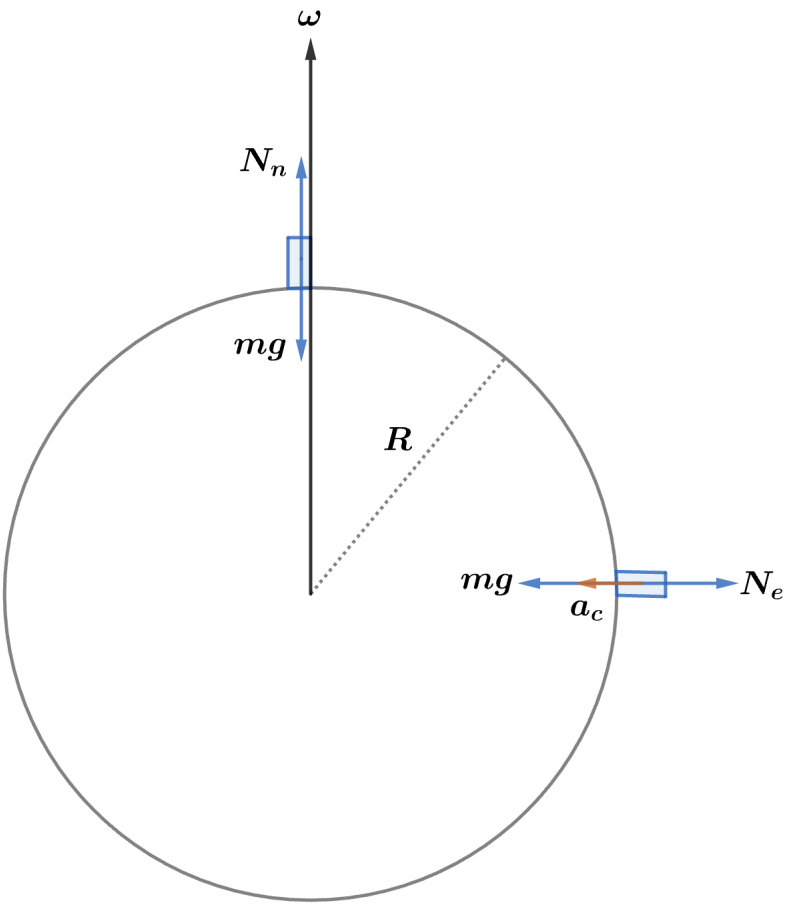
2007 F=ma Exam: Problem 23

Kevin S. Huang



For the person at the North Pole who is at rest, we have

$$N_n = mg$$

For the person at the equator who is undergoing uniform circular motion, we have

$$mg - N_e = ma_c = m\omega^2 R$$
$$N_e = m(g - \omega^2 R)$$

Thus, we have

$$\frac{N_e}{N_n} = \frac{g - \omega^2 R}{g} = 1 - \frac{\omega^2 R}{g}$$

so the answer is $\boxed{\text{C}}$.