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

1 **(a)** The Earth may be considered to be a uniform sphere of radius 6.38×10^6 m. Its mass is assumed to be concentrated at its centre.

Given that the gravitational field strength at the Earth's surface is 9.81 N kg^{-1}, show that the mass of the Earth is 5.99×10^{24} kg.

[2]

(b) A satellite is placed in geostationary orbit around the Earth.

(i) Calculate the angular speed of the satellite in its orbit.

angular speed = ... rad s^{-1} [3]

(ii) Using the data in **(a)**, determine the radius of the orbit.

radius = ... m [3]