

- 3** A satellite of mass 2400 kg is projected from the Earth's surface and placed in a geostationary orbit at a distance of 4.23×10^7 m from the centre of the Earth. The Earth may be assumed to be a uniform sphere and has mass of 6.00×10^{24} kg and radius of 6.37×10^6 m.

- (a)** State two conditions for the satellite at this distance to be considered a geostationary satellite.

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- (b)** Explain why the satellite does not move in the direction of the gravitational force.

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- (c)** Calculate the change in gravitational potential energy of the 2400 kg satellite when it is placed in the geostationary orbit from the Earth's surface.

[3]

change in gravitational potential energy = J

- (d) Due to a technical fault in the satellite, it is regarded as a space junk in the geostationary orbit.

With reference to your answer in (c), suggest a reason why it is considered a possible safety hazard for the satellite to fall back to Earth.

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