

Physics of Soft and Biological Matter II: Problem Set 4

Owen A. Hickey

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Problem 1 *Purcell, 10 points*

Read the review article from Purcell and summarize the concepts in your own words. The summary should be at least 1 single-spaced typed page.

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Problem 2 *Different Types of Ratchets, 10 points*

Download the paper Making Molecules into Motors

<http://www.physik.uni-augsburg.de/theo1/hanggi/Astumian.pdf>

Read the article and describe how each of the ratchet systems work in detail, the summary should be at least 1 single-spaced typed page.

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Problem 3 *The Flashing Ratchet, 10 points*

Download the paper DNA transport by a micromachined Brownian ratchet device

<http://www.pnas.org/content/96/23/13165.full.pdf>

Derive the formula for both the flux and the resolution of the ratchet.

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