**ISyE 2027E Final**
**Fall 2014**

**Name**

Please be neat and show all your work so that I can give you partial credit.
HAPPY HOLIDAYS.

**Question 1**
**Question 2**
**Question 3**
**Question 4**
**Question 5**
**Total**

(20) **1.** A student goes to class on a snowy day with probability 0.4, but on a non-snowy day attends with probability 0.7. Suppose that 20% of the days in February are snowy. What is the probability that it snowed on February 7th given that the student was in class that day?

(20) **2.** Suppose 1% of a certain brand of Christmas lights are defective. Use the Poisson approximation to compute the probability that in a box of 25 there will be at most one defective bulb.

(20) **3.** (20) Suppose $X$ and $Y$ have the joint density function $f(x, y) = (1 + x + y)/2$ for $0 < x < 1$ and $0 < y < 1$. Compute

(a) (10) the density function of $X$.

(b) (10) $P\{1/2 < X < 3/4, 1/3 < Y < 2/3\}$.

(20) **4.** Suppose $X$ has density function $2 - 2x$ for $0 < x < 1$ and 0 otherwise. Compute

(a) (10) $P\{X > 1/2\}$.

(b) (10) the median of $X$.

(20) **5.** (a) (10) Suppose $U$ and $V$ are independent uniform (0,1) random variables. Thus, the density function is 1 in the interval (0,1). Compute $E[(U-V)^2]$.

(a) (10) Suppose $X$ and $Y$ have joint density function $x+y$ when $0<x<1$ and $0<y<1$, 0 otherwise. Compute $Cov(X,Y)$.