Homework No. 03B (Fall 2021)

PHYS 203A: COLLEGE PHYSICS

Department of Physics, Southern Illinois University–Carbondale
Due date: Tuesday, 2021 Sep 14, 12.30pm, on D2L

Instructions

- Describe your thought process in detail and organize it clearly. Make sure your answer has the correct units and the right number of significant digits.

- After completion, scan the pages as a single PDF file, and submit the file on D2L (Assesments → Assignments).

1. (**10 points.**) A river R is flowing with respect to ground G with velocity $\vec{\mathbf{v}}_{RG} = 2.0\,\hat{\mathbf{i}}\,\text{m/s}$. A boat B can move in still water with a speed of $v_{BR} = 6.0\,\text{m/s}$. The banks of the river are separated by a distance of $200.0\,\text{m}$. The boat is moving with respect to river with velocity $\vec{\mathbf{v}}_{BR} = 6.0\,\hat{\mathbf{j}}\,\text{m/s}$. The boat gets drifted. Determine the magnitude and direction of the velocity of the boat with respect to the ground. How far down the river will the boat be drifted?

2. (**10 points.**) A train T travels due South at $30\,\text{m/s}$ relative to the ground G in a rain R that is blown toward the South by the wind. The path of each raindrop makes an angle of $70°$ with the vertical, as measured by an observer stationary on the ground. An observer on the train, however, sees the drops fall perfectly vertically. Determine the speed of the raindrops relative to the ground.