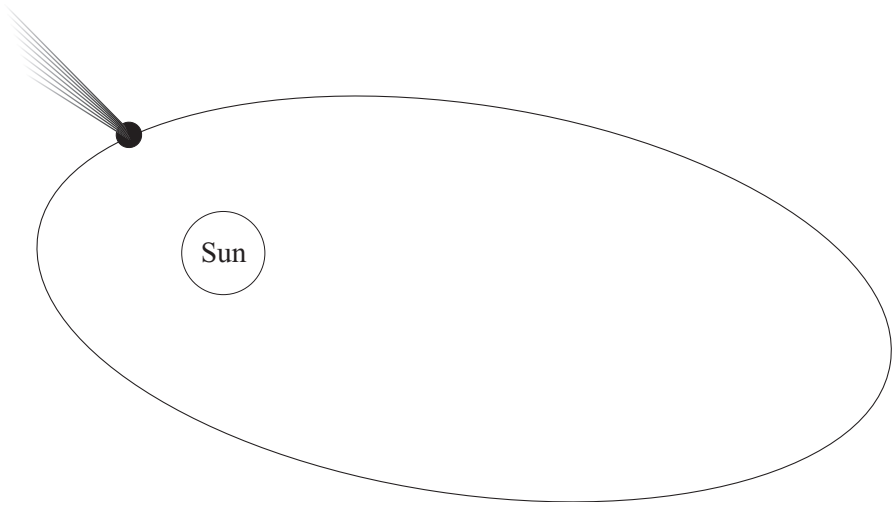
8

4.8.1.1 Our solar system

Question 06

June 2005 | 3451 | Original Q2 | Legacy

2 (a) The diagram shows an object in orbit around the Sun.



Which **one** of the following is the object most likely to be?

Draw a ring around your answer.

comet **moon** **planet** **star**

(1 mark)

(b) The Sun is part of the Milky Way galaxy.
What is a galaxy?

.....

(1 mark)

(c) Complete the following sentence by choosing the correct words from the box.
Each word may be used once or not at all.

dwarf	**giant**	**neutron**	**proton**	**supernova**

If a red ..... star is large enough, it may eventually blow up in an explosion called a ....., leaving behind a very dense ..... star.

(3 marks)

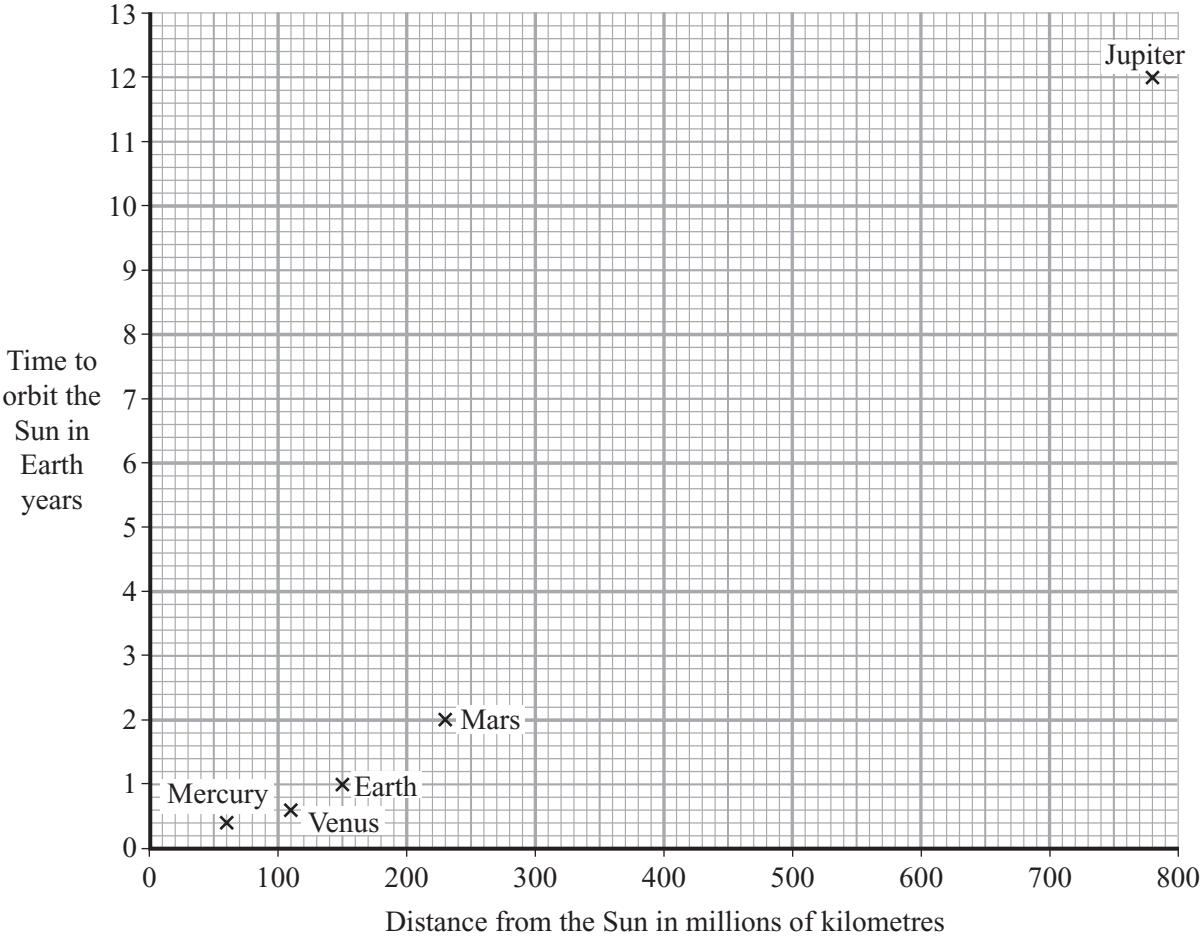
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4.8.1.1 Our solar system

Question 07

June 2005 | 3451 | Original Q12 | Legacy

12 (a) The chart shows that the time taken by a planet to orbit the Sun depends on its distance from the Sun.



(i) How does the time taken by a planet to orbit the Sun depend on the distance the planet is from the Sun?

.....

.....

(1 mark)

(ii) Asteroids orbit the Sun. One asteroid is 550 million kilometres from the Sun.

Estimate how long this asteroid takes to orbit the Sun.

Time to orbit the Sun = ... Earth years

(1 mark)

4.8.1.1 Our solar system

Question 07 · continued

MARGIN BLANK

(b) The atmosphere on Venus contains a large percentage of a greenhouse gas.

	Mercury	Venus	Earth
Average surface temperature	230 °C	470 °C	20 °C

(i) Which **one** of these gases increases the greenhouse effect? Draw a ring around your answer.

argon **carbon dioxide** **nitrogen** **oxygen**

(1 mark)

(ii) Explain how the information in the table and the chart shows that the atmosphere of Venus produces a greenhouse effect.

.....

.....

.....

.....

(2 marks)

5

TURN OVER FOR THE NEXT QUESTION

4.8.1.1 Our solar system

Question 08

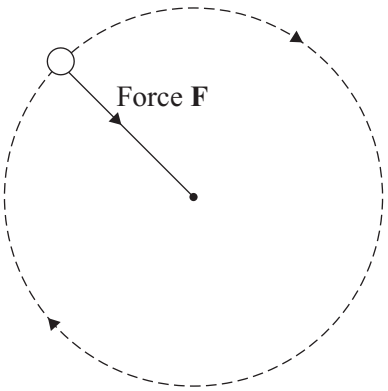
June 2005 | 3451 | Original Q15 | Legacy

15 (a) A student has fastened a ball to a piece of string and is swinging it round in a horizontal circle.



(i) The diagram below shows an overhead view of the movement of the ball.

Add an arrow, from the centre of the ball, to show the direction in which the ball would move if the string broke at this instant.



(1 mark)

(ii) Complete the table to show how force **F** changes if the student changes what he is doing. In each case, all the other factors stay the same.

If the student	Force F needs to
uses a ball with a greater mass	.....
swings the ball at a greater speed	.....
swings the ball with a shorter piece of string	.....

(3 marks)

(b) The Moon orbits the Earth in a circular path.

Use words from the box to complete the **three** spaces in the sentence.

direction	**resistance**	**speed**	**velocity**

You may use each word once, more than once or not at all.

The Moon's ..... is constant but its ..... changes because its ..... changes.

(2 marks)

(c) When any object moves in a circular, or nearly circular, path a force must act towards the centre of the circle.

(i) What word is used to describe this force?

.....

(1 mark)

(ii) The Moon orbits the Earth. What provides the force towards the Earth?

.....

(1 mark)

(iii) In an atom, name the particles which are moving in circular paths around the nucleus.

.....

(1 mark)

(iv) In the case of an atom, what word describes the forces which keep these particles moving in circular paths around the nucleus?

.....

(1 mark)

10

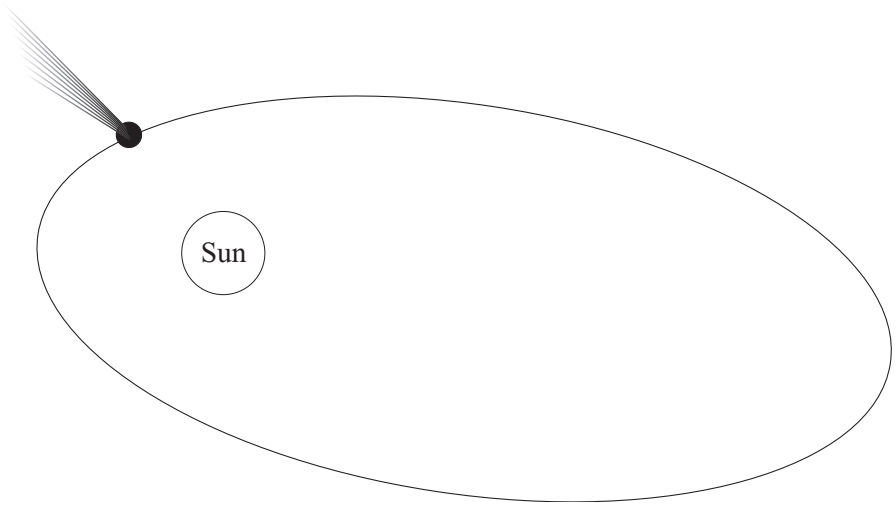
TURN OVER FOR THE NEXT QUESTION

4.8.1.1 Our solar system

Question 09

June 2005 | 3462 | Original Q2 | Legacy

2 (a) The diagram shows an object in orbit around the Sun.



Which **one** of the following is the object most likely to be?

Draw a ring around your answer.

comet **moon** **planet** **star**

(1 mark)

(b) The Sun is part of the Milky Way galaxy.
What is a galaxy?

.....

(1 mark)

(c) Complete the following sentence by choosing the correct words from the box.
Each word may be used once or not at all.

dwarf	**giant**	**neutron**	**proton**	**supernova**

If a red ..... star is large enough, it may eventually blow up in an explosion called a ....., leaving behind a very dense ..... star.

(3 marks)

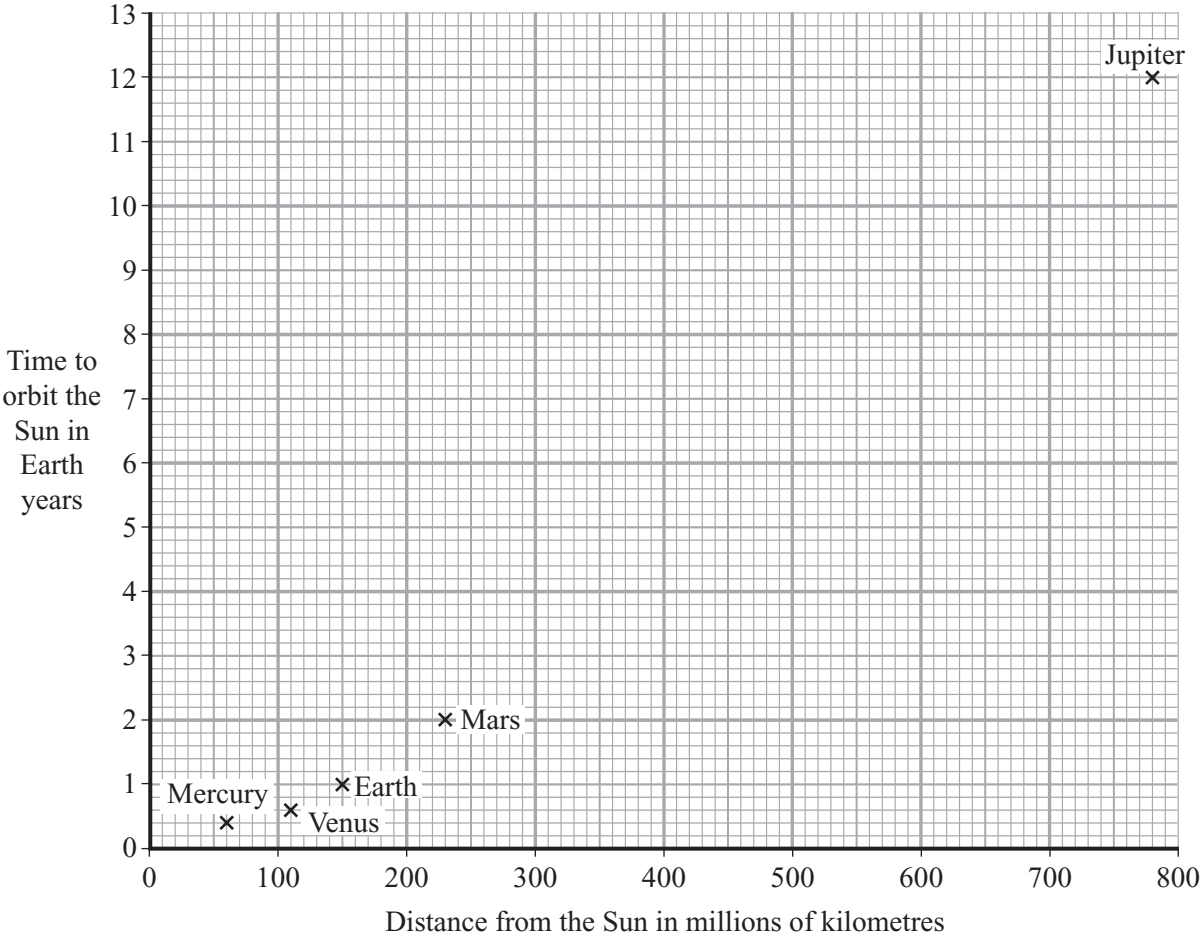
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4.8.1.1 Our solar system

Question 10

June 2005 | 3462 | Original Q10 | Legacy

10 (a) The chart shows that the time taken by a planet to orbit the Sun depends on its distance from the Sun.



(i) How does the time taken by a planet to orbit the Sun depend on the distance the planet is from the Sun?

.....

.....

(1 mark)

(ii) Asteroids orbit the Sun. One asteroid is 550 million kilometres from the Sun.

Estimate how long this asteroid takes to orbit the Sun.

Time to orbit the Sun = ... Earth years

(1 mark)

4.8.1.1 Our solar system

Question 10 · continued

MARGIN
BLANK

(b) The atmosphere on Venus contains a large percentage of a greenhouse gas.

	Mercury	Venus	Earth
Average surface temperature	230 °C	470 °C	20 °C

(i) Which **one** of these gases increases the greenhouse effect? Draw a ring around your answer.

argon **carbon dioxide** **nitrogen** **oxygen**

(1 mark)

(ii) Explain how the information in the table and the chart shows that the atmosphere of Venus produces a greenhouse effect.

.....

.....

.....

.....

(2 marks)

5

TURN OVER FOR THE NEXT QUESTION

4.8.1.1 Our solar system

Question 11

June 2006 | 3451 | Original Q3 | Legacy

3 (a) Read the following statements.

J – It is made up of at least a billion galaxies.

K – It is one of the stars in the Milky Way.

L – It is a slightly squashed circle.

M – It keeps the Moon in orbit around the Earth.

N – It is a large number of stars grouped together.

O – It is the explosion of a massive star.

Which statement, **J**, **K**, **L**, **M**, **N** or **O**, describes:

(i) the force of gravity; Letter .....
(1 mark)

(ii) the Sun; Letter .....
(1 mark)

(iii) the Universe; Letter .....
(1 mark)

(iv) a supernova? Letter .....
(1 mark)

4.8.1.1 Our solar system

Question 11 · continued

BLANK

(b) The Sun is in the main stable stage of its lifecycle.

(i) How long will the Sun be in this stage of its lifecycle? Put a tick (✓) in the box next to your choice.

Hundreds of years ☐

Thousands of years ☐

Millions of years ☐

Billions of years ☐

(1 mark)

(ii) Describe what will happen to the Sun after it has reached the end of the main stable stage of its lifecycle. The answer has been started for you.

At the end of the stable stage of its lifecycle the Sun will expand

.....

.....

.....

.....

.....

.....

(3 marks)

8

4.8.1.1 Our solar system

Question 12

June 2006 | 3451 | Original Q6 | Legacy

6 Scientists would like to know if there is life, or ever has been life, on other planets.

(a) Complete the sentence by choosing the correct words from the box.

Each word may be used once or not at all.

fossils	**gold**	**helium**	**sulphur**	**water**

If ..... or ..... were found on a planet, it suggests that the planet was or is able to support life.

(2 marks)

(b) We know that living organisms can change the atmosphere of a planet.

Complete the following sentence by crossing out the **two** lines in the box that are wrong.

On Earth plants have

increased
not changed
decreased

the amount of oxygen in the atmosphere.

(1 mark)

(c) Scientists working on the SETI project look for signs of intelligent life by monitoring signals from space.

Which **one** of the following pieces of equipment is used in the SETI project?

Draw a ring around your answer.

binoculars **periscope** **radio telescope** **telescope**

(1 mark)

4

4.8.1.1 Our solar system

Question 13

June 2006 | 3462 | Original Q3 | Legacy

3 (a) Read the following statements.

J – It is made up of at least a billion galaxies.

K – It is one of the stars in the Milky Way.

L – It is a slightly squashed circle.

M – It keeps the Moon in orbit around the Earth.

N – It is a large number of stars grouped together.

O – It is the explosion of a massive star.

Which statement, **J**, **K**, **L**, **M**, **N** or **O**, describes:

(i) the force of gravity; Letter .....
(1 mark)

(ii) the Sun; Letter .....
(1 mark)

(iii) the Universe; Letter .....
(1 mark)

(iv) a supernova? Letter .....
(1 mark)

4.8.1.1 Our solar system

Question 13 · continued

BLANK

(b) The Sun is in the main stable stage of its lifecycle.

(i) How long will the Sun be in this stage of its lifecycle? Put a tick (✓) in the box next to your choice.

Hundreds of years ☐

Thousands of years ☐

Millions of years ☐

Billions of years ☐

(1 mark)

(ii) Describe what will happen to the Sun after it has reached the end of the main stable stage of its lifecycle. The answer has been started for you.

At the end of the stable stage of its lifecycle the Sun will expand

.....

.....

.....

.....

.....

.....

(3 marks)

8

4.8.1.1 Our solar system

Question 14

June 2006 | 3462 | Original Q6 | Legacy

6 Scientists would like to know if there is life, or ever has been life, on other planets.

(a) Complete the sentence by choosing the correct words from the box.

Each word may be used once or not at all.

fossils	**gold**	**helium**	**sulphur**	**water**

If ..... or ..... were found on a planet, it suggests that the planet was or is able to support life.

(2 marks)

(b) We know that living organisms can change the atmosphere of a planet.

Complete the following sentence by crossing out the **two** lines in the box that are wrong.

On Earth plants have

increased
not changed
decreased

the amount of oxygen in the atmosphere.

(1 mark)

(c) Scientists working on the SETI project look for signs of intelligent life by monitoring signals from space.

Which **one** of the following pieces of equipment is used in the SETI project?

Draw a ring around your answer.

binoculars **periscope** **radio telescope** **telescope**

(1 mark)

4

4.8.1.1 Our solar system

Question 15

January 2007 | PHY1F | Original Q4 | Legacy

4 Light is given out by the Sun and a distant galaxy.

(a) Compared to the light from the Sun, the light from the distant galaxy has moved towards the red end of the spectrum.

(i) What name is given to this effect?

.....

(1 mark)

(ii) Complete the following sentence by drawing a ring around the line in the box that is correct.

The fact that light from a distant galaxy seems to move towards the red end of the spectrum gives scientists evidence that

galaxies are shrinking
galaxies are changing colour
the universe is expanding

.

(1 mark)

(b) Scientists have a theory that the universe began from a very small point and then exploded outwards.

(i) What name is given to this theory?

.....

(1 mark)

(ii) Which statement gives a reason why scientists think that the universe began with an explosion?

Put a tick (✓) in the box next to your choice.

At the moment it is the best way of explaining our scientific knowledge. ☐

It can be proved using equations. ☐

People felt the explosion. ☐

(1 mark)

4.8.1.1 Our solar system

Question 15 · continued

BLANK

(c) Scientists use various types of telescope to obtain data from our solar system and beyond.

(i) What type of electromagnetic radiation is detected using an optical telescope?

.....

(1 mark)

(ii) The image from a telescope orbiting in space is usually clearer than the image from a telescope on the Earth.

Which statement gives a reason for this? Put a tick (✓) in the box next to your choice.

A space telescope is bigger. ☐

A space telescope is closer to the stars. ☐

The atmosphere does not block the light to a space telescope. ☐

(1 mark)

(iii) Give **one** disadvantage of having a telescope in space.

.....

.....

(1 mark)

7

4.8.1.1 Our solar system

Question 16

June 2007 | PHY1B | Original Q7 | Legacy

QUESTION SEVEN

The solar system is part of the Milky Way galaxy.

7A Astronomers measure the wavelengths of light from distant galaxies.

The unit for wavelength is . . .

1 Hz

2 m/s

3 m

4 °C

7B Visible light from distant galaxies shows an increase in . . .

1 frequency.

2 intensity.

3 speed.

4 wavelength.

7C There is a red-shift in light observed from most distant galaxies.

This has led scientists to the belief that . . .

1 galaxies are moving away from each other.

2 galaxies are moving towards each other.

3 galaxies are moving towards the Milky Way.

4 galaxies are moving towards each other, but some are moving apart.

4.8.1.1 Our solar system

Question 16 · continued

7D Scientists who have studied electromagnetic radiation from distant galaxies support the 'big bang' theory, which states that the Universe began . . .

1 in many places at the same time.

2 from a very small point.

3 as one very big galaxy.

4 as one very big solar system.

Turn over for the next question

4.8.1.1 Our solar system

Question 17

January 2008 | PHY3F | Original Q5 | Legacy

5 Two students collect data from the Internet about planets in the Solar System.

The table shows the data that they collect about the first six planets.

Name of planet	Distance from the Sun in arbitrary units	Time for one orbit of the Sun in years	Mean surface temperature of the planet in ºC
Mercury	0.4	0.2	+ 125
Venus	0.7	0.6	+ 465
Earth	1.0	1.0	+ 22
Mars	1.5	1.9	– 48
Jupiter	5.2	11.9	
Saturn	9.6	29.5	– 180

(a) One student says that the mean surface temperature of planets gets less the further they are from the Sun. The other student agrees but says that one planet does not fit the pattern.

Which planet does not fit the pattern?

.....

(1 mark)

(b) Estimate a value for the mean surface temperature of Jupiter.

Mean surface temperature of Jupiter = ... ºC

(1 mark)

(c) Use words from the box to complete the following conclusion reached using the data in the table.

You can use the words once, more than once or not at all.

decreases	increases	stays the same

As the distance from the Sun to a planet.....

the time taken for the planet to orbit the Sun..... .

(1 mark)

Question 17 · continued

BLANK

(d) Hundreds of years ago, some scientists thought that Mars was a hot planet because it has a reddish colour.

Which **one** of the following statements gives the reason why scientists no longer think this?

Put a tick (✓) in the box next to your answer.

Hundreds of years ago, scientists got everything wrong. ☐

Today's scientists have new evidence about Mars. ☐

All scientific ideas change every one hundred years. ☐

(1 mark)

4

Turn over for the next question

4.8.1.1 Our solar system

Question 18

June 2008 | PHY3F | Original Q4 | Legacy

4 (a) Complete the **two** spaces in the sentence.

Stars form when enough ..... and gas from ..... are pulled together by gravitational attraction. *(2 marks)*

4 (b) How are stars able to give out energy for millions of years?

Put a tick (✓) in the box next to the answer.

By atoms joining together ☐

By atoms splitting apart ☐

By burning gases ☐

(1 mark)

4 (c) There are many billions of stars in our galaxy. Our Sun is one of these stars. What is the name of our galaxy?

.....

(1 mark)

4 (d)

Why was the Universe created?

We cannot expect scientists to answer this question. What is the reason for this?

Put a tick (✓) in the box next to the reason.

It will take too long to collect the scientific evidence. ☐

The answer depends on beliefs and opinions, not scientific evidence. ☐

There is not enough scientific evidence. ☐

(1 mark)

5

4.8.1.1 Our solar system

Question 19

June 2008 | PHY3F | Original Q7 | Legacy

7 (a) Thousands of artificial satellites are now in orbit around the Earth. A student used the Internet to collect information about four of them.

The table shows the data that the student collected.

Satellite	Altitude (= height above the surface of the Earth) in kilometres	Period of orbit in hours
A	300	1.5
B	850	1.7
C	20 000	12.0
D	36 000	24.0

7 (a) (i) What conclusion, on the relationship between the altitude of a satellite and its period of its orbit, can the student come to from this data?

.....

.....

(1 mark)

7 (a) (ii) Any conclusion from the data in the table may not be valid for all satellites.

Give **two** reasons.

1 .....

.....

2 .....

.....

(2 marks)

7 (b) The Moon is the Earth's only natural satellite.

Explain how the Moon stays in a nearly circular orbit around the Earth.

.....

.....

.....

(2 marks)

Question 7 continues on the next page

4.8.1.1 Our solar system

Question 19 · continued

for mark

7 (c) Two students see a film in which people on a spaceship hear an explosion on another spaceship.

The students think that this is not possible. What scientific evidence supports their opinion?

.....

.....

(1 mark)

7 (d) Some people say that space should not be explored.

Do you agree with them? Explain your answer.

.....

.....

.....

(2 marks)

8

4.8.1.1 Our solar system

Question 20

June 2009 | PHY3F | Original Q6 | Legacy

6 This passage is from a science magazine.

> *A star forms when enough dust and gas are pulled together. Masses smaller than a star may also be formed when dust and gas are pulled together.*

6 (a) What is the force which pulls the dust and gas together?

.....

(1 mark)

6 (b) Complete the sentences.

6 (b) (i) The smaller masses may be attracted by the star and become

..... .

(1 mark)

6 (b) (ii) Our nearest star, the Sun, is stable because the gravitational forces and the radiation pressure are ..... .

(1 mark)

6 (b) (iii) The Sun is one of billions of stars in the galaxy called the

..... .

(1 mark)

4

4.8.1.1 Our solar system

Question 21

January 2010 | PHY3F | Original Q7 | Legacy

7 A student collects data from the Internet about planets in the solar system.
She arranges the data into a table.

Name of the planet	Distance from the Sun in millions of kilometres	Time taken for one orbit of the Sun in years	Time taken to spin on its axis in hours	Average temperature on the side facing the Sun in °C
Mercury	60	0.24	1400	+430
Venus	110	0.60	5800	+470
Earth	150	1	24	+20
Mars	230	2	25	–20
Jupiter	780	12	10	–150
Saturn	1400	30	10	–180
Uranus	2900	84	17	–220
Neptune	4500	160	16	–230

7 (a) Name the **two** variables in the student's table which **always** have the relationship:

As one increases, so does the other.

..... and .....

(1 mark)

7 (b) (i) Give an example of **two** variables in the student's table which **generally** have the relationship:

As one increases, the other decreases.

..... and .....

(1 mark)

7 (b) (ii) Which piece of data does not seem to fit the relationship in (b)(i)?

.....

(1 mark)

4.8.1.1 Our solar system

Question 21 · continued

for mark

7 (c) Scientists plan to launch a satellite which will orbit Mars above its equator.
It will be a geostationary satellite.

How many hours will it take to orbit Mars?

..... hours
(1 mark)

7 (d) Mars has two moons.

Neither of them is in a geostationary orbit and they both take different times to orbit the planet.

Which **one** of these statements is correct.
Put a tick (✓) in the box next to your answer.

The two moons will always be above the same point on the surface of Mars. ☐

The two moons will be in different positions at different times. ☐

You can never see both moons at the same time. ☐

(1 mark)

7 (e) Use words from the box to complete the **three** spaces in the passage.

circular	**direction**	**friction**	**gravitational**	**speed**	**universal**

The moons of the planet Neptune move in circular paths around the planet.

They continuously accelerate towards the centre of Neptune.

The acceleration changes the ..... of each moon but does not change its ..... . The force causing the acceleration is a ..... force.

(2 marks)

7

4.8.1.1 Our solar system

Question 22

June 2010 | PHY3F | Original Q6 | Legacy

6 (a) A student finds data on the Internet for her project on the Solar System.
She checks this data on other websites.

The table shows the checked data.

Name of planet	Diameter in km	Distance from Sun in millions of km	Period in days
Mercury	4 840	58	87
Venus	12 390	108	224
Earth	12 760	149	365
Mars	6 800	228	686
Jupiter	142 800	778	4 332
Saturn	119 400	1 428	10 759
Uranus	47 600	2 870	30 685
Neptune	48 400	4 497	60 190

6 (a) (i) In the table, the period of each planet is given in days.

What is meant by the *period* of a planet?

.....

(1 mark)

6 (a) (ii) Suggest why the student checks the data on other websites.

.....

.....

(1 mark)

6 (a) (iii) What is the relationship, if any, between a planet's distance from the Sun and its period?

.....

.....

(1 mark)

4.8.1.1 Our solar system

Question 22 · continued

6 (a) (iv) What is the relationship, if any, between a planet's diameter and its period?

.....

.....

(1 mark)

6 (b) What is the force which provides the centripetal force to keep planets in their orbits?

.....

(1 mark)

6 (c) What is the name of the galaxy which contains the Solar System?

.....

(1 mark)

6 (d) Complete the following sentence by drawing a ring around the correct word in the box.

The universe is made up of

hundreds
thousands
millions
billions

of galaxies. *(1 mark)*

7

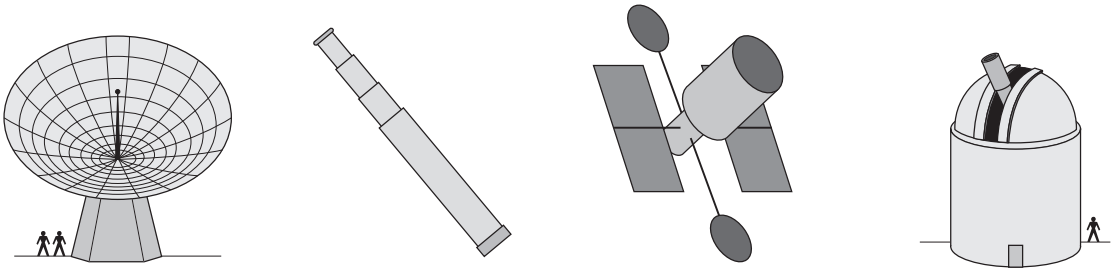
4.8.1.1 Our solar system

Question 23

November 2010 | PHY1BP | Original Q2 | Legacy

QUESTION TWO

The drawings show different types of telescope. They are not drawn to scale.



1 2 3 4

Not to scale

Match descriptions, **A**, **B**, **C** and **D**, with the telescopes **1**–**4**.

A can be used by anyone to view the surface of the Moon

B in orbit around the Earth

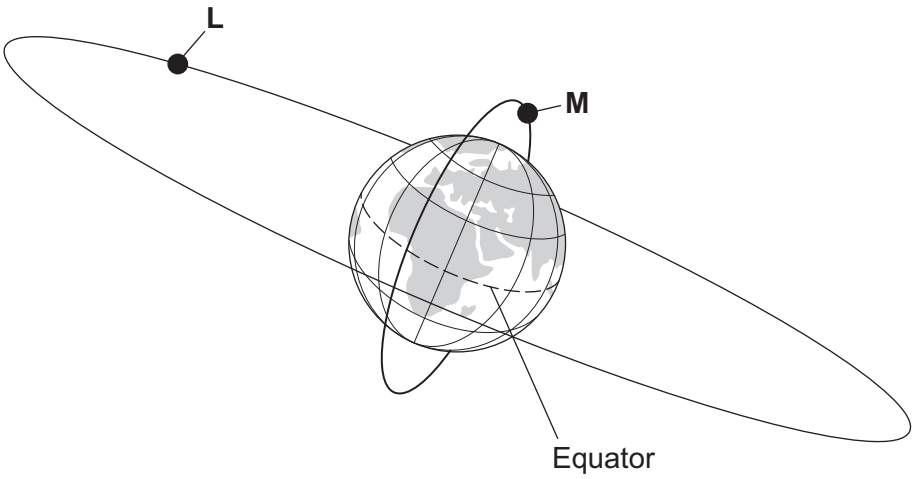
C built on the top of a mountain and can be used to view planets

D used by scientists to detect radio waves from space

4.8.1.1 Our solar system

Question 24

4 The diagram, which is not to scale, shows two satellites, **L** and **M**, orbiting the Earth.



4 (a) Complete the following table.

Each letter, **L** or **M**, may be used once, more than once or not at all.

Statement about the satellite	Letter for the satellite
It is used as a monitoring satellite.	
It is a geostationary satellite.	
It takes 24 hours to complete its orbit.	

(2 marks)

4 (b) Complete the following sentence.

To stay in its present orbit around the Earth, each satellite must move at a particular ..... .

(1 mark)

4.8.1.1 Our solar system

Question 24 · continued

4 (c) Thousands of satellites are now in orbit around the Earth. A student used the Internet to collect information about some of them.

Name of satellite	Average distance from the centre of the Earth in kilometres	Speed in kilometres per second	Time taken to orbit the Earth
The Moon	391 400	1.01	28 days
GEO	42 200	3.07	1 day
Navstar	26 600	3.87	12 hours
Lageos	12 300	5.70	3.8 hours
HST	7 000	7.56	97 mins
ISS	6 700	7.68	92 mins

4 (c) (i) The Moon takes a longer time than any of the other satellites to orbit the Earth.

Give **one** other way in which the Moon is different from the other satellites in the table.

.....

.....

(1 mark)

4 (c) (ii) What conclusion on the relationship between the *average distance* and *speed* can the student come to on the basis of this data?

.....

.....

(1 mark)

4 (c) (iii) What conclusion on the relationship between the *speed* and the *time taken to orbit the Earth* can the student come to on the basis of this data?

.....

.....

(1 mark)

6

4.8.1.1 Our solar system

Question 25

0 1 . 1 The Sun is a star.

Which galaxy is the Sun in?

Tick **one** box.

[1 mark]

- Cartwheel ☐
- Milky Way ☐
- Starburst ☐
- Tadpole ☐

0 1 . 2 Light takes 500 seconds to travel from the Sun to the Earth.

Light travels at 300 000 kilometres per second.

Calculate the distance between the Sun and the Earth.

Use the equation:

distance = speed × time

[2 marks]

Distance = _____ kilometres

4.8.1.1 Our solar system

Question 25 · continued

Table 1 gives information about some of the planets in our solar system.

The planets are in order of increasing distance from the Sun.

Table 1

Planet	Time to orbit the Sun in years
Mercury	0.2
Venus	0.6
Earth	1.0
Mars	
Jupiter	12.0

0 1 . 3 There are some planets in our solar system missing from **Table 1**.

How many planets are missing?

[1 mark]

_____

0 1 . 4 Estimate how many years it takes Mars to orbit the Sun.

[1 mark]

_____ years

0 1 . 5 Calculate how many times Venus will orbit the Sun in 9 years.

[2 marks]

_____

_____

_____

_____

In 9 years Venus will orbit the Sun _____ times.

7

4.8.1.1 Our solar system

Question 26

November 2020 | 8463/2F | Original Q2

0 2 Our solar system includes the Sun, planets and moons.

0 2 . 1 Complete the sentence.

Choose the answer from the box.

[1 mark]

Andromeda	**Milky Way**	**Pinwheel**	**Whirlpool**

Our solar system is part of the _____ galaxy.

0 2 . 2 Planets orbit the Sun.

What force causes planets to orbit the Sun?

[1 mark]

_____

Table 2 shows data about five planets.

Table 2

Planet	Mean distance from the Sun in millions of kilometres	Mean surface temperature in °C
Earth	150	+22
Mars	228	–48
Jupiter	778	**X**
Saturn	1430	–178
Uranus	2870	–200

0 2 . 3 How does the mean surface temperature of the planets in **Table 2** change as the mean distance from the Sun increases?

[1 mark]

_____

_____

Question 26 · continued

0 2 . 4 Predict the mean surface temperature of Jupiter (**X**) in **Table 2**.

[1 mark]

Mean surface temperature of Jupiter = _____ °C

0 2 . 5 Five of the planets in the solar system are given in **Table 2**.

How many other planets are there in the solar system?

[1 mark]

Tick (✓) **one** box.

Two ☐

Three ☐

Four ☐

Five ☐

0 2 . 6 Our Moon is a natural satellite.

Why is the Moon classified as a satellite?

[1 mark]

Tick (✓) **one** box.

It has no atmosphere. ☐

It has no gravitational field. ☐

It is too small to be a planet. ☐

It orbits a planet. ☐

Question 2 continues on the next page

4.8.1.1 Our solar system

Question 26 · continued

0 2 . 7 How are planets and moons similar?

[2 marks]

Tick (✓) **two** boxes.

- Their mass is about the same. ☐
- Their orbits are circular. ☐
- Their surfaces are the same colour. ☐
- They are similar in diameter. ☐
- They do not emit visible light. ☐

0 2 . 8 The diameter of the Earth is 13 000 km.

The diameter of the Sun is 110 times greater than the diameter of the Earth.

Calculate the diameter of the Sun.

[2 marks]

Diameter of the Sun = _____ km

10

4.8.1.1 Our solar system

Question 27

June 2022 | 8463/2F | Original Q3

0 3 The Sun is at the centre of our solar system.

0 3 . 1 What type of object is the Sun?

[1 mark]

_____

0 3 . 2 What is the name of the galaxy our solar system is part of?

[1 mark]

Tick (✓) **one** box.

- Andromeda ☐
- Milky Way ☐
- Sombrero ☐
- Tadpole ☐

Question 27 · continued

Table 2 gives information about some of the moons in our solar system.

Table 2

Moon	Radius in kilometres
Ganymede	2630
Titan	2570
Europa	1560
Charon	606

0 3 . 3 What is a moon?

[1 mark]

0 3 . 4 A student researched the radius of some planets in the solar system.

radius of largest dwarf planet = 1190 km
radius of smallest planet = 2440 km

The student made the following conclusions:

1. dwarf planets are always smaller than moons
2. planets are always bigger than moons.

Give **one** reason why each of the student's conclusions is wrong.

Use the data given above and in **Table 2**.

[2 marks]

1

2

Question 3 continues on the next page

4.8.1.1 Our solar system

Question 27 · continued

The Earth's Moon and the International Space Station both orbit the Earth.

0 3 . 5 Give **one other** similarity and **one** difference between the orbit of the Earth's Moon and the orbit of the International Space Station.

[2 marks]

Similarity _____

_____

Difference _____

_____

0 3 . 6 Very few people have been to the International Space Station.

Suggest **one** reason why very few people have been to the International Space Station.

[1 mark]

_____

_____

_____

8

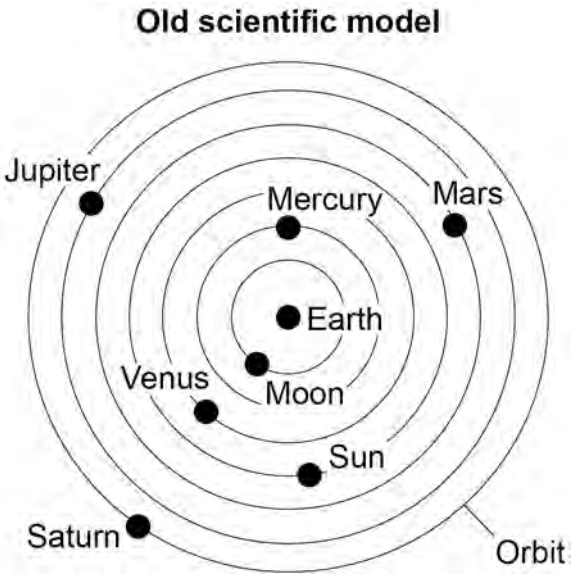
4.8.1.1 Our solar system

Question 28

June 2023 | 8463/2F | Original Q4

0 4 **Figure 10** shows an old scientific model of the solar system that has now been replaced.

Figure 10



0 4 . 1 Which statement is a reason for replacing an old scientific model with a newer scientific model?

[1 mark]

Tick (✓) **one** box.

- The old model cannot explain new observations. ☐
- The old model has been used by scientists for a long time. ☐
- The old model is too simple. ☐

4.8.1.1 Our solar system

Question 28 · continued

0 4 . 2 Compare the model of the solar system used now with the old model of the solar system shown in **Figure 10**.

[4 marks]

Question 4 continues on the next page

4.8.1.1 Our solar system

Question 28 · continued

Table 1 shows data about four planets.

Table 1

Planet	Mean distance from the Sun in millions of kilometres	Time taken for one orbit in Earth years
Mercury	58	0.25
Venus	108	0.60
Earth	150	1.00
Mars	228	1.90

0 4 . 3 How does the time taken for one orbit change as the mean distance from the Sun increases?

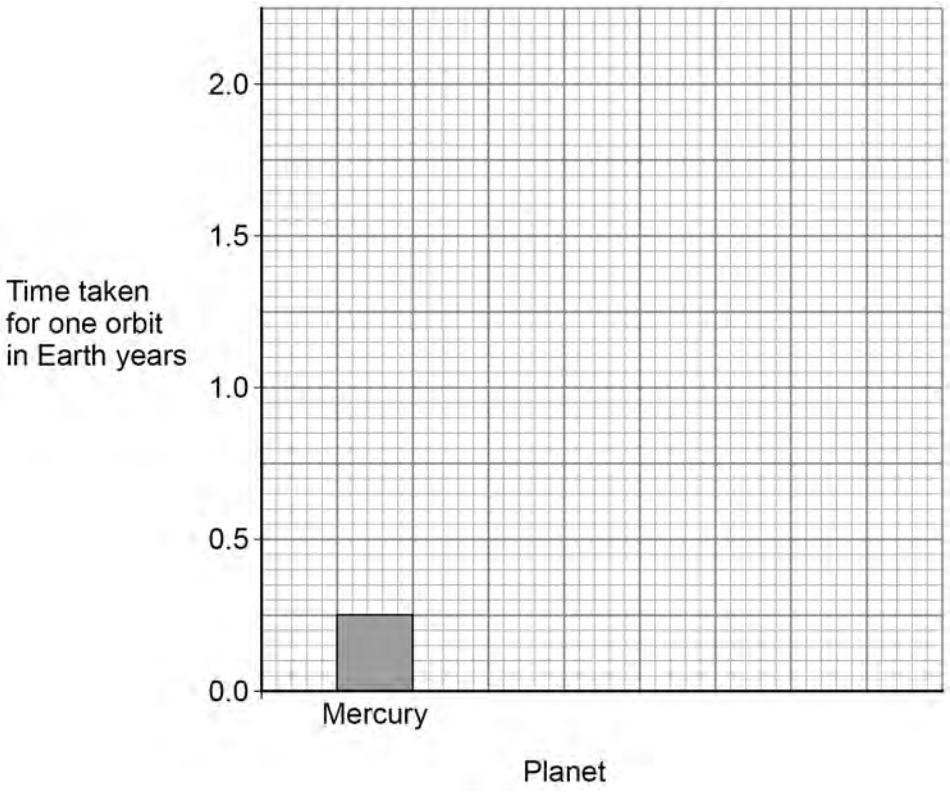
[1 mark]

4.8.1.1 Our solar system

Question 28 · continued

0 4 . 4 The bar chart in **Figure 11** shows some of the data from **Table 1**.

Figure 11



Complete the bar chart.

Use data from **Table 1**.

[2 marks]

Question 4 continues on the next page

Question 28 · continued

0 4 . 5 All stars have a life cycle.

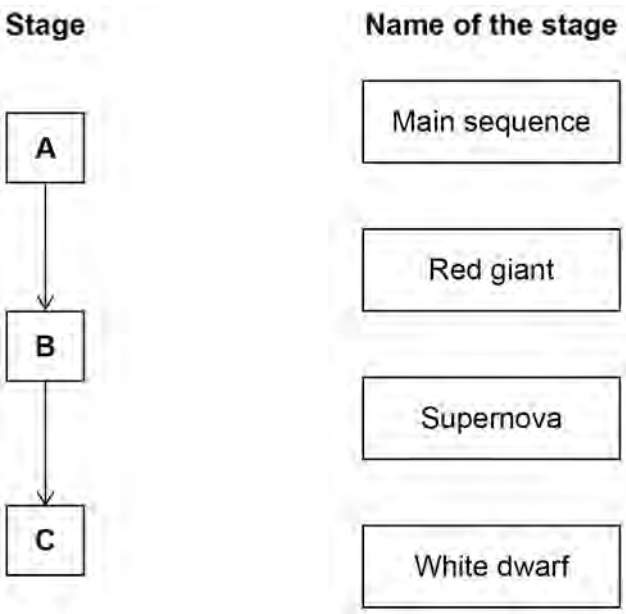
A, **B** and **C** in **Figure 12** represent three stages in the life cycle of the Sun.

The stages are in the correct order.

Draw **one** line from each stage to the name of the stage.

[2 marks]

Figure 12



0 4 . 6 Stars act like black bodies.

Which statement is true for perfect black bodies?

[1 mark]

Tick (✓) **one** box.

They are good reflectors of radiation. ☐

They are the best emitters of radiation. ☐

They easily transmit radiation. ☐

11

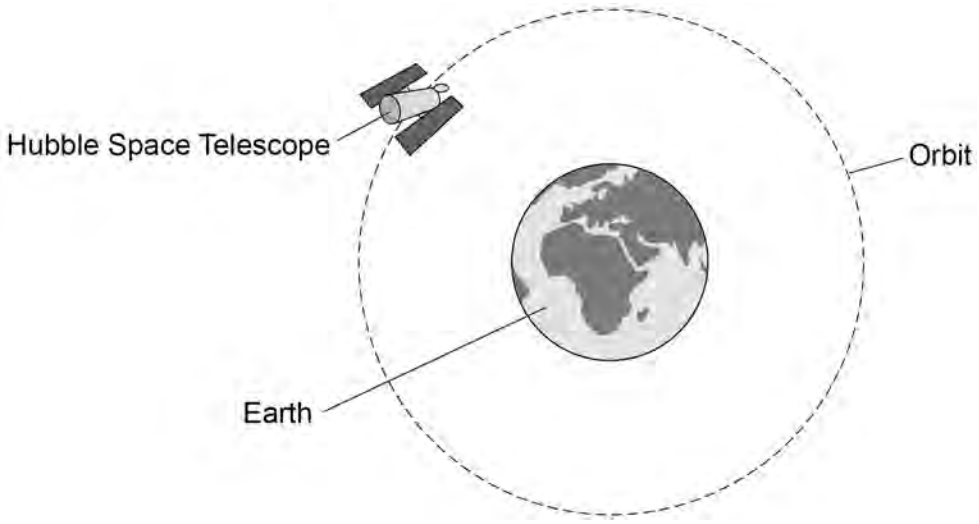
4.8.1.1 Our solar system

Question 29

June 2023 | 8463/2F | Original Q7

0 7 **Figure 17** shows the Hubble Space Telescope orbiting the Earth.

Figure 17



0 7 . 1 What name is given to an object that orbits a planet?

[1 mark]

Tick (✓) **one** box.

A comet ☐

A satellite ☐

A star ☐

0 7 . 2 The Earth exerts a gravitational force on the Hubble Space Telescope.

Draw an arrow on **Figure 17** to show the gravitational force.

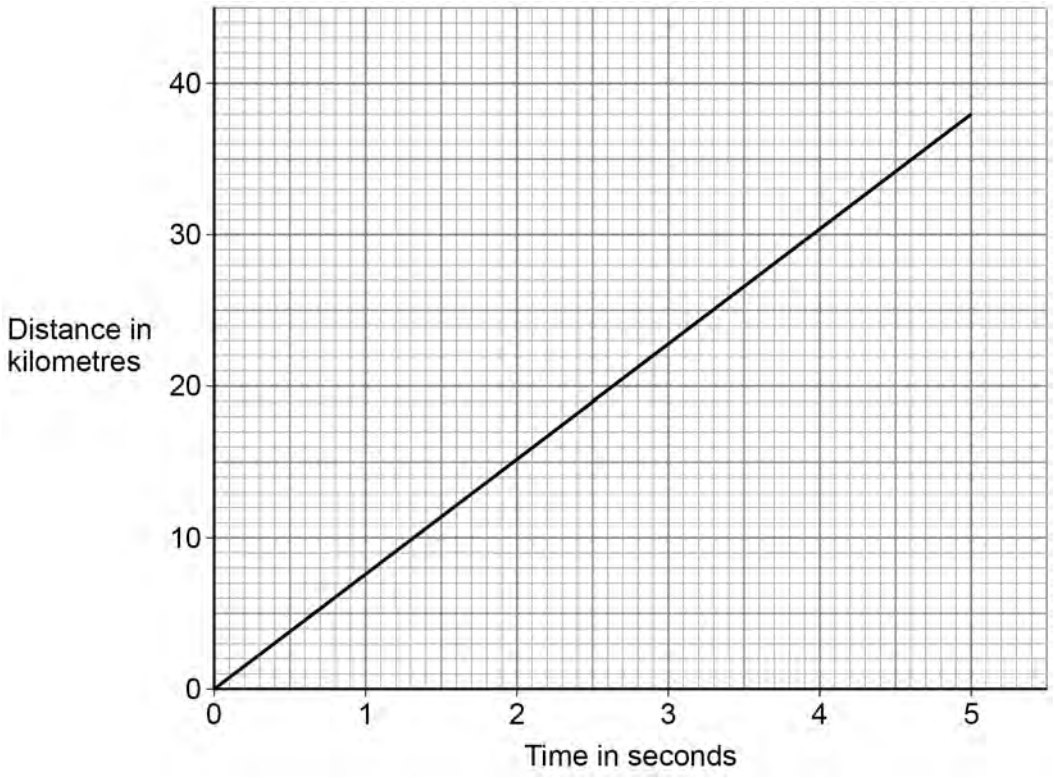
[1 mark]

4.8.1.1 Our solar system

Question 29 · continued

0 7 . 3 **Figure 18** shows how the distance travelled by the Hubble Space Telescope during its orbit changes with time.

Figure 18



The gradient of the line in **Figure 18** gives the speed of the Hubble Space Telescope.

Determine the speed of the Hubble Space Telescope.

Give your answer in km/s.

[3 marks]

Speed = _____ km/s

4.8.1.1 Our solar system

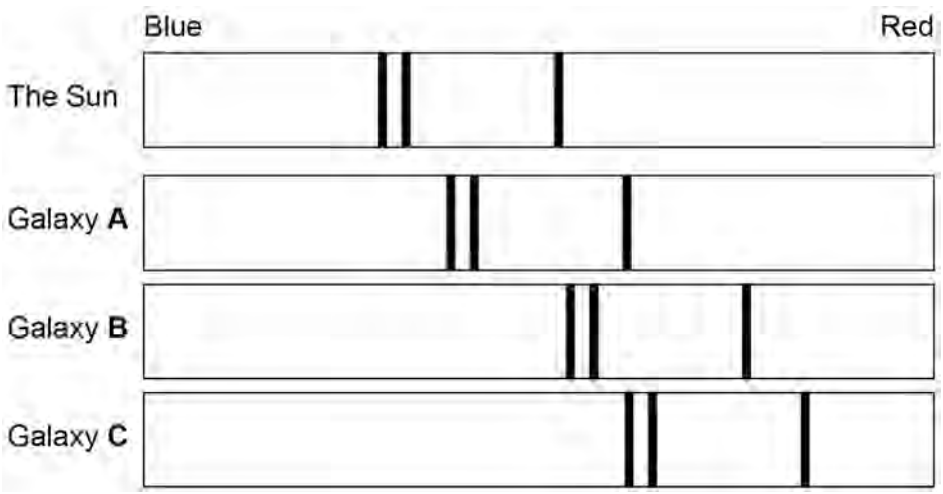
Question 29 · continued

The Hubble Space Telescope can detect the visible light spectra from distant galaxies.

The visible light spectra from stars and galaxies include dark lines at specific wavelengths.

Figure 19 shows the visible light spectra from the Sun and three galaxies.

Figure 19



0 7 . 4 Which galaxy is moving away from the Earth the fastest?

[1 mark]

Tick (✓) **one** box.

Galaxy **A** ☐

Galaxy **B** ☐

Galaxy **C** ☐

4.8.1.1 Our solar system

Question 29 · continued

June 2023 | 8463/2F | Original Q7

0 7 . 5 Which galaxy is the furthest away from the Earth?

[1 mark]

Tick (✓) **one** box.

Galaxy **A** ☐

Galaxy **B** ☐

Galaxy **C** ☐

0 7 . 6 New scientific observations indicate that many galaxies rotate too quickly for the known mass of the stars they contain.

Why is it important that new scientific observations are peer reviewed?

[1 mark]

Tick (✓) **one** box.

To check the observations are correct ☐

To identify control variables ☐

To provide more proof ☐

8

4.8.1.1 Our solar system

Question 30

June 2024 | 8463/2F | Original Q1

0 1 A group of stars is called a galaxy.

0 1 . 1 What is the name of our galaxy?

[1 mark]

Tick (✓) **one** box.

- Black Eye ☐
- Hockey Stick ☐
- Milky Way ☐
- Sculptor Dwarf ☐

0 1 . 2 The Sun is one of the stars in our galaxy.

What was the Sun originally formed from?

[1 mark]

Tick (✓) **one** box.

- Dust and gas ☐
- Heavy elements ☐
- Oxygen ☐

Question 30 · continued

0 1 . 3 Which of the following forces was involved in the formation of the Sun?

[1 mark]

Tick (✓) **one** box.

- Electrostatic force ☐
- Gravitational force ☐
- Magnetic force ☐

0 1 . 4 Stars produce light because they release energy.

Complete the sentence.

Choose the answer from the box.

[1 mark]

combustion	**conduction**	**fusion**

The process which releases energy inside stars is _____.

0 1 . 5 Visible light and infrared radiation travel from the Sun to the Earth.

Which statement describes the time taken for visible light and infrared radiation to travel from the Sun to the Earth?

[1 mark]

Tick (✓) **one** box.

- Visible light takes less time than infrared radiation ☐
- Visible light takes the same time as infrared radiation ☐
- Visible light takes more time than infrared radiation ☐

Question 30 · continued

0 1 . 6 Infrared radiation has a longer wavelength than visible light.

Complete the sentence.

Choose the answer from the box.

[1 mark]

smaller	**the same**	**greater**

Compared with the frequency of infrared radiation, the frequency of visible light is _____.

0 1 . 7 The Sun and the Earth both emit infrared radiation.

How does the rate of infrared radiation emitted by the Sun compare with the rate of infrared radiation emitted by the Earth?

Give a reason for your answer.

[2 marks]

Tick (✓) **one** box.

Lower rate than the Earth ☐

Same rate as the Earth ☐

Greater rate than the Earth ☐

8

Reason _____

_____

4.8.1.1 Our solar system

Question 31

June 2025 | 8463/2F | Original Q3

0 3 Telescopes are used to observe distant objects.

0 3 . 1 Complete the sentences.

Choose answers from the box.

[2 marks]

galaxy	**moon**	**nebula**	**star**	**universe**

A natural satellite of a planet is called a _____.

A planet orbits a _____.

0 3 . 2 What is the name of our galaxy?

[1 mark]

Tick (✓) **one** box.

- Andromeda ☐
- Centaurus ☐
- Milky Way ☐
- Whirlpool ☐

4.8.1.1 Our solar system

Question 31 · continued

0 3 . 3 The Sun is our nearest star.

What will happen to the Sun at the end of its life cycle?

[1 mark]

Tick (✓) **one** box.

It will become a black dwarf. ☐

It will become a black hole. ☐

It will become a neutron star. ☐

The James Webb Space Telescope is the most powerful telescope ever launched into space.

0 3 . 4 Very distant galaxies can be observed using the James Webb Space Telescope.

How does the speed of a very distant galaxy compare to the speed of a much nearer galaxy?

[1 mark]

Tick (✓) **one** box.

A very distant galaxy moves faster. ☐

The speeds are the same. ☐

A very distant galaxy moves slower. ☐

Question 3 continues on the next page

4.8.1.1 Our solar system

Question 31 · continued

0 3 . 5 There is an observed increase in the wavelength of light from most distant galaxies.

What name is given to this increase in the wavelength of light?

[1 mark]

Tick (✓) **one** box.

Blue-shift ☐

Green-shift ☐

Red-shift ☐

0 3 . 6 Observations from the James Webb Space Telescope support the Big Bang theory.

Complete the sentence.

Choose the answer from the box.

[1 mark]

cold	hot	large

The Big Bang theory suggests that the universe began from a region that

was extremely _____.

0 3 . 7 What does the Big Bang theory suggest is happening to the size of the universe?

[1 mark]

Tick (✓) **one** box.

The universe is getting smaller. ☐

The size of the universe is constant. ☐

The universe is getting bigger. ☐

8