AS2008 Q2

2. The earth orbits the sun once a year and the moon orbits the earth about once a month. From the earth you can observe the changing phases of the moon. If an observer stands on the moon and looks at the earth, what would be the period of the phases of the earth seen by that observer?

A Same period as the phases of the moon

B A little longer than the period for the phases of the moon

C A little shorter than the period for the phases for the moon

D About 1 year

AS2011 Q3

A parsec is a unit of length used by astronomers to measure distance. If a parsec is 3.26 light years, and a light year is the distance that light travels in a year, how many metres are there in a parsec?

Speed of light is 3×10^8 ms^{-1}

A. 3×10^7

B. 5×10^{14}

C. 9×10^{15}

D. 3×10^{16}

AS2011 Q9

The best estimate for the angle θ of the sun subtended at the eye when viewed from the earth is

A. 0.05°

B. 0.5°

C. 5°

D. 25°

AS2007 Q10

a) At the earth's surface, the radiant power received from the Sun normally is 1.3×10^3 W per square metre. The power radiated by the Sun is the same everywhere over the Sun's surface. If the Earth orbits at a distance of 1.5×10^{11} m from the Sun, calculate the total energy radiated away by the Sun each second. (It may be useful to know that the surface are of a sphere is $4\pi r^2$).

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_____ [2]

b) Although you may not have studied it yet, Einstein produced a famous equation relating mass and energy which we shall use, $E = mc^2$, where E is energy in joules, m is mass in kg, is the velocity of light in a vacuum ($c = 3 \times 10^8$ m/s). Using your answer to part (a), calculate the mass loss of the Sun due to the energy being radiated away each second.

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_____ [1]

c) If the mass of the Sun is 2×10^{30} kg, what is the percentage of the Sun's mass that is lost by radiation each year?

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_____ [2]

d) Assuming that this rate remains constant, what is the percentage loss of mass of the sun since it was formed, five thousand million years ago?

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_____ [2]

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