Applications (Uses) of polarization:

1. Polarization is used in sunglasses to reduce the glare. [*The transmission axis of polaroid in sunglasses is vertical, so only vertical components of light are transmitted while horizontal components are absorbed.*]
2. Polaroid filters are used in plastic industries for performing stress analysis tests.
3. Three-dimensional movies are produced and shown with the help of polarization.
4. Polarization is used for differentiating between transverse and longitudinal waves. etc.

Exercise:

Part I:

1. The polarization phenomenon can take place
   a.in transverse waves only b. in longitudinal waves only
   c. in standing waves only d. in all waves
2. Transverse nature of light is conclusively proved by the phenomenon of
   a. interference b. diffraction c. polarization d. reflection
3. Which of the following phenomenon does not support wave nature of light:
   a. Interference b. diffraction c. polarization e. none of above
4. Intensity of light depends on
   a. frequency b. velocity c. wavelength d. amplitude
5. In the propagation of electromagnetic waves, the angle between the direction of propagation and plane of polarizations is
   a. 0° b. 90° c. 45° d. 180°
6. The device produce plane polarized light is
   a. a crystal b. a biprism c. a grating d. Nicol prism
7. Light transmitted by Nicol prism is
   a. unpolarized b. plane polarized c. circularly polarized d. elliptically polarized
8. Optically active substance are those which
   a. produce polarized light b. rotate the plane of polarization of polarized light
   c. produces double refraction d. convert plane polarized light into circularly polarized light
9. In the propagation of light waves, the angle between the plane of vibration and plane of polarization is
   a. 45° b. 60° c. 90° d. 180°

1. Can ultrasonic waves be polarized? Explain.
2. Is there any difference between polarizer and analyzer? Explain.
3. What is the basic difference between polarized and unpolarized light?

Part II:

1. An unpolarized beam of intensity *I* falls on a polaroid. The intensity of emergent light is
   a. *I* b. *I*/2 c. 2*I* d. *zero*
2. The Brewster's angle for polarization is given by
   a. $sin^{-1}\mu = i_p$ b. $sin^{-1}(1/\mu) = i_p$ c. $tann^{-1}\mu = i_p$ d. $sin^{-1}(1/\mu) = i_p$
3. If the light is polarized by reflection, then the angle between reflected and refracted light is
   a. 0° b. 45° c. 90° d. 180°