

Answer on Question #80550, Physics / Mechanics | Relativity

Question:

A ball of mass 60g is moving due south with a speed of 50 ms<sup>-1</sup> at latitude 30°N. Calculate the magnitude and direction of the coriolis force on the ball. Compare the magnitude of this force to the weight of the ball.

Solution:

The Coriolis force  $F = 2m\vec{V} \times \vec{\omega} = m2V\omega \sin \alpha = 0.06 \cdot 2 \cdot 50 \cdot \left( \frac{6.28}{24 \cdot 3600} \right) \cdot 0.5 = 0.06 \cdot 0.0036 = 0.22$

(mN), it acts on the West direction.

The ratio of Coriolis force to the weight equals to  $\frac{0.0036}{9.81} = 3.7 \cdot 10^{-4}$

The answer:

F = 0.22 mN, acts on the West direction.

The ratio of Coriolis force to the weight equals to  $3.7 \cdot 10^{-4}$

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