Name:

SA402 – Dynamic and Stochastic Models
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Fall 2016

Quiz – 7 September 2016

Instructions. You have 15 minutes to complete this quiz. You may use your calculator. You may not use any other materials (e.g., notes, homework, books).

Standard	Problems	Score
B3	1ab	
B4	1c, 2a	
B5	2b	

Problem 1. Simplex Pizza sells New York style and Sicilian style pizza by the slice. Let N represent the number of New York style slices in one order, and let T represent the total number of slices in one order. The joint pmf p_{NT} for N and T is:

		T		
	p_{NT}	1	2	3
N	0	0.10	0.05	0.01
	1	0.25	0.10	0.02
	2	0	0.35	0.04
	3	0	0	0.08

a. What is the probability that an order contains a total of 2 slices?

b. Explain why $p_{NT}(2,1) = p_{NT}(3,1) = p_{NT}(3,2) = 0$.

c. What is the probability that an order contains 2 New York style slices, given that the order contains a total of 2 slices?

Problem 2. Simplex Pizza was having problems with its three ovens yesterday: sometimes a pizza pie came out of an oven burnt. 30% of the pies were baked in oven 1, 35% in oven 2, and 35% in oven 3. 1% of the pies baked in oven 1 came out burnt, 2% in oven 2, and 5% in oven 3.

Suppose you select 1 pizza pie made yesterday at random. Let V be a random variable that represents the oven it was baked in (i.e. $V = 1$, 2 or 3). In addition, let B represent a random variable indicating whether the pizza came out burnt (i.e. 1 if burnt, 0 otherwise).

a. Show that the probabiity that the randomly selected pie came out burnt, $\Pr\{B = 1\}$, is equal to 0.0275.

b. Explain why V and B are <u>not</u> independent.
(To score "P", an intuitive explanation is sufficient. To score "M", you must provide a numerical argument.)