

(iii) What does the observation of red-shift suggest is happening to the Universe?

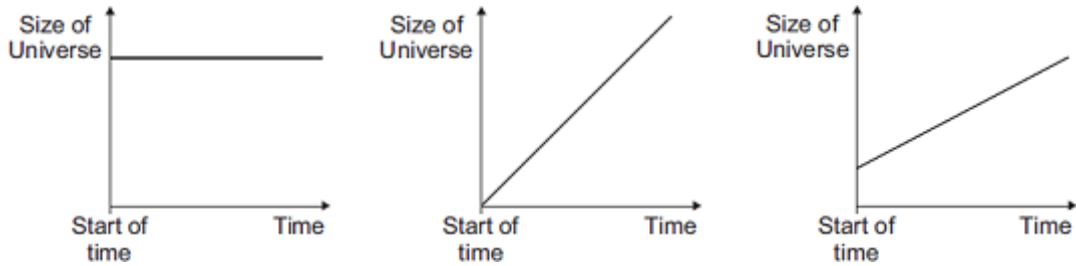
(1)

(Total 9 marks)

5.

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.



Which graph would the 'big bang' theory suggest is correct?

Write your answer, **X**, **Y** or **Z**, in the box.

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

to support

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

(1)

(ii) In 1965, scientists rejected the 'steady state' 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.

(1)

(Total 5 marks)

6.

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)

(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)

(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?

(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)

(Total 4 marks)

7.

Explain, in as much detail as you can, the scientific evidence for the “big bang” theory of the origin of the Universe.

(Total 5 marks)