Exam II Guide Boyce/10ed: 3.1-3.7 Halleck MAT 2680 NYCCT (CUNY) Fall 2013

1. Be able to write down basic sets to homogeneous equations. This means find two solutions. (Ex. 3, p. 149)

2. Reduction of order is way to take known solution and produce a second solution. (Ex 3, p. 172)

3. What are the fundamental solution sets for each of the three cases of roots when solving constant coefficient equations? The summary is on p. 171. (Ex. 3, p. 149; Ex. 2, p. 170; Ex. 3, p. 163)

4. Solutions to second order nonhomogeneous equations have two components. There is the homogeneous solution, and particular or nonhomogeneous solution. (Thm. 3.5.2, p. 176)

5. To find particular solutions you must know the method of undetermined coefficients. (Ex. 4, p. 179)

6. Mechanical vibrations and RLC circuits give excellent examples for utilizing all the techniques in the Chapter.
    a. Know the difference between damped and undamped vibrations. If there is no dampening, the motion is sinusoidal. Be able to determine the natural (circular) spring frequency. (Ex. 2, p.197)
    b. If there is dampening, know the three different kinds: underdamped, critically damped, and overdamped, depending on the roots to the characteristic equation. If underdamped, know the quasi period. (Ex. 3, p. 200) Know how to graph solutions in the three different cases of dampening.

**Exam is 1 hour 15 minutes. All questions involve linear 2nd order equations.**
**Ok**: handwritten notes, calculator (TI 83/84)
**Not ok**: printouts, book, **TI 89,** laptop, tablet, cell phone or other handheld
Each problem (or part) is worth 20% and should take about 15 minutes to complete.

1. Fill in blank, short answer, T-F, matching. Emph: defs and thm and graphic analysis of behavior
2. Homogeneous IVP with constant coefficients
3. Reduction of order for a non-constant coefficient, homogeneous
4. Non-homogeneous with constant coefficients
5. Mass-spring or RLC problem with damping. Classify the nature of damping and if underdamped, find the quasi-period. Also be prepared to write as a cosine with phase.