

- 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 6.0×10^{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]