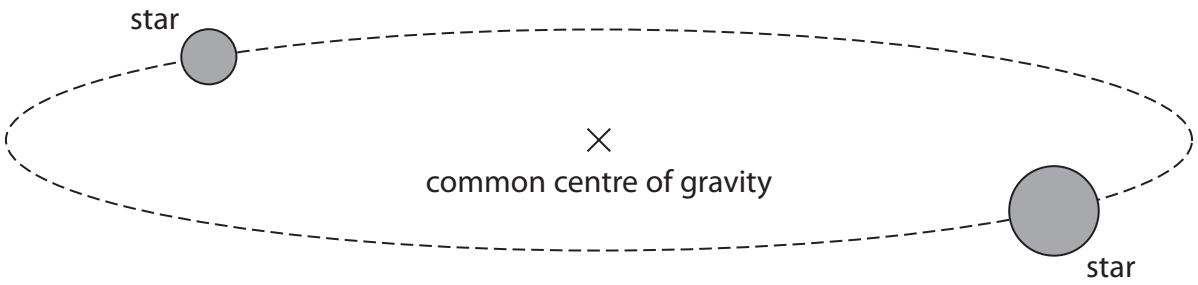
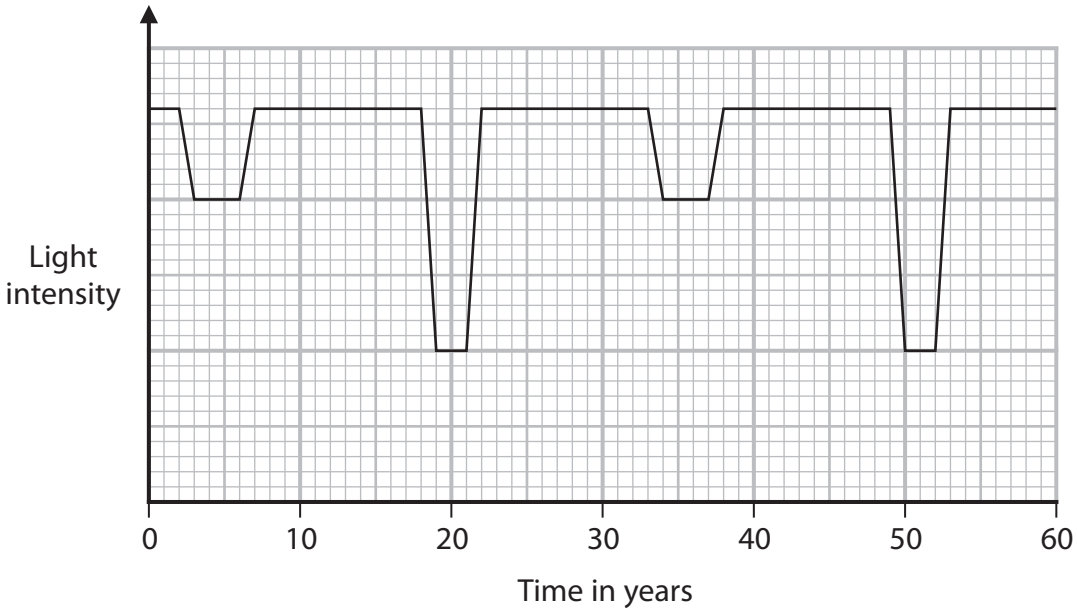
8 A binary star system has two nearby stars, which orbit each other in a circular path around a common centre of gravity.



(a) In an eclipsing binary system, one star passes behind the other star in its orbit. This causes a decrease in the light intensity of the binary star system when viewed from Earth.

The graph shows how the light intensity of the binary star system changes with time.



(i) Suggest why the decreases in light intensity are not all the same.

(1)

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(ii) Use the graph to determine the time period of the binary star system.

(1)

time period = ... years

(iii) One of the stars in this binary system has an orbital speed of 19 km/s.

Calculate the orbital radius of this star.

(4)

orbital radius = ... km

(b) A different binary star system is in a distant galaxy.

When observed from the Earth, light from this galaxy has a longer wavelength than the wavelength of the light when it is emitted from the galaxy.

Explain why this gives evidence for the Big Bang theory.

(3)

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(Total for Question 8 = 9 marks)

TOTAL FOR PAPER = 70 MARKS

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