



POLARISATION

Name: _____

1. Can a sound wave in air be polarised? Explain.
2. No light passes through two perfect polarising filters with perpendicular axes. However, if a third polarising filter is placed between the original two, some light can pass. Why is this? Under what circumstances does most of the light pass?
3. The angle between the axes of two polarising filters is 45.0° . By how much does the second filter reduce the intensity of the light coming through the first? **0.500**
4. If you have completely polarised light of intensity 150 W/m^2 , what will its intensity be after passing through a polarising filter with its axis at an 89.0° angle to the light's polarisation direction? **$4.57 \times 10^{-2} \text{ W/m}^2$**
5. What angle would the axis of a polarising filter need to make with the direction of polarised light of intensity 1.00 kW/m^2 to reduce the intensity to 10.0 W/m^2 ? **84.3°**
6. What angle will be required for an analyser to reduce the the intensity of polarised light to 90.0% of its original value? **18.4°**
7. A beam of polarised light passes through a polarising filter. When the angle between the polarising axis of the filter and the direction of polarisation of the light is θ , the intensity of the emerging beam is I . If you now want the intensity to be $I/2$, what should be the angle (in terms of θ) between the polarising angle of the filter and the original direction of polarisation of the light?
8. Unpolarised light of intensity 21.2 W/cm^2 is incident on two polarising filters. The axis of the first filter is at an angle of 24.6° counterclockwise from the vertical (viewed in the direction the light is traveling) and the axis of the second filter is at 62.2° counterclockwise from the vertical. What is the intensity of the light after it has passed through the second polariser? **6.65 W/cm^2**
9. Three polarising filters are stacked, with the polarising axis of the second and third filters at angles of 23.6° and 62.2° , respectively, to that of the first. If unpolarised light is incident on the stack, the light has an intensity of 75.5 W/cm^2 after it passes through the stack. If the incident intensity is kept constant, what is the intensity of the light after it has passed through the stack if the second polariser is removed?