PH 2502 Term B 2017
Lasers R.S. Quimby

STUDY GUIDE 5

Readings:

Chapter 21 This chapter considers the frequency spectrum of the laser output in some detail. Methods for controlling the laser wavelength are described.

Chapter 22 The principles of pulsed lasers are considered in this chapter. Two important methods are emphasized: Q-switching and mode-locking.

Chapter 23 This chapter gives an overview of a few important types of lasers. Optically pumped lasers include ruby, neodymium, and other rare earth doped solid state lasers. Special treatment is given for fiber lasers, a new and increasingly important type of laser. In this course, the mathematics of "optical transparency" given on pp. 432-433 will not be emphasized, but you can look through these pages (and example 23-2) as optional reading. Other optically pumped lasers include dye lasers, and Ti:sapphire lasers.

Electrically pumped lasers include the well-known low power HeNe laser, the higher power argon ion laser, the ultraviolet excimer laser, and the infrared CO_2 laser.

Homework #5 (due Dec. 11):

Problems from text

1. 21-3 (the attenuation can be neglected within the gain medium)
2. 21-4
3. 21-7 (the index of the medium is ≈1)
4. 22-1
5. 22-3
6. 22-4
7. 22-6 (the air-equivalent cavity length is the length of a cavity in air that would have the same pulse round-trip time as the actual laser being considered)
8. 22-11