3 A satellite orbiting the Earth is in a geostationary orbit.

(a) State the period of the satellite and state one feature of geostationary orbit.

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.....

..... [2]

(b) Explain how the satellite can be accelerating even though it travels at a constant speed.

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.....

.....

..... [3]

(c) **(i)** A satellite of mass m has a geostationary orbit around the Earth. The radius of the orbit is r. The speed of the satellite is v. The mass of the Earth is M.

Use Newton's law of gravitation to write an equation that relates the centripetal force on the satellite to the gravitational force acting on the satellite.

[1]

(ii) Calculate the height of a geostationary satellite above the Earth's surface.

mass of Earth = 5.97×10^{24} kg
radius of Earth = 6.37×10^{6} m

height of satellite = ... m [4]

[Total: 10]