Review Problem 3

Suppose we have an incoherent optical system with a circular pupil that operates at a working F-number $F_w/\# = 4$ and has a wavelength of $\lambda = 0.5\mu m$. Answer the following:

(a) What is the cutoff frequency?

(b) The irradiance of the object for the system is given by

$$o(x, y) = \frac{1}{2} + \frac{1}{4}cos(2\pi\xi_o x) + \frac{1}{10}cos(4\pi\xi_o x) + \frac{1}{10}cos(8\pi\xi_o x),$$

where $\xi_o = 250\ cyc/mm$. If the system is diffraction limited, what is the irradiance of the image?

(c) What is the contrast of the final image?