Q1- Light from an argon laser strikes a diffraction grating that has 5310 grooves per cm . The center and the first order principal maxima are separated by 0.488 m on a wall 1.72 m from the grating. Determine the wavelength of the laser light.

The spacing between the adjacent grooves will be

$$
a=0.01 / 5310 \mathrm{~m}
$$

The angular position $\theta$ for the first order maxima in a diffraction grating is given by

$$
a^{*} \sin \theta=\lambda
$$

Hence $\lambda=a * \sin \theta=(0.01 / 5310)^{*} \frac{0.488}{\sqrt{0.488^{2}+1.72^{2}}}$


Or $\quad \lambda=1.883 * 10^{-6} * 0.273=5.14 * 10^{-7} \mathrm{~m}$

Q2- A helium-neon laser ( $\lambda=632 \mathrm{~nm}$ ) is used to calibrate a diffraction grating. If the first order maximum occurs at 20.5 degree, what is the spacing between adjacent grooves in the grating?

For the first order maximum from a diffraction grating

$$
a * \sin \theta=\lambda
$$

or

$$
\mathrm{a}=\lambda / \sin \theta=632 * 10^{-9} / \sin 20.5^{\circ}=1.80 * 10^{-6} \mathrm{~m} .
$$

