Examination in Optical Physics 021022

1-2

A microscope is to be used for fourier optics. It has an objective with f=5mm and an eye piece with two 20mm lenses, 20mm apart. The field lens is 200mm from the objective. The laser beam is focused to a point before the object with a 10mm lens. Where should the 10mm lens be situated if the fourier transform is to be seen when exchanging the eye piece to a 200mm lens (placed where the eye lens of the eye piece is)

3

Mr Person has a black and white striped shirt (2,5 lp / cm) and is photographed with a camera set at 5,00m distance. The camera has f=50mm and f-number 8. At what distance should Mr Person be in order for the shirt to be evenly grey?
Diffraction and aberrations can be neglected.

4

Linearly polarized light hits a glass surface (n=1,5) with incident angle 80°. The direction of polarization is 80° towards the plane of incidence. Determine the polarization after reflection.

5

The principal planes of meniscus lenses can be situated at unexpected places. Assume that you have a positive meniscus lens with radii of curvature 50mm and 100mm, n=1,56 and center thickness 5mm. Where are the principal planes?

6

In a double slit experiment one of the slits has twice the width of the other. They are illuminated in the same way. How is the interference pattern in this case compared to the normal case with slits of equal width?