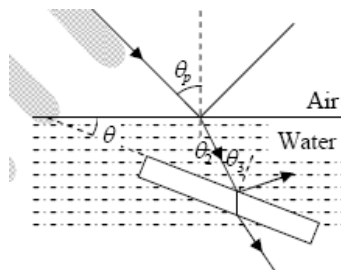
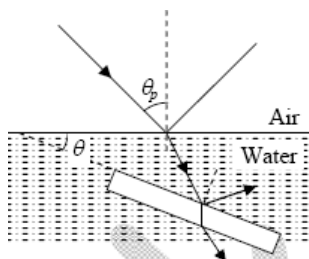
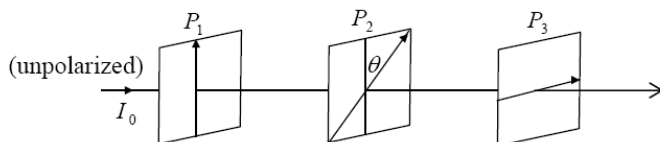


Tutorial Sheet-4
15B11PH111, Physics-1 (2021-22)

- How many orders will be visible if the wavelength of the incident radiation is 5000 \AA and the number of lines on the grating is 2620 per inch? [CO2]
- Light of wavelength 680 nm is incident normally on a diffraction grating having 4000 lines/cm. What will be the diffraction angle (in degrees) corresponding to the third-order maximum? [CO2]
- Calculate the minimum number of line in a grating which will just resolve the lines of wavelength 5890 \AA and 5896 \AA in the second and third order. [CO1]
- A diffraction grating used at normal incidence gives a yellow line ($\lambda = 6000 \text{ \AA}$) in a central spectral order superimposed on a blue line ($\lambda = 4800 \text{ \AA}$) of the next higher order. If the angle of diffraction is $\sin^{-1}(3/4)$, calculate the grating element in meter. [CO2]
- What other spectral lines in the visible range 4000 \AA to 7000 \AA will coincide with the fifth order line of 6000 \AA in a grating spectrum? [CO3]
- A microscope is used to resolve two self-luminous objects separated by a distance of $4.0 \times 10^{-5} \text{ cm}$. If the wavelength of light is 5461 \AA , calculate the numerical aperture of the objective. [CO3]
- Light is incident from a medium of refractive index $n = 1.5$ onto dry air. What will be the smallest angle of incidence in degrees (two decimal places) for which the light is not transmitted into air? [CO1]
- When an unpolarized light is incident from dry air ($n=1$) to a glass plate ($n=1.52$) at a particular angle, it is observed that the reflected beam is linearly polarized. What is the angle of the refracted beam with respect to the surface normal? [CO2]
- Light strikes a water surface ($n=1.33$) at the polarizing angle from air ($n=1$). The part of the beam refracted into the water strikes a submerged glass slab (index of refraction, 1.50), as shown in Figure. The light reflected from the upper surface of the slab is completely polarized. Find the angle between the water surface and the glass slab. [CO2]



- Consider three polarizer's P_1 , P_2 , and P_3 placed along an axis as shown in the figure. The pass axis of P_1 and P_3 are at right angles to each other while the pass axis of P_2 makes an angle θ with that of P_1 . A beam of unpolarized light of intensity I_0 is incident on P_1 as shown. What will be the intensity of light emerging from P_3 ? [CO4]



- Plane- polarized light is incident on a single polarizing disk with the direction of E_0 parallel to the direction of the transmission axis. Through what angle should the disk be rotated so that the intensity in the transmitted beam is reduced by a factor of (a) 3.00, (b) 5.00, (c) 10.0? [CO4]