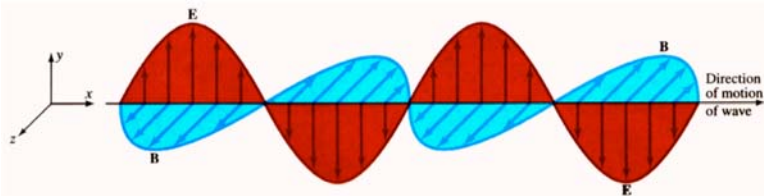


38.6 Polarization of Light Waves

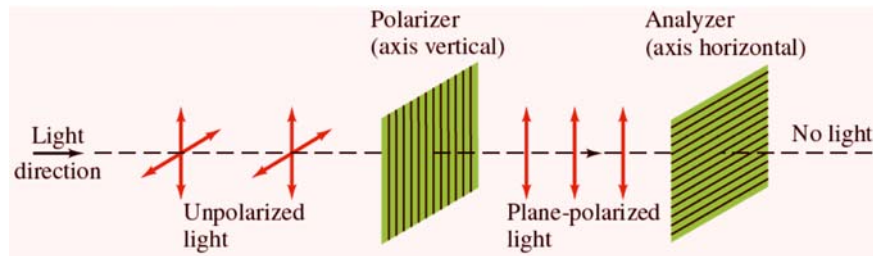
- EM waves are transverse waves.
- The direction of polarization of the EM waves is defined as the direction \vec{E} is vibrating.



- Ordinary light is *unpolarized*, i.e., \vec{E} are randomly pointed in all directions.

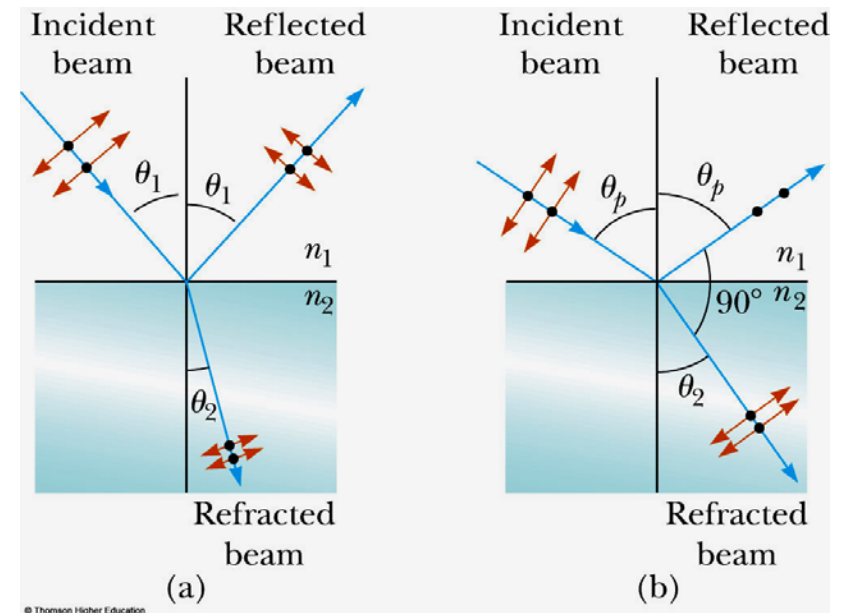
Linearly polarized light: \vec{E} vibrates in the same direction all the time.

Ideal polarizer: all light with $\vec{E} \parallel$ to the transmission axis is transmitted, and all light with $\vec{E} \perp$ to the transmission axis is absorbed. An unpolarized light passing through a polarizer become polarized.



Polarization by Reflection

When an unpolarized light beam is reflected from a surface, the reflected light can be completely polarized, partially polarized, or unpolarized, depending on the incidence angle.



Brewster's angle θ_p : $\tan \theta_p = \frac{n_2}{n_1}$

At this particular angle of incident, the reflected beam is completely polarized, with its vector parallel to the surface.

For water ($n = 1.33$), $\theta_p = \tan^{-1}(1.33) = 53.06^\circ$

Q: how to find out the transmission axis of a polarizer?