NJIT **Math 244 Exam I, Fall** **Name:**_____

October 6, 2011 **Student #:** _____

Instructor: Dhar

Must show all work for full credit!!!

I pledge that I have not violated the NJIT code of honor_____

1. (a) In how many ways can 6 different trees be planted on an open field in a circle?
(Please see problem #2.43, page 52)

   (b) In how many ways can 3 oaks, 3 pines and 3 maples be arranged along a property line if one does not distinguish among the trees of the same kind?
   (Please see problem #2.46, page 52)
(12 points)

2. How many three-digit numbers can be formed that are greater than 220 from the digits 0, 1, 2, 3, 4, and 5 if each digit can be used only once? (10 points)
(Please see problem # 2.36, page 52)

3. (a) In how many ways can 7 people be lined up to get on the bus?
(b) In how many ways can 7 people be lined up to get on the bus if four specific persons among them insist on following each other? (Please see problem # 2.32, page 52)
(12 points)

4. Interest centers around the nature of an oven purchased at a particular department store. It can be either a gas or an electric oven. Consider the decisions made by five distinct customers.
a.   Suppose that the probability is 0.43 that less than 2 of these customers purchase an electric oven. What is the probability that at least two purchase the electric oven?
b.   Suppose it is known that the probability that all five customers purchase the electric ovens is 0.011 while 0.121 is the probability that all five purchase the gas oven. What is the probability that at least one of each type of oven is represented by the five purchases of ovens by these customers? (Please see problem # 2.68, page 61)
(12 points)

5. A manufacturer of a flue vaccine is concerned about the quality of its flue serum. Batches of serum are processed by three different departments (D1, D2, D3) having rejection rates of 0.10, 0.09 and 0.13, respectively. The inspections by the three departments are sequential (first D1 inspects, then D2 inspects second and finally D3 inspects third) and independently. (a) What is the probability that a batch of serum is rejected by the second department? (b) What is the probability that a batch of serum is rejected by the third department? (Please see # 2.78, page 70)
(16 points)

6. For married couples living in a certain suburb, the probability that the husband will vote on a bond referendum is 0.22, the probability that the wife will vote on the referendum is 0.27, and the probability both vote on the referendum is 0.11. what is the probability that
   a. At least one member of a married couple will vote on the bond referendum?
   b. A wife will vote, given that her husband will vote?
   c. A husband will vote, given that his wife will not vote? (Please see problem 2.82, page 70)
(20 points)

7.   A certain form of cancer is known to be found in women over 60 with probability 0.075. A blood test exists for the detection of the disease, but the test is not infallible. In fact, it is known that 10% of the time the test gives a false negative (i.e., the test incorrectly gives a negative result of no cancer when the patient actually has cancer) and 4% of the time the test gives a false positive (i.e., the test incorrectly gives a positive result of cancer when the patient is actually free from cancer). If a woman over 60 is known to have taken the test and received a favorable (tested negative, i.e. free from this cancer) result what is the probability that she has the disease? (18 points) (Please see problem 2.118, page 78)

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