

Review Questions

1. If the wavelength of orange light is 6.0×10^{-7} m in air, what is its frequency? **[5.0×10^{14} Hz]**
2. The frequency of a light is 3.8×10^{14} Hz. What is its wavelength in air, in nanometers?
[789 nm]
3. A certain shade of violet light has a wavelength in air of 440 nm. If the index of refraction of alcohol is 1.40, what is the wavelength of the violet light in alcohol? (remember your thin film interference lesson?) **[3.1×10^{-7}]**
4. The index of refraction of turpentine is 1.47. A ray of red light in air strikes a puddle of turpentine on the desktop.
 - A) What is the wavelength of red light in turpentine? **[4.4×10^{-7} m]**
 - B) What is the angle of refraction in turpentine? **[26°]**
5. A light source emitting monochromatic light of wavelength 450 nm illuminates 2 slits that are 640 nm apart.
 - A) At what angle does the first-order maximum occur? **[45°]**
 - B) If a screen is 2.0 m away from the slits, how far will this first-order maximum be from the centre line? **[1.4 m]**
 - C) How far away will the third set of black bands be from the centre line? Hint: notice question didn't say 'third order'; it said 'third set of black band'. **[3.5 m]**
6. For a physics experiment, a student pours a thin layer of corn oil (330nm) onto a layer of water in a beaker. If the wavelength of light is 467 nm, will constructive or destructive interference occur for a light falling perpendicular to the surface? The refractive indices of water and corn oil are 1.33 and 1.47 respectively.
 - A) Draw a labeled diagram of this situation.
 - B) Use the labeled diagram to determine if a bright band of light will be seen or a lack of light (dark band).
[total wavelength shift of 2.5λ so..dark band...destructive interference]