

PHY 167, SPRING 2020, TEST 3 (Practice)

(3 points maximum for each problem, 15 points maximum for the whole)

Analytical answers are mandatory!

1. A widely used “short-wave” radio broadcast band is referred to as the 49 m band. What is (a) wave length  $\lambda$ ; (b) wave vector  $k$ ; (c) frequency  $f$ ; (d) frequency  $\omega$  of this signal?

2. Some rearview mirrors produce images of cars behind you that are smaller than they would be if the mirror were flat. Are the mirrors concave or convex? What is the mirror’s radius of curvature if cars 20 m away appear 0.33 of their normal size?

3. A diver shines a flashlight upward from beneath the water at a  $42.5^\circ$  angle to the vertical. At what angle does the light leave the water?

4. If 720 nm and 660 nm light passes through two slits  $d=0.58$  mm apart, how far apart are second-order fringes for these two wavelengths on a screen  $L=1$  m away?

5. Two polarizers are aligned so that the light passing through them has a maximal intensity. By which angle should one of them be turned so that the intensity of light is reduced by half?