Q1. 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.





(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)

- (b) The teacher is using the demonstration to model the red-shift in light that is observed from most distant galaxies.
 - (i) Which **one** of the following statements gives the main reason why models are used in science?

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

Models can help to explain an effect or theory.





Models can help to generate new ideas.

Models can prove that a theory is correct.

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	(ii)	Explain how this demonstration can be used as a model for red-shift.
		(2)
(c)	Red- smal	shift provides evidence to support the theory that the Universe began from a very I initial point.
	Wha	t name is given to this theory?
		(4)
		(1) (Total 5 marks)

- **Q2.** The 'big bang' theory is one theory explaining the origin of the Universe.
 - (a) The graphs **X**, **Y** and **Z**, show how the size of the Universe may have changed with time.



Explain the reason for your answer.

(3)

(b) In 1948, an alternative to the 'big bang' theory, called the 'steady state' theory, was developed.

The 'steady state' theory suggested that the Universe, although expanding, has always existed without a beginning in time.

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

The measurement of red-shift in the light from distant galaxies provides evidence

only the 'big bang' theory.

to support | only the 'steady state' theory.

both the 'big bang' and 'steady state' theories.

(1)

(ii) In 1965, scientists rejected the 'steady stat' theory in favour of the 'big bang' theory.

Suggest what might cause scientists to stop supporting one theory and to start supporting an alternative theory.

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(1) (Total 5 marks) **Q3.** The diagram shows a teacher using a loudspeaker to demonstrate an important effect. The loudspeaker produces a note of constant frequency and is swung around in a circle.



	(ii)	Which one of the following statements gives the main reason why models are used in science?		
		Put a tick (\checkmark) 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 prove that a theory is wrong.		
		(1)		
(c)	Red- smal	shift provides evidence to support the theory that the Universe began from a very I initial point.		
	Wha	t name is given to this theory?		
		(1) (Total 5 marks)		