

Section A

Answer **all** the questions in the spaces provided.

- 1 (a)** Explain what is meant by a *geostationary orbit*.

.....

 [3]

- (b)** A satellite of mass m is in a circular orbit about a planet.

The mass M of the planet may be considered to be concentrated at its centre.
 Show that the radius R of the orbit of the satellite is given by the expression

$$R^3 = \left(\frac{GMT^2}{4\pi^2} \right)$$

where T is the period of the orbit of the satellite and G is the gravitational constant.
 Explain your working.

[4]

- (c)** The Earth has mass 6.0×10^{24} kg. Use the expression given in **(b)** to determine the radius of the geostationary orbit about the Earth.

radius = m [3]