Problem Set 13, 12 December 2018 Name: _____ , Section: ___

Problem – Townsend (P1.37)* Determine the probability that a photon is detected at the first minimum of a six-slit grating if the bottom two slits are closed. Assume the magnitude of the probability amplitude due to each slit is r. *Suggestion*: Start by showing how the complex probability amplitudes from each slit add up to zero at the first minimum.

Solution:

Problem – Townsend (P1.43) Use the principle of least time to derive Snell's law, namely, $n_1 \sin\theta_1 = n_2 \sin\theta_2$ for light being refracted as it travels from a medium with index of refraction n_1 into a medium with index of refraction n_2. *Suggestion*: Follow a procedure similar to the one given in Example 1.11. Locate the source S in medium 1 and the point P in medium 2.

Solution: