**1 (a)** State the equation for the gravitational force $F$ between two point masses $m_1$ and $m_2$ that are separated by a distance $r$. State the meaning of any other symbols you use.

[2]

**(b)** A satellite is in a circular orbit of radius $R$ around a planet of mass $M$.

Show that the period $T$ of the orbit is given by

$$T^2 = kR^3$$

where $k$ is a constant that depends on the value of $M$. Explain your reasoning.

[3]

**(c)** A satellite is in a circular orbit around the Earth with a period of 24 hours. The mass of the Earth is $6.0 \times 10^{24}$ kg.

**(i)** Calculate the radius of the orbit.

radius = ................................................... m  [2]

**(ii)** State the **two** other conditions that must be met for the orbit to be geostationary.

1 ................................................................................................................................

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2 ................................................................................................................................

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[2]