Problem Set 2023-5
Physics 265
First Semester, AY 2023– 2024
Release Date: 22 September 2023
Due: 6 January 2024
Ten points per number

1. Dispersion by a Prism. Plot the angular dispersion OE as a function differential wavelength $\Delta\lambda$ [see Eqn 37, p 193, Born & Wolf) for a prism (base lengths b = 2.5, 5 and 7.5 cm, l_1 = 5 cm) that is made of your assigned dielectric material for the range: 400 nm ≤ λ ≤ 800 nm ($\Delta\lambda$ = 0.1 nm). Which of the two materials is more suitable for a prism spectrometer? Explain succinctly.

2. The Prism Spectrometer (Fig 4.28, p 192). Which one will yield a better spectral resolution (separation) for the multi-wavelength image point P' - a spectrometer with a longer or shorter focal length for lens L_2? Is it essential that the focal lengths of L_1 and L_2 be equal? Explain.

END.