Problems for Assignment 5 Due Friday, November 13, 2015 Total Points : 100

Assigned Problems. Do the seven problems listed below, of which six are from the textbook. Problems denoted with a "*" have answers given in the textbook. You will not get credit for simply copying in these answers. Each of the six problems from the textbook are worth 15 points. The non-textbook problem is worth 10 points.

- · 3.4.5* (page 174), 3.4.11* (pages 178-179), 3.4.16 (page 184), 3.4.22(iii) (page 189).
- \cdot 2.5.21 (page 79), 2.6.1 (page 81).
- · Let W be a one-dimensional standard Brownian Motion on some fixed probability space $(\Omega, \mathcal{F}, \mathbb{P})$ with filtration \mathbb{F} which satisfies the usual conditions. Show
 - a) $\left\{X_t = W_t^2\right\}_{t \ge 0}$ is a Markov process.
 - b) $\{X_t = (W_t t)^2\}_{t \ge 0}$ is not a Markov process. **Hint**: for 0 < s < t consider $E\left[(W_t t)^2 \mid \mathcal{F}_s\right]$.

Things to Read and Understand. Please read carefully the following items.

- · The proof of Theorem 3.4.6 when $t \mapsto \langle M \rangle_t$ is not strictly increasing.
- Section 3.4.(E).
- The construction of Wiener measure in Chapter 2.4. In particular, make sure you understand problem 2.4.1 and 2.4.2.
- The equivalent formulations of the Markov and strong Markov properties in Chapters 2.5 and 2.6. In particular the reduction to bounded optional times in Problem 2.6.9.