Section A

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

For Examiner's Use

1 **(a)** State Newton's law of gravitation.

.....

.....

..... [2]

(b) The Earth may be considered to be a uniform sphere of radius R equal to 6.4×10^6 m.

A satellite is in a geostationary orbit.

(i) Describe what is meant by a *geostationary orbit.*

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.....

.....

..... [3]

(ii) Show that the radius x of the geostationary orbit is given by the expression

$$gR^2 = x^3\omega^2$$

where g is the acceleration of free fall at the Earth's surface and ω is the angular speed of the satellite about the centre of the Earth.

[3]

(iii) Determine the radius x of the geostationary orbit.

radius = ... m [3]