

Answer on question # 55567, Physics / Astronomy — Astrophysics

Question What is the magnitude of the angular momentum associated (a) with Earth's rotation about its own axis and (b) with its revolution about the Sun? See Appendix E, and consider Earth to be a uniform sphere.

Solution (a)

$$M = I\omega = \frac{2}{5}mr^2\omega_1 = \frac{2}{5}5.97 \cdot 10^{24} \cdot (6.4 \cdot 10^6)^2 \cdot \frac{2\pi}{86400} \approx 7.1 \cdot 10^{33} \text{ kg} \cdot \text{m}^2/\text{s}$$

(b)

$$M = I\omega = mR^2\omega_2 = 5.97 \cdot 10^{24} \cdot (150 \cdot 10^9)^2 \cdot \frac{2\pi}{31 \cdot 10^6} \approx 2.72 \cdot 10^{40} \text{ kg} \cdot \text{m}^2/\text{s}$$

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