

Name of the Student: \_\_\_\_\_

Max. Marks : 18 Marks

Time : 18 Minutes

**Q1.**

Optical telescopes may be used to observe galaxies. Some optical telescopes are on the Earth and some are on satellites in space.

Scientists have observed that the wavelengths of the light from galaxies moving away from the Earth are longer than expected. This observation is called red-shift.

- (i) What does the size of the red-shift tell the scientists about the distance a galaxy is from the Earth?

\_\_\_\_\_  
\_\_\_\_\_

(1)

- (ii) Complete the following passage.

Red-shift provides evidence to support the 'big bang' theory. The 'big bang' theory is one of the ways of explaining the \_\_\_\_\_ of the Universe.

(1)

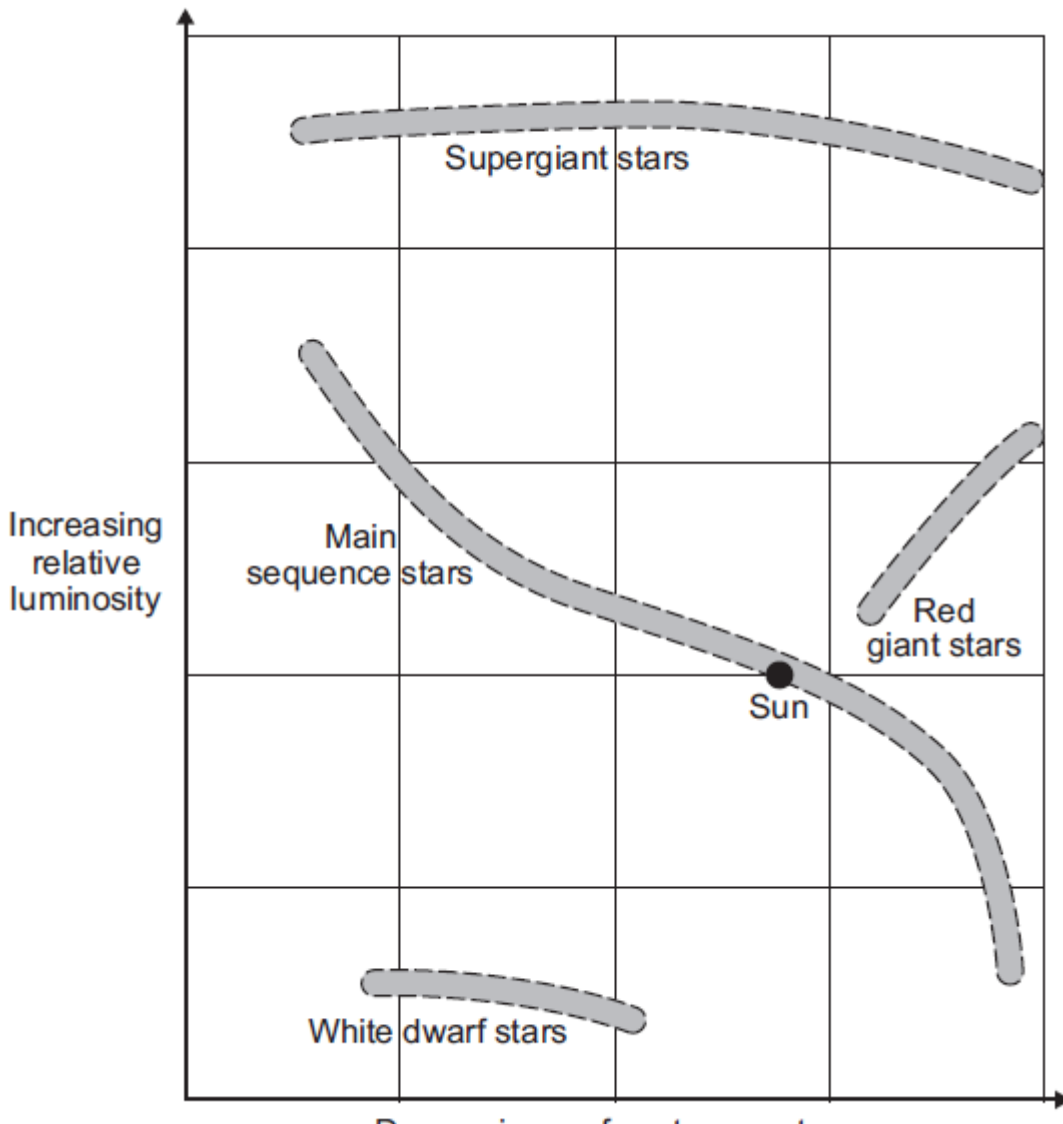
(Total 2 marks)

**Q2.**

The diagram, drawn below, places stars in one of four groups.

Where a star is placed on the diagram is determined by the surface temperature and relative luminosity of the star.

A star with a relative luminosity of 1, emits the same amount of energy every second as the Sun.



- (a) The Sun will spend most of its life cycle as a main sequence star. This is the stable period of the Sun's life cycle.

What happens to cause the stable period in the life cycle of a star to end?

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(1)

- (b) Use the information in the diagram to describe what will happen to the Sun after the stable period ends.

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**Q3.**

The 'Big Bang' theory is one theory of the origin of the Universe.

- (a) (i) Explain what is meant by the 'Big Bang' theory.

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(2)

- (ii) The light arriving from distant galaxies provides scientists with evidence to support the 'Big Bang' theory.

Explain how.

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(2)

- (b) At a meeting held in 2005, a group of scientists claimed that new data had been collected that showed the 'Big Bang' theory to be wrong. Other scientists said that there was no reason to doubt the 'Big Bang' theory.

What should scientists do when a theory does **not** appear to be supported by new data?

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(2)

- (c) Scientists can answer many questions about the Universe, but not the question:

*Why was the Universe created?*

Suggest a reason why this question **cannot** be answered by scientists.

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(1)

**Q4.**

- (a) Our star, the Sun, is stable.

Explain what the conditions need to be for a star to remain stable.

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(2)

- (b) Shortly after the 'big bang', hydrogen was the only element in the Universe.

Explain how the other elements came to be formed.

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(3)

(Total 5 marks)