



Surname	Initial(s)
Signature	

Paper Reference(s)

5010 5046

Edexcel GCSE

Science (5010)

Physics (5046)

P1b – Topics 11 and 12

Foundation and Higher Tier

Thursday 24 June 2010 – Afternoon

Time: 20 minutes

Materials required for examination

Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers

Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

Foundation tier candidates: answer questions 1 – 24.

Higher tier candidates: answer questions 17 – 40.

All candidates are to answer questions 17 – 24.

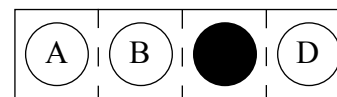
Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D
and mark it in HB pencil on the answer sheet.

For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

Do any necessary calculations and rough work in this booklet. You may use a calculator if you wish.

You must not take this booklet or the answer sheet out of the examination room.

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Turn over

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**Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.**

Space

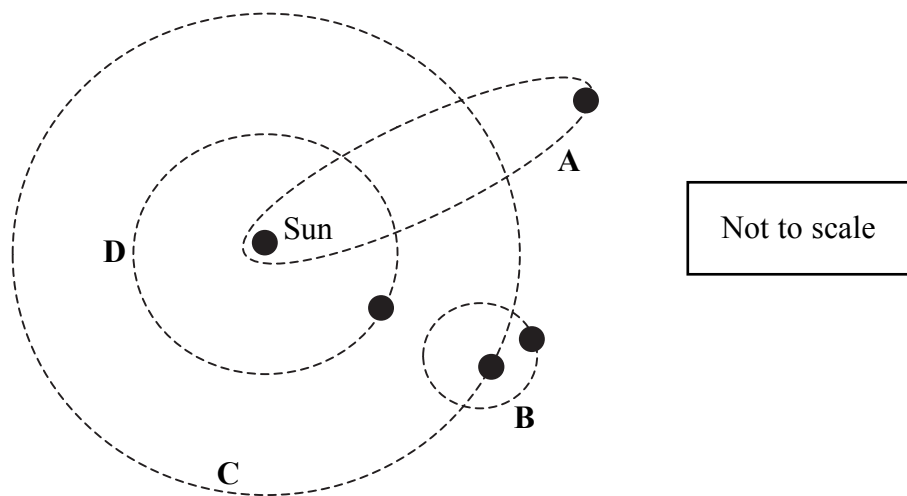
1. The Sun, with its planets, their moons and asteroids are called the

- A Milky Way
- B Universe
- C Galaxy
- D Solar System

2. Stars and planets are formed when dust and gas are pulled together by a force.
This force is called

- A friction
- B thrust
- C gravity
- D magnetism

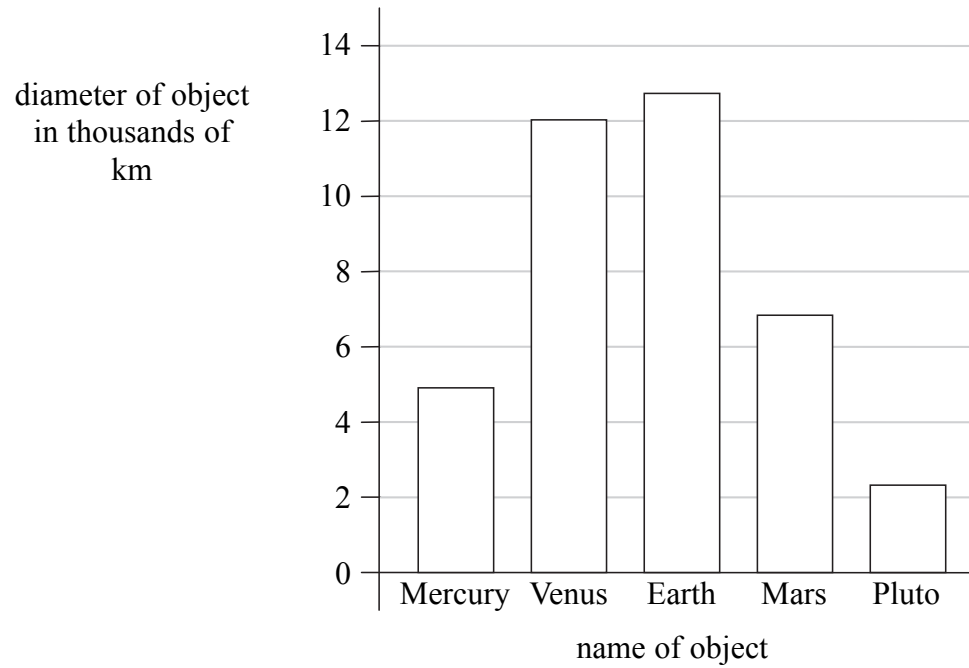
3. Which of these dotted lines shows the orbit of a comet?



4. Which of these is most likely to collide with the Earth?

- A a comet
- B a planet
- C a moon
- D a star

5. The bar chart shows the diameter of some objects that orbit the Sun.



The object with almost the same diameter as Earth is

- A Mercury
 - B Venus
 - C Mars
 - D Pluto
6. All planets
- A have at least one moon
 - B have rings around them
 - C are made of gas
 - D are in orbit around a star
7. Which of these provides evidence for the possibility of life on Mars?
- A photographs of Mars show that it has extinct volcanoes
 - B a day on Mars lasts almost the same time as a day on Earth
 - C mars has summer and winter because its axis is tilted
 - D soil samples collected on Mars contain ice

8. Which of these is correct about extraterrestrial life forms?
- A scientists have proved that these life forms exist
 - B scientists will never prove that these life forms exist
 - C scientists do not know if these life forms exist
 - D during this century, scientists will prove that these life forms exist

Waves in medicine

9. Mobile phones can interfere with some hospital equipment.
The radiation used to send and receive calls is
- A infrared radiation
 - B microwave radiation
 - C ultrasound radiation
 - D ultraviolet radiation

Use this information to answer questions 10 and 11.

A scanner shows an image of a developing fetus.



10. The fetus is scanned using
- A gamma rays
 - B X-rays
 - C ultrasound waves
 - D ultraviolet waves
11. The scanner forms the image from waves that are
- A absorbed by the fetus
 - B emitted by the fetus
 - C radiated by the fetus
 - D reflected by the fetus

12. Sometimes doctors measure a patient's temperature using an ear thermometer.



This thermometer measures temperature by scanning for

- A infrared radiation absorbed by the eardrum
 - B infrared radiation emitted by the eardrum
 - C ultrasound radiation absorbed by the eardrum
 - D ultrasound radiation emitted by the eardrum
13. Doctors use images of broken bones.

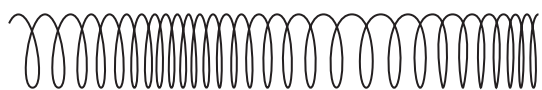


These images are formed because

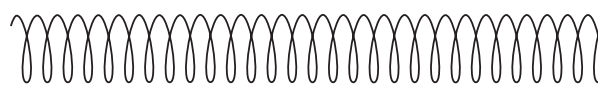
- A some X-rays are emitted by bones in the hand
- B some X-rays are absorbed by bones in the hand
- C some ultraviolet rays are emitted by bones in the hand
- D some ultraviolet rays are absorbed by bones in the hand

Investigating waves

14. Which of these shows a longitudinal wave?



A



B



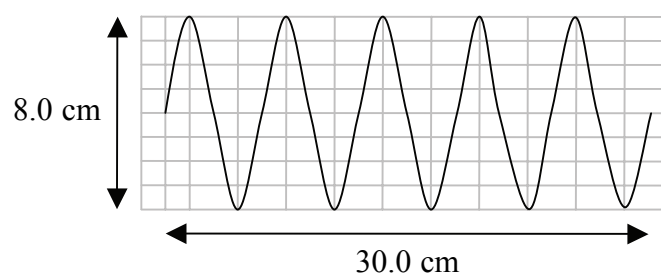
C



D

Use this information to answer questions 15 and 16.

A student draws this image of a wave.



15. The amplitude of the wave is

- A** 4.0 cm
- B** 6.0 cm
- C** 8.0 cm
- D** 30.0 cm

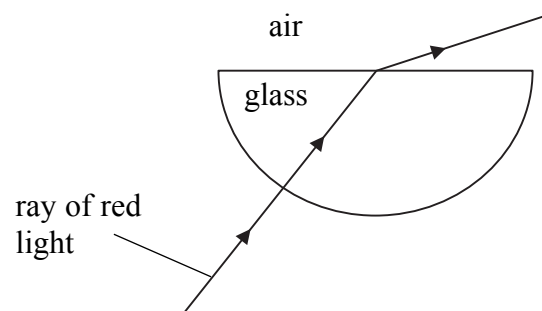
16. The wavelength of the wave is

- A** 4.0 cm
- B** 6.0 cm
- C** 8.0 cm
- D** 30.0 cm

Higher tier candidates start at question 17 and answer questions 17 to 40.
 Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Light and waves

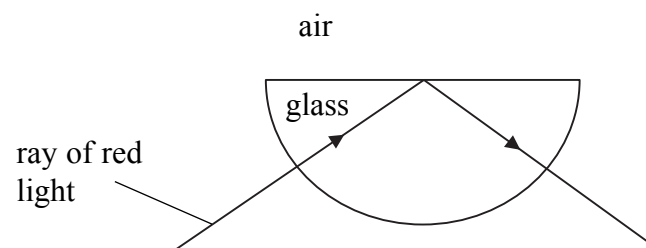
The diagram shows the path of a ray of red light through a glass block.



17. The ray of light is refracted as it travels from glass into air because

- A its speed changes
- B its amplitude changes
- C its frequency changes
- D it is not white light

18. A student discovers that some rays follow a different path.



Which row of the table is correct for this path?

	reason for direction change	this is used in
A	total internal reflection	optical fibres
B	total internal reflection	spectacles
C	total internal refraction	optical fibres
D	total internal refraction	spectacles

19. Electromagnetic waves transfer

- A energy but not matter
- B matter but not energy
- C both energy and matter
- D neither energy nor matter

20. Which row of the table is correct for a radio wave compared to other parts of the electromagnetic spectrum?

	the wavelength of a radio wave is	the frequency of a radio wave is
A	longest	highest
B	shortest	lowest
C	longest	lowest
D	shortest	highest

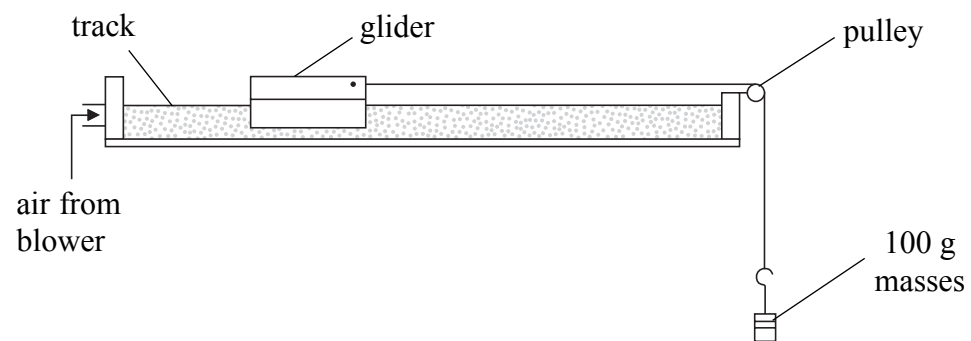
Acceleration

21. A rocket is accelerating upwards.
Which row of the table is correct for the rocket?

	the kinetic energy of the rocket is	the gravitational potential energy of the rocket is
A	decreasing	decreasing
B	increasing	decreasing
C	decreasing	increasing
D	increasing	increasing

Use this information to answer questions 22 and 23.

Some students investigate the motion of a glider on an air track.
The glider moves over a cushion of air and so there is very little friction.



$$\text{weight} = \text{mass} \times \text{gravitational field strength}$$

Gravitational field strength = 10 N/kg

22. In one experiment the students used three 100 g masses to accelerate the glider.
The total weight of the three masses is

- A 3 N
- B 30 N
- C 300 N
- D 3000 N

23. The students discuss their investigation.

Reducing friction will make the experiment a fair test.

Amit

We should use an electronic timer to measure the acceleration.

Brendan

Doubling the weight will double the acceleration.

Colyn

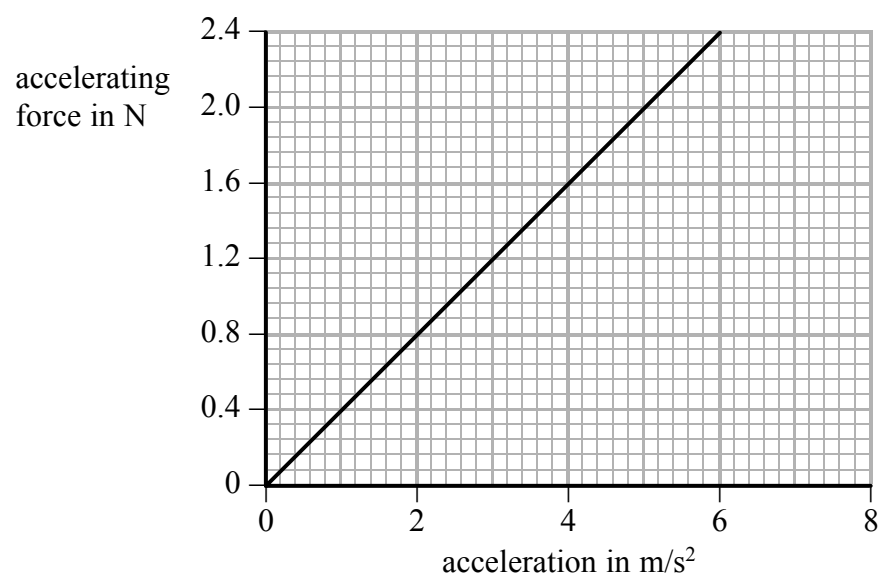
When we repeat the experiment we must use a glider with the same mass.

Dermot

Who has made a prediction for the investigation?

- A Amit
- B Brendan
- C Colyn
- D Dermot

24. The students plot their results on a graph.



The acceleration produced by an accelerating force of 1.0 N would be

- A 0.40 m/s^2
- B 2.25 m/s^2
- C 2.5 m/s^2
- D 3.0 m/s^2

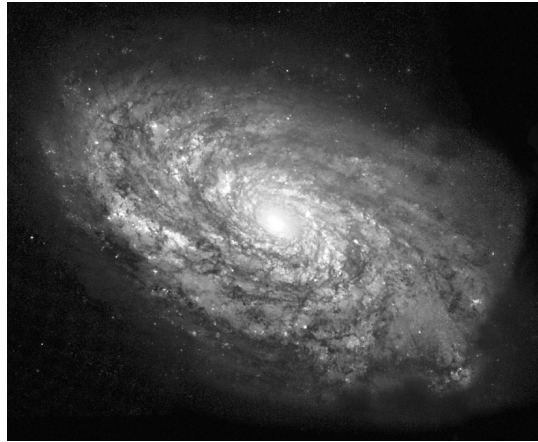
TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

Foundation tier candidates do not answer any more questions after question 24.

**Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.**

Space

25. The photograph shows millions of stars.



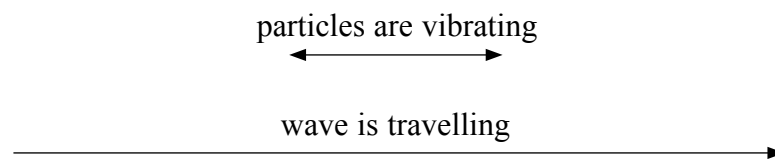
This group of stars is

- A a Universe of stars
 - B a galaxy of stars
 - C a nebula
 - D the Big Bang
26. Which row of the table best describes conditions in space far from any planet?

	gravitational field strength	temperature is about
A	same as on Earth	-270 °C
B	much less than on Earth	-270 °C
C	same as on Earth	0 °C
D	much less than on Earth	0 °C

Waves

27. The diagram shows the direction in which particles of a wave are vibrating. It also shows the direction the wave is travelling.



The wave could be

- A a radio wave
 - B a light wave
 - C a sound wave
 - D an ultraviolet wave
28. An astronaut on the Moon can see a spacecraft. The astronaut sends a microwave signal, a light signal and a radio signal to the spacecraft. The signals all leave at the same time.

In which order do the signals arrive at the spacecraft?

- A light first, then radio, then microwave
 - B radio first, then light, then microwave
 - C light first, then microwave, then radio
 - D they all arrive at the same time
29. The table gives information about three types of ultraviolet (UV) radiation.

type of radiation	UVA	UVB	UVC
range of wavelengths (nanometres)	400–320	320–280	280–100

UVC is the most dangerous form of ultraviolet radiation because it has the

- A least energy
- B highest speed
- C longest wavelength
- D highest frequency

30. Optical fibres are often used instead of copper cables for sending signals.
Which row of the table is correct for using optical fibres instead of copper cables?

	in optical fibres	in optical fibres
A	more energy is lost per km	less information can be sent per second
B	more energy is lost per km	more information can be sent per second
C	less energy is lost per km	more information can be sent per second
D	less energy is lost per km	less information can be sent per second

31. $\text{speed} = \text{distance}/\text{time}$

Amy sees a lightning flash.
She hears the thunder from the flash 5 seconds later.
The sound travels at 340 m/s.

How far away was the lightning?

- A 68 m
- B 850 m
- C 1700 m
- D 3400 m

Mass, force and weight

32. Some students are discussing mass and weight.

Mass and weight are the same thing, but one is in kg and the other in N.

Andrew

The mass of an object depends on gravity.

Brian

The mass of an object is how much matter it contains.

Colin

The weight of an object is its gravitational field strength.

Debra

Who has made a correct statement?

- A Andrew
- B Brian
- C Colin
- D Debra

33. $\text{force} = \text{mass} \times \text{acceleration}$

A rocket has an acceleration of 3.0 m/s^2 at lift-off.
The resultant force on the rocket at lift-off is $6\,000\,000 \text{ N}$.

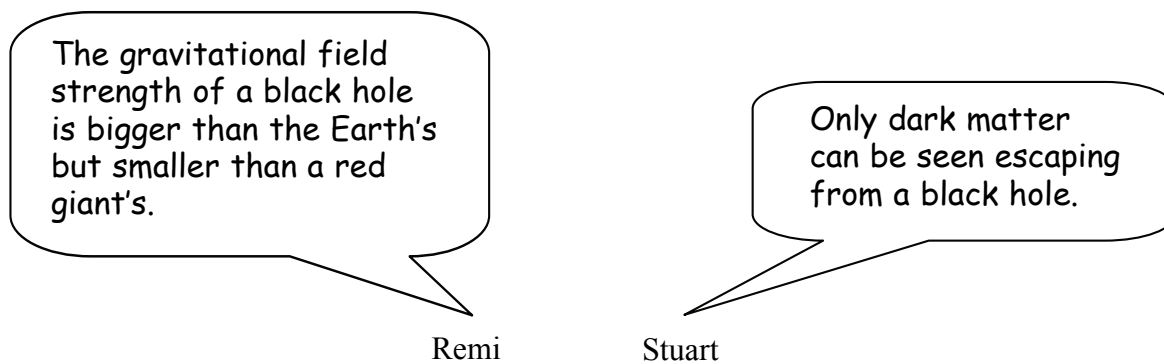
The mass of the rocket at lift-off is

- A $2\,000\,000 \text{ N}$
- B $2\,000\,000 \text{ kg}$
- C $18\,000\,000 \text{ N}$
- D $18\,000\,000 \text{ kg}$

34. The reaction force on the rocket is caused by the action force pushing gases out of the rocket. Which row of the table is correct for the reaction force on the rocket compared to the action force?

	the direction of the reaction force is	the size of the reaction force is
A	the opposite	the same
B	the opposite	bigger
C	the same	the same
D	the same	bigger

35. Two students discuss black holes.



Who is correct?

- A** Remi only
 - B** Stuart only
 - C** both Remi and Stuart
 - D** neither
- Waves**
36. Scientists find it difficult to predict earthquakes because
- A** the Earth's outer core is liquid
 - B** transverse earthquake waves cannot travel through liquids
 - C** parts of the Earth's crust are in constant motion
 - D** scientists do not know enough about the processes that cause earthquakes

37.

$\text{speed} = \text{frequency} \times \text{wavelength}$
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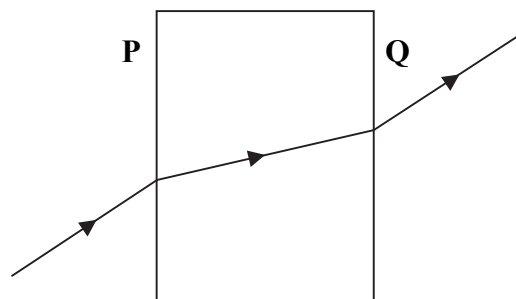
The table gives information about three radio waves.

name	frequency (MHz)	wavelength (m)
UHF	3000	0.1
VHF	300	1
HF	30	10

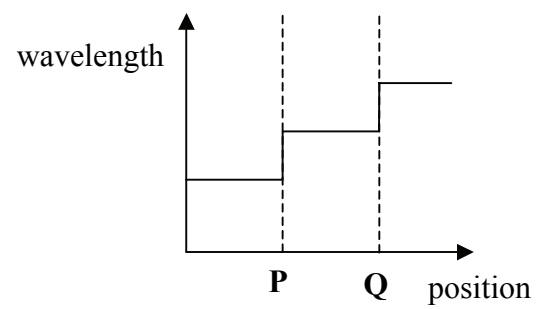
This information shows that the speeds of the radio waves are

- A** the same
- B** steadily increasing with frequency
- C** steadily decreasing with frequency
- D** 300 m/s

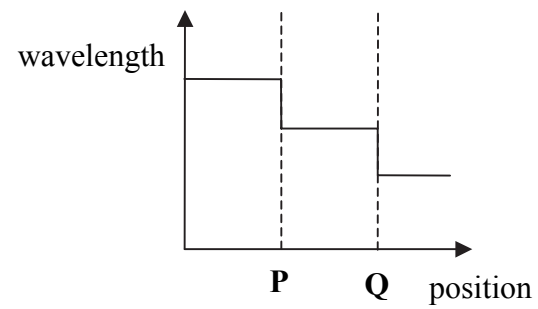
38. The diagram shows a ray of light passing through a glass block in air. **P** and **Q** are the sides of the block.



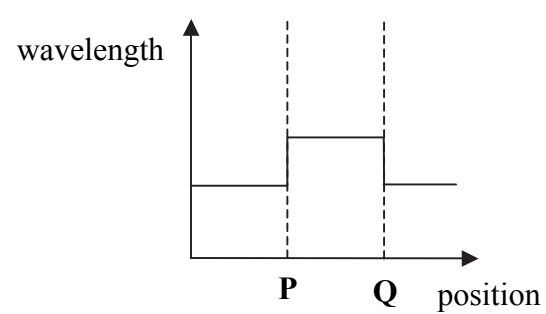
The frequency of the light does not change.
Which of these shows the changes in wavelength of the ray?



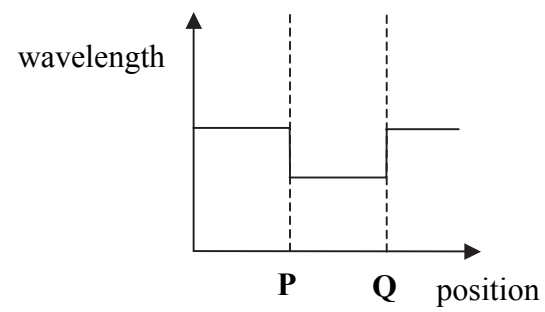
A



B



C



D

Astronomy

39. Which row of the table is correct for a main sequence star that is much more massive than the Sun?

	can we be certain that the more massive star has a planet that supports life?	the massive star will next be
A	yes	a white dwarf
B	no	a supernova
C	no	a white dwarf
D	yes	a supernova

40. Two students discuss evidence for the Big Bang theory.

Microwave radiation from distant stars shows they are moving away at high speed.

Ashley

The red shift from nearby galaxies is less than the red shift from more distant galaxies.

Cara

Who is correct?

- A** Ashley only
- B** Cara only
- C** both Ashley and Cara
- D** neither

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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