AQA GCSE Physics | 8463

SPECIFICATION POINT 4.8.2

Red-shift (physics only)

Past-paper questions

Tier	**Foundation**
Question groups	**23**
Available paper years	**2006–2025**

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.

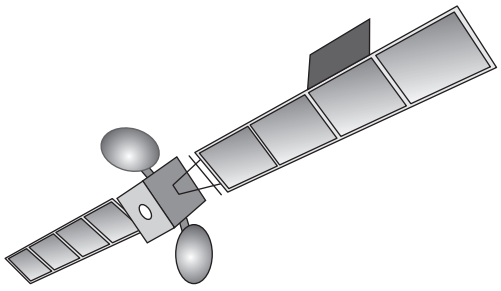
4.8.2 Red-shift (physics only)

Question 01

November 2006 | PHY1B | Original Q5 | Legacy

QUESTION FIVE

The drawing shows a satellite which carries a telescope used to observe space.



Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A a distant galaxy

B a satellite

C the Earth

D the Universe

Observations of space using visible light are better from . . . **1** . . . because clouds may block observations taken from . . . **2** . . . .

The red-shift in light from . . . **3** . . . provides evidence of the 'big bang' theory of the start of . . . **4** . . . .

4.8.2 Red-shift (physics only)

Question 02

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)

4.8.2 Red-shift (physics only)

Question 02 · 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

4.8.2 Red-shift (physics only)

Question 03

March 2007 | PHY1B | Original Q4 | Legacy

QUESTION FOUR

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A away from

B beyond

C furthest

D towards

The light that reaches us from distant galaxies shows a shift . . . **1** . . . the red end of the electromagnetic spectrum. This is evidence that these galaxies are moving . . . **2** . . . us at a very high speed.

Telescopes orbiting outside the Earth's atmosphere can detect infra red radiation from the . . . **3** . . . galaxies. This is . . . **4** . . . the capability of telescopes on the Earth's surface.

4.8.2 Red-shift (physics only)

Question 04

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.

4.8.2 Red-shift (physics only)

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

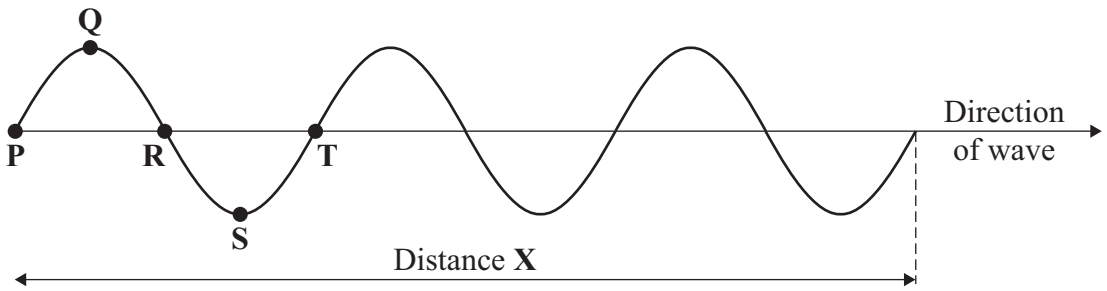
4.8.2 Red-shift (physics only)

Question 05

November 2007 | PHY1B | Original Q7 | Legacy

QUESTION SEVEN

The diagram shows part of a wave.



7A The wavelength of this wave is . . .

1 **PR**

2 **PT**

3 **RT**

4 **QS**

7B The wave travels distance **X** in 1 second.

The frequency of the wave is . . .

1 1 Hz

2 2 Hz

3 3 Hz

4 6 Hz

4.8.2 Red-shift (physics only)

Question 05 · continued

7C The spectrum of light from a source of white light moving away at high speed shows . . .

1 a 'shift' towards the red end of the spectrum.

2 an increase in the intensity of the ultraviolet radiation.

3 that light travels in straight lines.

4 that red light travels more slowly than blue light in a vacuum.

7D Scientists have analysed light from distant galaxies.

Their conclusion is that . . .

1 our solar system and distant galaxies are moving apart at high speed.

2 galaxies are moving towards each other at high speed.

3 galaxies are stationary.

4 the planets in our solar system are moving away from the Sun at high speed.

4.8.2 Red-shift (physics only)

Question 06

June 2008 | PHY1BP | Original Q6 | Legacy

QUESTION SIX

This question is about what scientists know about the universe.

Match words, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A a false statement

B an observation

C a belief which science cannot prove

D a theory

Statement about the universe	
God created the universe.	**1**
Red-shift, which suggests that galaxies are moving apart.	**2**
The universe was created by a ‘big bang’.	**3**
You can see the universe expanding by looking through a telescope.	**4**

4.8.2 Red-shift (physics only)

Question 07

June 2008 | PHY1F | Original Q4 | Legacy

4 The table gives data about two space telescopes. The Hubble telescope is already in space, but the James Webb telescope is still being built.

Name of telescope	Mirror diameter in metres	Launch Year	Orbit distance from the Earth in kilometres
Hubble	2.4	1990	575
James Webb	6.5	2013	1 500 000

4 (a) Give **one** reason why the image from an optical telescope on the Earth may not be as clear as the image produced by a space telescope.

.....

.....

(1 mark)

4 (b) Explain why it is easier for astronauts to service the Hubble telescope than it will be for astronauts to service the James Webb telescope.

.....

.....

.....

.....

(2 marks)

4 (c) The large mirror for the James Webb telescope will be folded, launched into space and then opened out. This will be a complicated process so a working scale model of the mirror system has been built.

Which statement gives a reason for building the scale model?

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

To see what the mirror system will look like ☐

To test the design to make sure it will work ☐

To measure the power needed by the telescope ☐

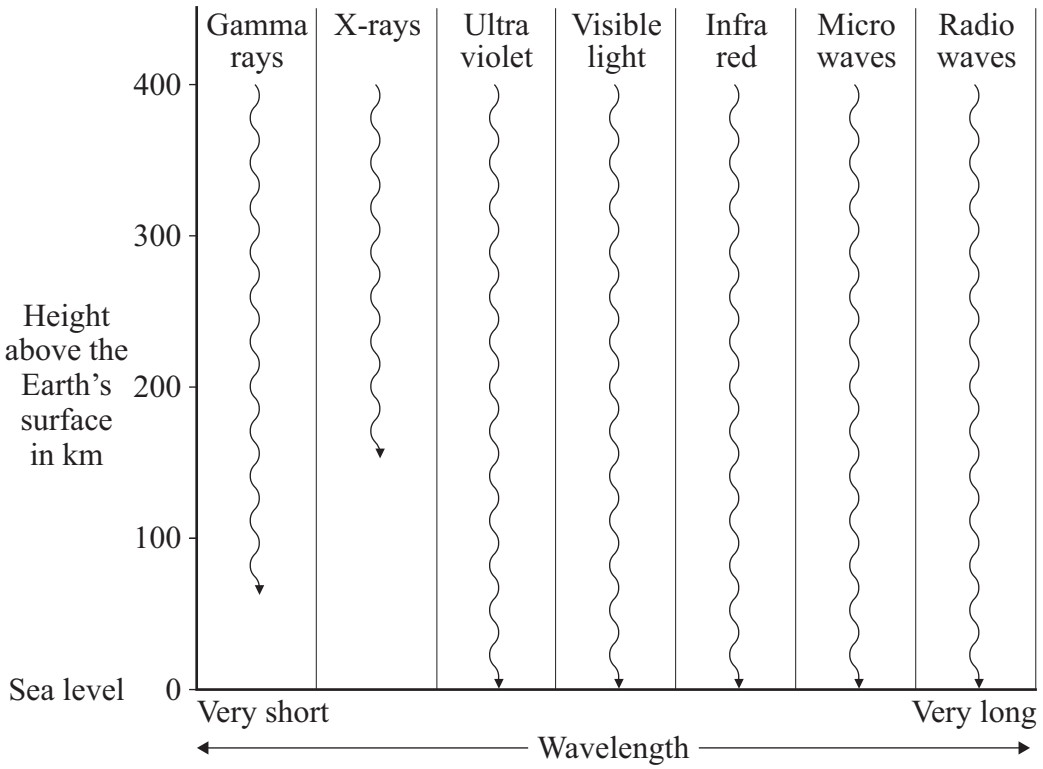
(1 mark)

4.8.2 Red-shift (physics only)

Question 07 · continued

for mark

4 (d) The diagram shows how far different types of electromagnetic wave can travel through the Earth's atmosphere before being absorbed.



Name **two** types of electromagnetic wave that can be detected by a space telescope but cannot be detected by a telescope positioned on Earth.

1 .....

2 .....

(2 marks)

4 (e) Observations of distant galaxies have given evidence to support the theory that the universe began from a very small point.

What name is given to this theory?

.....

(1 mark)

7

4.8.2 Red-shift (physics only)

Question 08

June 2009 | PHY1BP | Original Q7 | Legacy

QUESTION SEVEN

Scientists studying distant galaxies have noticed that light from them appears to have increased in wavelength.

7A What is this apparent increase in wavelength called?

1 black hole formation

2 blue-shift

3 red-shift

4 the Hubble effect

7B What does the apparent increase in wavelength suggest about the universe?

1 It is expanding.

2 It is contracting.

3 It was expanding but is now contracting.

4 It was contracting but is now expanding.

7C What does the apparent increase in wavelength suggest about the origin of the universe?

1 It all started from one small point.

2 It was formed by gravity pulling material together.

3 It was formed by two galaxies colliding.

4 It had no starting point; it has always existed.

7D What name is given to the theory about the origin of the universe that has been developed from these observations?

1 big bang theory

2 steady state theory

3 relativity theory

4 gravitational theory

4.8.2 Red-shift (physics only)

Question 09

November 2009 | PHY1BP | Original Q7 | Legacy

QUESTION SEVEN

Astronomers studying light from distant galaxies notice that the light from them seems to increase in wavelength.

7A The increase in wavelength is known as . . .

1 blue-shift.

2 contraction.

3 expansion.

4 red-shift.

7B The increase in wavelength . . .

1 is smaller the further away the galaxy is.

2 is larger the further away the galaxy is.

3 becomes zero for very distant galaxies.

4 is the same whether galaxies are moving towards us or away from us.

7C The unit of wavelength is the . . .

1 hertz.

2 metre.

3 metre per second.

4 second.

7D Most astronomers think that the universe began from a very small initial point.

Since then, the universe has . . .

1 been contracting.

2 been contracting then expanding.

3 been expanding.

4 stayed unchanged.

4.8.2 Red-shift (physics only)

Question 10

5 (a) An optical telescope, used to observe stars, is to be built either at the bottom or at the top of a high mountain.

5 (a) (i) What type of electromagnetic radiation is detected by an optical telescope?

.....

(1 mark)

5 (a) (ii) Give **one** advantage of having the telescope at the top of the high mountain rather than at the bottom.

.....

.....

(1 mark)

5 (b) Gamma radiation from the Sun is absorbed by the atmosphere.

Where should a telescope designed to detect gamma radiation be positioned?

.....

.....

(1 mark)

5 (c) By observing distant galaxies, scientists have found evidence to support the 'Big Bang' theory.

Which statement about the 'Big Bang' theory is correct?

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

Scientists have proved beyond doubt that it happened. ☐

It is the only way of explaining the origin of the Universe. ☐

The Universe began from a very small point. ☐

(1 mark)

4

4.8.2 Red-shift (physics only)

Question 11

June 2010 | PHY1BP | Original Q7 | Legacy

QUESTION SEVEN

Light is given out by the Sun and by galaxies.

7A Compared with the light from the Sun, the light from many galaxies has moved towards the red end of the spectrum.

What name is given to this effect?

1 light-move

2 light-shift

3 red-move

4 red-shift

7B The light from many galaxies is moved towards the red end of the spectrum.

This fact gives scientists evidence that . . .

1 galaxies are shrinking.

2 galaxies are changing colour.

3 the universe is expanding.

4 the universe is shrinking.

7C Scientists have a theory that the universe began from a very small point.

What name is given to this theory?

1 Big Bang

2 Big explosion

3 Expansion of space

4 Steady state

7D Scientists think that the universe began from a very small point because . . .

1 it can be proved using equations.

2 it is the only way of explaining how the universe began.

3 powerful telescopes enable us to see the small point.

4 at the moment it is the best way of explaining our observations.

4.8.2 Red-shift (physics only)

Question 12

June 2010 | PHY1F | Original Q5 | Legacy

5 (a) Scientists use telescopes to observe stars and galaxies.
Some telescopes are on Earth, but some are on satellites in space.

Why do telescopes in space give better images than telescopes on the Earth?

.....

.....

(1 mark)

5 (b) Scientists have observed that the wavelengths of the light given out from galaxies that are moving away from the Earth are longer than expected.

5 (b) (i) What name is given to this observation?

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

blue-shift ☐

green-shift ☐

red-shift ☐

(1 mark)

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

This observation gives evidence for the idea that the universe is

shrinking.

not changing.

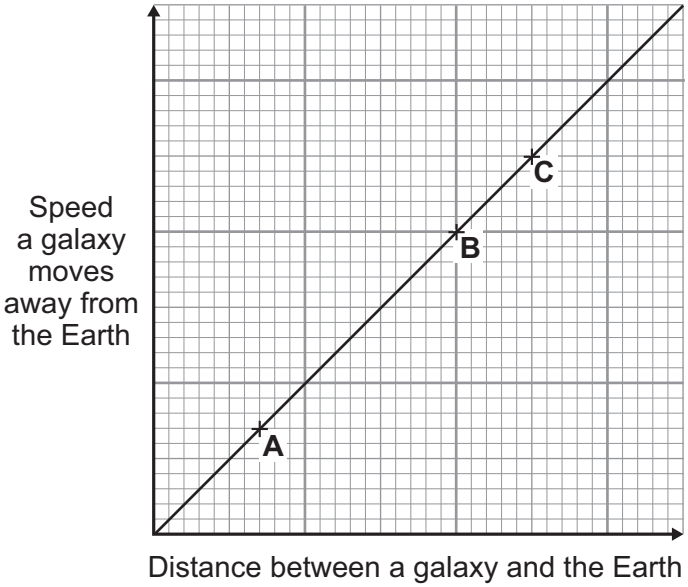
expanding.

(1 mark)

4.8.2 Red-shift (physics only)

Question 12 · continued

5 (c) Use the graph to answer the following questions.



5 (c) (i) What is the link between the speed that a galaxy moves away from the Earth and the distance between the galaxy and the Earth?

.....

.....

(1 mark)

5 (c) (ii) The positions of three galaxies, **A**, **B** and **C**, are marked on the graph.

From which galaxy, **A**, **B** or **C**, would the wavelength of the light reaching the Earth seem to have changed the most?

Galaxy .....

Give a reason for your answer.

.....

.....

.....

.....

(2 marks)

6

4.8.2 Red-shift (physics only)

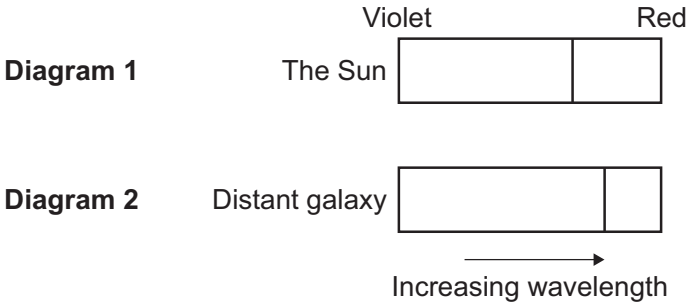
Question 13

November 2010 | PHY1BP | Original Q5 | Legacy

QUESTION FIVE

Diagram 1 shows the spectrum of light from the Sun. There is a black line in the spectrum.

Diagram 2 shows the spectrum of light from a distant galaxy. This spectrum has the same black line.



Match words, **A**, **B**, **C** and **D**, with the numbers **1**–**4** in the sentences.

A decreased

B increased

C shifted

D not changed

Edwin Hubble compared the spectrum of light from this distant galaxy to the spectrum of light from the Sun.

Hubble found that the position of the black line had . . . **1** . . . .

This was because the wavelength of the observed light had . . . **2** . . . .

The frequency of the observed light had . . . **3** . . . .

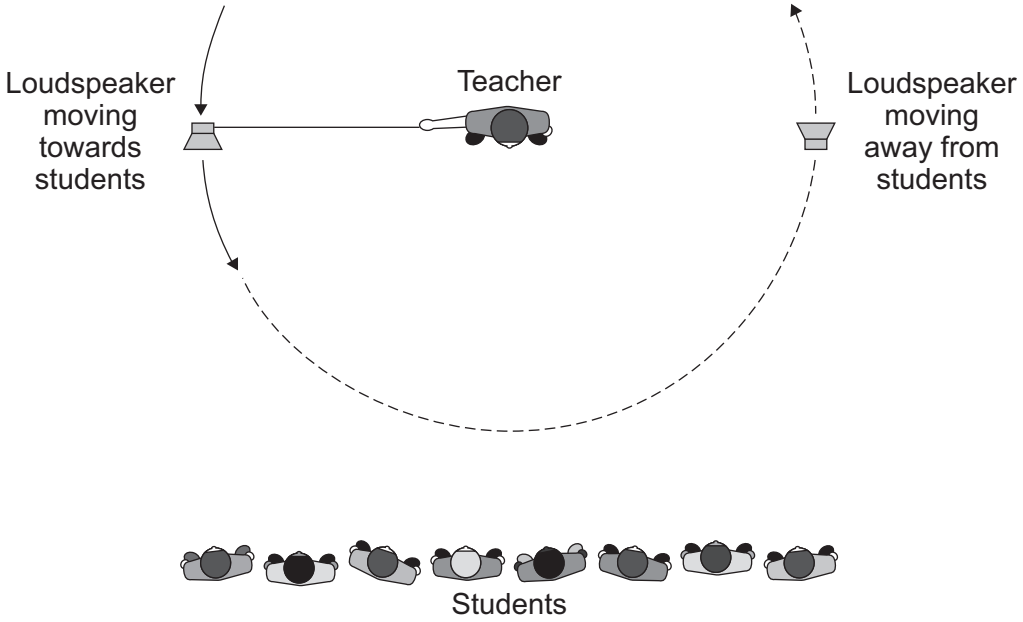
The speed of the light had . . . **4** . . . .

4.8.2 Red-shift (physics only)

Question 14

January 2011 | PHY1F | Original Q7 | Legacy

7 The diagram shows a teacher using a loudspeaker to demonstrate an important effect. The loudspeaker, which produces a note of constant frequency, is swung around in a circle.



7 (a) As the loudspeaker moves towards the students, the frequency of the note heard by the students increases.

What happens to the note heard by the students as the loudspeaker moves away from them?

.....

.....

(1 mark)

4.8.2 Red-shift (physics only)

Question 14 · continued

7 (b) The teacher is using the demonstration to model the red-shift in light that is observed from most distant galaxies.

7 (b) (i) Which **one** of the following statements gives the main reason why models are used in science?

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

Models can help to explain an effect or theory. ☐

Models can prove that a theory is correct. ☐

Models can help to generate new ideas. ☐

(1 mark)

7 (b) (ii) Explain how this demonstration can be used as a model for red-shift.

.....

.....

.....

.....

(2 marks)

7 (c) Red-shift provides evidence to support the theory that the Universe began from a very small initial point.

What name is given to this theory?

.....

(1 mark)

5

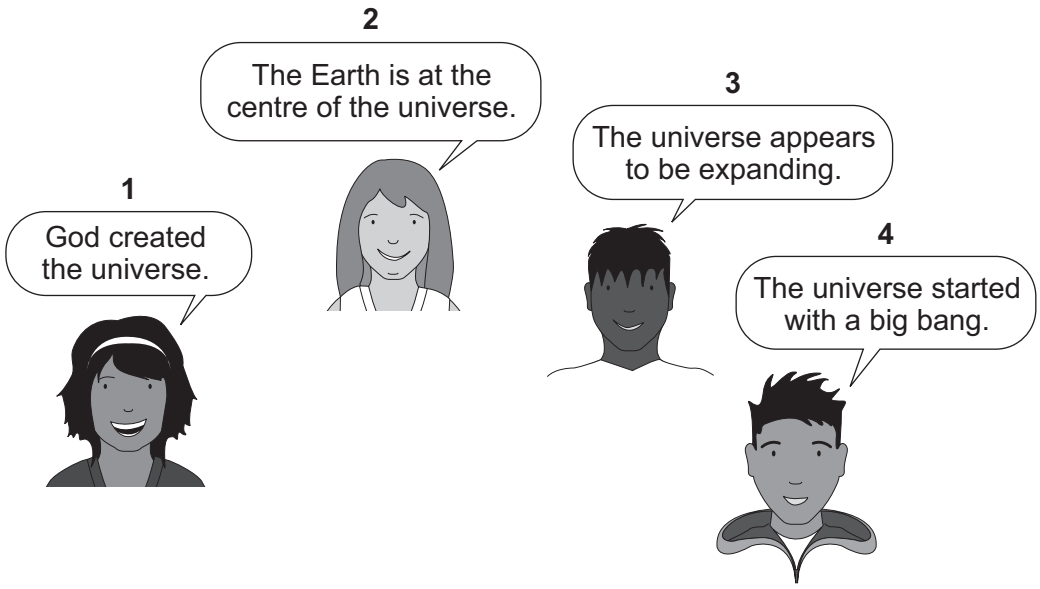
4.8.2 Red-shift (physics only)

Question 15

March 2011 | PHY1BP | Original Q5 | Legacy

QUESTION FIVE

Some students are talking about the universe.



Match descriptions, **A**, **B**, **C** and **D**, with the students' statements **1**–**4**.

A a belief that science cannot disprove

B a conclusion based on observations of red-shift

C a theory supported by scientific evidence but not direct observations

D a theory that science has disproved

4.8.2 Red-shift (physics only)

Question 16

June 2011 | PHY1BP | Original Q5 | Legacy

QUESTION FIVE

A source of sound waves is moving away from an observer.

Match words, **A**, **B**, **C** and **D**, with the numbers **1**–**4** in the sentences.

A frequency

B red-shift

C wavelength

D wave speed

Compared with the sound that the source emits, the observer hears a sound with a bigger . . . **1** . . . and a smaller . . . **2** . . . .

There is no change in the . . . **3** . . . .

A similar effect is seen with the light from a distant galaxy. This is called . . . **4** . . . .

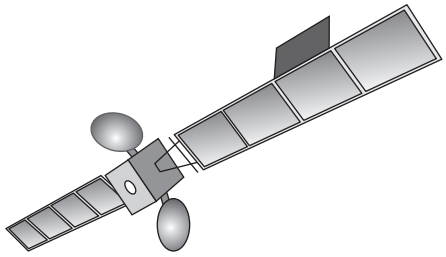
4.8.2 Red-shift (physics only)

Question 17

November 2011 | PHY1BP | Original Q3 | Legacy

QUESTION THREE

The drawing shows a satellite that carries a telescope used to look at objects in space.



Match words, **A**, **B**, **C** and **D**, with the numbers **1**–**4** in the sentences.

A a distant galaxy

B a satellite

C the Earth

D the Universe

Observations of space using visible light are better made from . . . **1** . . . because clouds may block observations made from . . . **2** . . . .

The red-shift in light from . . . **3** . . . provides evidence of the ‘big bang’ theory of the start of . . . **4** . . . .

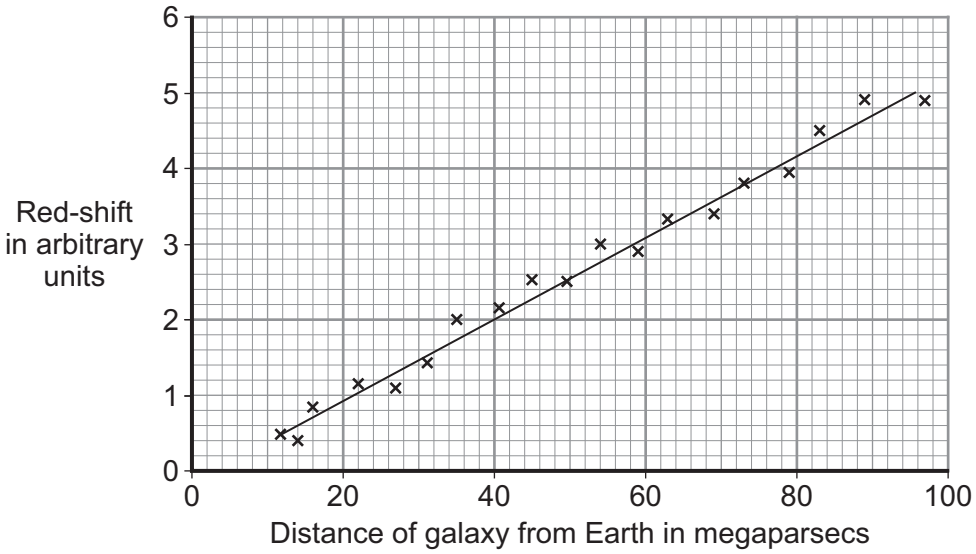
4.8.2 Red-shift (physics only)

Question 18

November 2011 | PHY1BP | Original Q7 | Legacy

QUESTION SEVEN

The graph shows the red-shift for a number of galaxies.



A megaparsec is a unit of distance used by astronomers.

7A The graph shows that . . .

1 the further away from Earth a galaxy is, the smaller the red-shift.

2 the further away from Earth a galaxy is, the bigger the red-shift.

3 the amount of red-shift is the same however far from Earth the galaxy is.

4 there is no relationship between red-shift and the distance from Earth.

7B A scientist is concerned that not all the points on the graph lie on the straight line.

How can the scientist check that the results are reliable?

1 ignore the results that do not fit on the line

2 use more precise measuring instruments

3 make the observations from space telescopes

4 compare the data with that obtained by other scientists

4.8.2 Red-shift (physics only)

Question 18 · continued

7C A galaxy produces a red-shift of 2 units.

How far from Earth is it?

1 20 megaparsecs

2 40 megaparsecs

3 60 megaparsecs

4 80 megaparsecs

7D Data is obtained for another distant galaxy that shows red-shift. This data does not fit the pattern of the other galaxies.

Data such as this that does not fit the pattern is called . . .

1 accurate.

2 anomalous.

3 precise.

4 sensitive.

4.8.2 Red-shift (physics only)

Question 19

June 2012 | PH1FP | Original Q3 | Legacy

3 A school is near a busy road. A car travels past the school at high speed.



The students notice that the sound of the car engine seems to change as the car travels past the school. A teacher says that this is an example of the Doppler effect. The students decide to study the sound they hear from passing cars.

3 (a) (i) Give **one** risk the students should consider when doing their study.

.....

(1 mark)

3 (a) (ii) As a car travels towards the students, the frequency of the sound the students hear is different to the frequency of the sound they would hear if the car was stationary.

Draw a ring around the correct answer in the box to complete the sentence.

Compared to the sound from the stationary car, the frequency has

decreased.
increased.
become quieter.

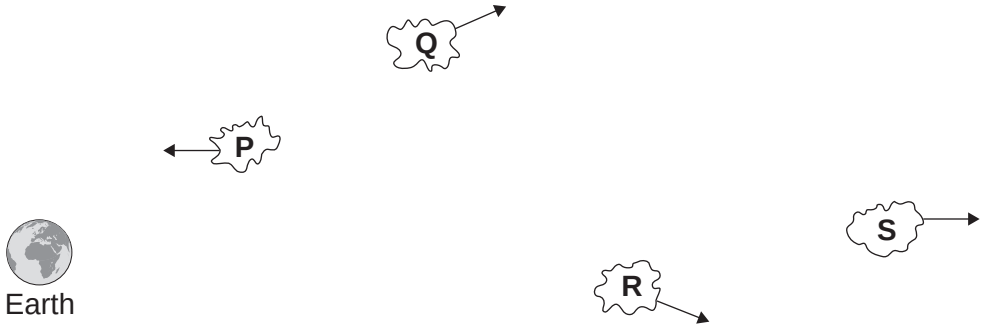
(1 mark)

4.8.2 Red-shift (physics only)

Question 19 · continued

3 (b) In the same way as the sound from the car engine changes, the light from most galaxies also seems to have a change in observed frequency. This is called red-shift.

3 (b) (i) The diagram shows four galaxies, **P**, **Q**, **R** and **S**. The arrows show the direction the galaxies are moving relative to the Earth.



Which **one** of the galaxies is moving the fastest?

Write the correct answer in the box. ☐

Which **one** of the galaxies will produce the biggest red-shift?

Write the correct answer in the box. ☐

(2 marks)

Question 3 continues on the next page

4.8.2 Red-shift (physics only)

Question 19 · continued

3 (b) (ii) Most scientists support a theory that the Universe began from a very small initial point. Red-shift can be used as evidence for this theory.

What name is given to the theory that the Universe began from a very small initial point?

.....

(1 mark)

3 (b) (iii) Cosmic microwave background radiation (CMBR) provides more evidence for this theory. CMBR is detected coming from space.

Where does CMBR come from?

Tick (✓) **one** box.

CMBR only comes from near the Sun. ☐

CMBR comes from all parts of the Universe. ☐

CMBR only comes from the Moon. ☐

(1 mark)

3 (b) (iv) Which statement gives the reason why most scientists support the theory that the Universe began from a very small initial point?

Tick (✓) **one** box.

The evidence proves it happened. ☐

There is no other way of explaining how the Universe began. ☐

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

(1 mark)

7

4.8.2 Red-shift (physics only)

Question 20

7 (a) Scientists have observed that the wavelengths of the light from galaxies moving away from the Earth are longer than expected.

7 (a) (i) What name is given to this observation?

.....

(1 mark)

7 (a) (ii) Draw a ring around the correct answer in the box to complete the sentence.

This observation gives scientists evidence that

light can be stretched.
galaxies are changing colour.
the Universe is expanding.

(1 mark)

7 (a) (iii) There is a pattern linking the size of the observed increase in the wavelengths of light from a galaxy and the distance the galaxy is from the Earth.



Which **one** of the graphs, **L**, **M** or **N**, shows the correct pattern?

Write the correct answer in the box. ☐

(1 mark)

4.8.2 Red-shift (physics only)

Question 20 · continued

7 (b) Observations help scientists answer questions about the Universe.

Scientists **cannot** answer every question.

Which **one** of the following questions **cannot** be answered by scientists?

Tick (✓) **one** box.

How old is the Universe? ☐

Why was the Universe created? ☐

How fast does light travel through the Universe? ☐

(1 mark)

4

Turn over for the next question

4.8.2 Red-shift (physics only)

Question 21

June 2019 | 8463/2F | Original Q2

0 2 Most galaxies are moving away from the Earth. Scientists can determine the speed of a galaxy by observing the light from the galaxy.

0 2 . 1 Complete the sentence.

Choose the answer from the box.

[1 mark]

frequency	**speed**	**wavelength**

When scientists observe the light from distant galaxies, they observe an increase in the _____ of light from those galaxies.

4.8.2 Red-shift (physics only)

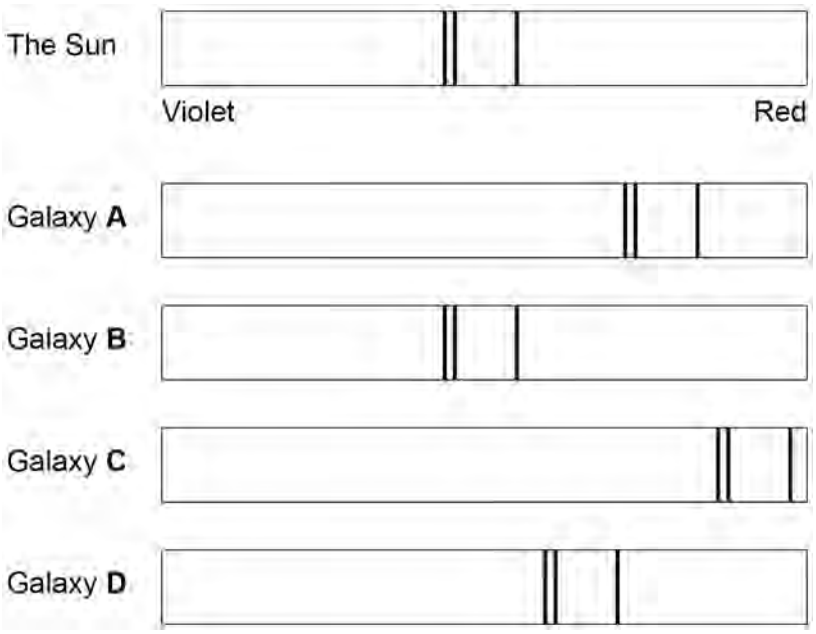
Question 21 · continued

The light spectra from stars and galaxies include dark lines.

The lines have the same pattern.

Figure 3 shows the light spectrum from the Sun and from four galaxies.

Figure 3



0 2 . 2 Which galaxy is moving the fastest away from the Earth?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 2 . 3 Which galaxy is the furthest away from the Earth?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.8.2 Red-shift (physics only)

Question 21 · continued

0 2 . 4 The Big Bang theory is one way to explain the origin of the universe.

How does the Big Bang theory describe the universe when it began?

[1 mark]

Tick (✓) **one** box.

- Very big and very dense ☐
- Very big and extremely hot ☐
- Very dense and extremely hot ☐
- Very small and extremely cold ☐

0 2 . 5 Which statement about the Big Bang theory is correct?

[1 mark]

Tick (✓) **one** box.

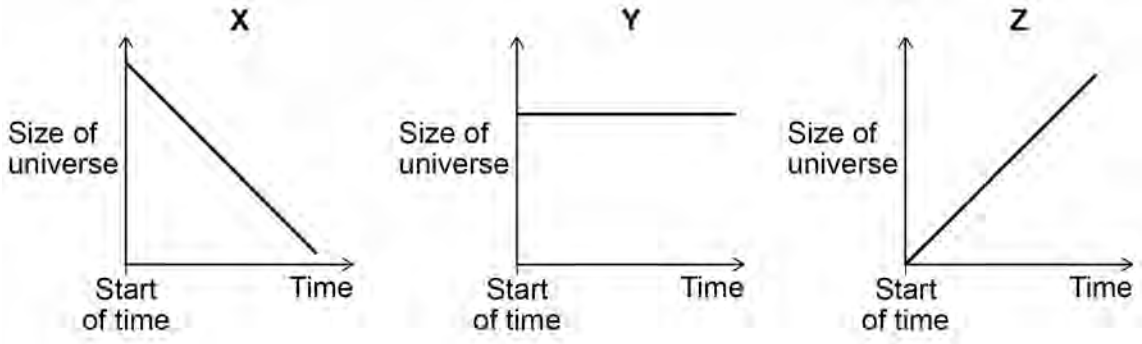
- Scientists have proved that the theory is correct. ☐
- Scientific evidence supports the theory. ☐
- There is no other way to explain the origin of the universe. ☐

4.8.2 Red-shift (physics only)

Question 21 · continued

0 2 . 6 **Figure 4** shows three ways that the size of the universe may have changed with time.

Figure 4



Which graph would the Big Bang theory suggest is correct?

[2 marks]

Tick (✓) **one** box.

X ☐ Y ☐ Z ☐

Give a reason for your answer.

_____

_____

7

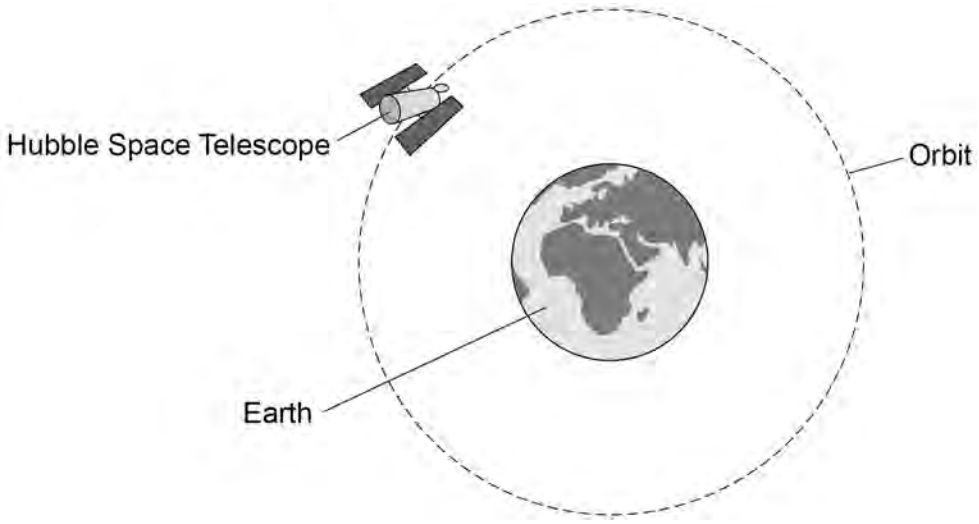
4.8.2 Red-shift (physics only)

Question 22

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.

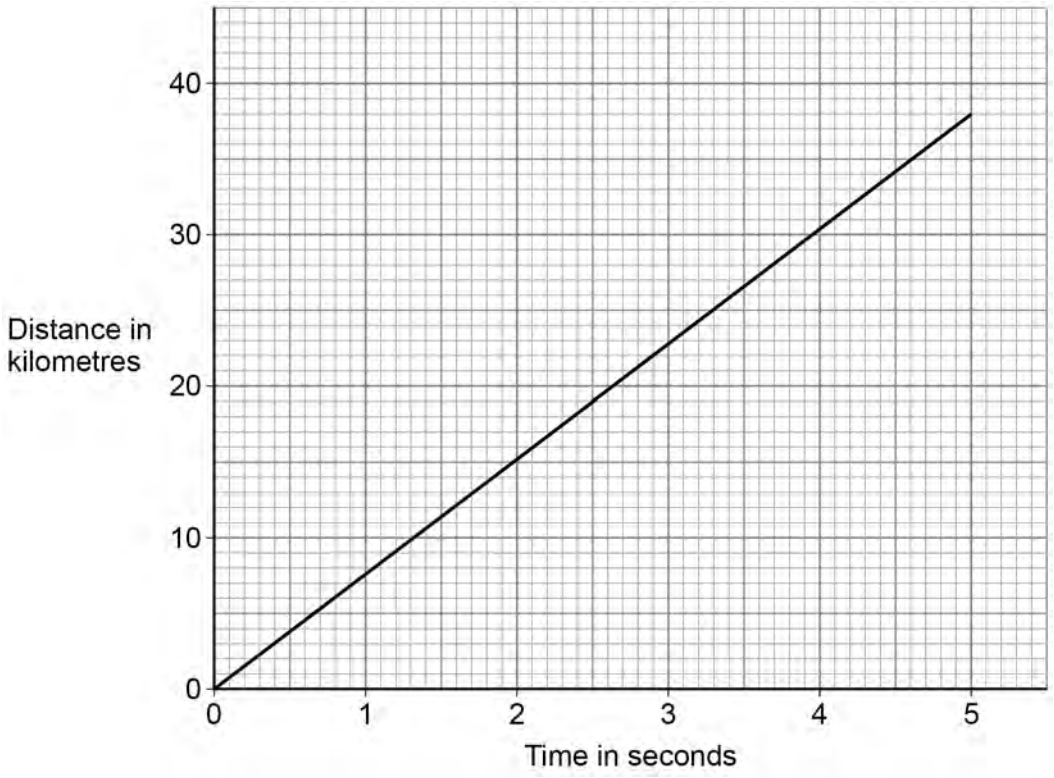
[1 mark]

4.8.2 Red-shift (physics only)

Question 22 · 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

4.8.2 Red-shift (physics only)

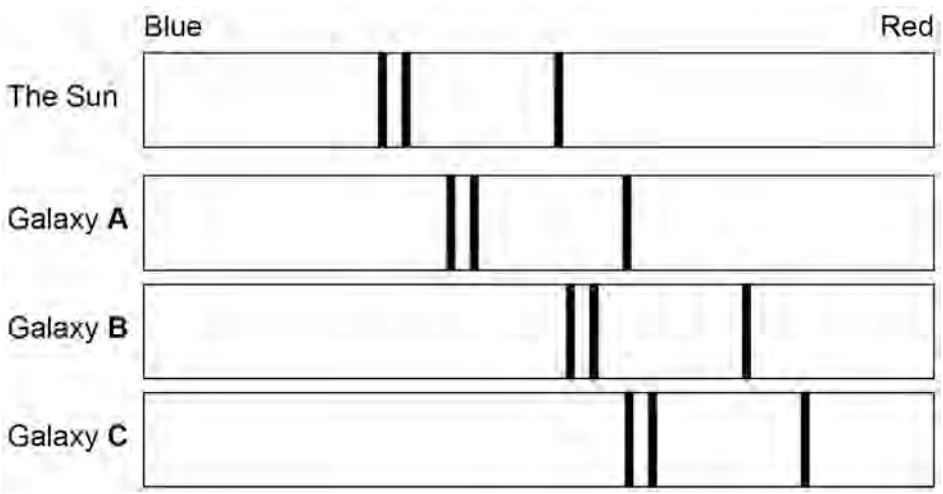
Question 22 · continued

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** ☐

4.8.2 Red-shift (physics only)

Question 22 · 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

4.8.2 Red-shift (physics only)

Question 23

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 ☐

4.8.2 Red-shift (physics only)

Question 23 · 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

4.8.2 Red-shift (physics only)

Question 23 · 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