DEPARTMENT OF PHYSICS
Engineering Optics (PH 301)
Assignment-3

Full Marks: 15 **Date: Nov. 11, 2020**

Answer all questions.

1. Given than the width of the relative light intensity versus photon energy spectrum of a light emitting diode (LED) is typically around ~ $3k_BT$. What is the linewidth $\Delta\lambda$ in the output spectrum in terms of wavelength? [3]
2. Consider a GaAs LED. The bandgap of GaAs at 300K is 1.42 eV, which changes (decreases) with temperature as dE_g/dT = - 4.5 × 10^{-4} eVK^{-1}. What is the change in the emitted wavelength if the temperature change is 10^oC? [3]
3. Can we use Si or Ge diodes for LED material? [2]
4. The cornea and eye lens have focal lengths of 2.3 and 6.4, respectively. Find the net focal length and optical power of the eye. [2]
5. Virtual image cannot be projected on a screen. Can a virtual image be photographed? If your answer is yes, please explain how? [2]
6. What is the resolution limit (at the object) for a microscope objective whose acceptance cone has a numerical aperture of (a) 0.25, (b) 0.80, and (c) 1.2 at a wavelength of 550 nm? [3]
