PHYSICS 242 DRILL SET 13, SPRING '17 NAME _____

Slide this drill set under Marteena 308's door any time *before* 7:50 AM, Friday, April 21, or give it to me in Marteena 312 *by* 8:00 AM that day. Each problem uses one different Block 13 Objectives equation.

1. You use a Michelson interferometer with nearly monochromatic light. When you move the movable mirror only 2.54 μm (0.000100 inch), 8.0 fringes move past a point in the interference pattern. What's the light's wavelength in nanometers?

ONE EQUATION USED	SOLUTION	ANSWER
		_____ nm

2. Nearly monochromatic 633 nm coherent light is split into two beams. Solely due to their path difference, the beams are 1620° out of phase when come back together at point *P*. Calculate that path difference in micrometers.

ONE EQUATION USED	SOLUTION	ANSWER
		_____ μm

3. You wish to use a magnifier as discussed in our textbook to give a lateral magnification of infinity and an angular magnification of 3.2. What is the focal length and type of the lens required?

EQUATION USED (ONE = SIGN)	SOLUTION	ANSWER
=		focal length = ____ cm Circle one below: converging diverging

4. Light is incident normally upon a thin film of oil from below (from the water). The oil film is 598 nm thick. Calculate the two wavelengths in the oil between 244 nm and 427 nm that will give a reflection minimum.

ONE EQUATION USED	SOLUTION		ANSWER
	The phase shift upon reflection off the oil is ___ rad. The phase shift upon reflection off the air is ___ rad.	air $n = 1.00$ _____ oil $n = 1.64$ _____ water $n = 1.33$	_____ nm and _____ nm

5. Light that has wavelengths of 633 nm in the air, 476 nm in the water, and 411 nm in the glass is incident normally upon a thin film of water from above (from the air). Calculate the minimum, non-zero thickness (in nm) of the water film that will give a transmission maximum .

ONE EQUATION USED	SOLUTION		ANSWER
	The phase shift upon reflection off the water is ___ rad. The phase shift upon reflection off the glass is ___ rad. A transmission maximum gives a reflection _____.	air $n = 1.00$ _____ water $n = 1.33$ glass $n = 1.54$	_____ nm