

Quick Check Handout **Example Answers**

Instructions: Answer each question to the best of your ability. You may use your notes. Through your answers, show what you learned about light polarization and how sunglasses work.

1. Compare and contrast *polarized* and *unpolarized light*.

Polarized light has electric fields oscillating in one direction, whereas unpolarized light has electric fields oscillating in all directions.

2. Polarization refers to which property of the wave?

Polarization refers to the direction of disturbance.

3. Other than using a polarizing filter, list one way in which light can be polarized.

Polarization methods are:

- **Polarization by reflection**
- **Polarization by refraction**
- **Polarization by scattering**

Note: Polarizing by transmission = using a polarizing filter

4. A beam of horizontally polarized light of intensity 87 W/m^2 enters a second polarizing filter rotating 40.0° to the horizontal. Calculate the transmitted intensity.

$$\begin{aligned} I &= I_0 \cos^2 \theta \\ I &= 87 \cos^2 40.0^\circ \\ I &= 51 \text{ W/m}^2 \end{aligned}$$

5. Explain how light becomes polarized through the transmission method.

Polaroid filters use specific chemicals to filter out one-half of the vibrations upon transmission of the light through the filter. When unpolarized light is transmitted through a polaroid filter, it emerges with one-half the intensity and with vibrations in a single plane; it emerges as polarized light.

6. A beam of light strikes and reflects off a non-metallic, vertical surface. The light is now polarized in which direction? Explain.

The light is vertically polarized. This is because the surface creates more vibrations in that direction, creating polarization.