Please box your final answers. Calculators are allowed, but not required. Answers may be left as fractions and/or expressions containing factorial (!), permutation (P_r^n), and combination (C_r^n) notation.

1. (a) (4 points) How many distinct 3 letter "words" can you make from 7 distinct letters? Note: In the this question, a word does not have to appear in a dictionary to be considered a "word"; anything with three letters is considered a "word".

   (b) (4 points) How many ways can you select 3 dogs and 2 cats from a group of 5 dogs and 6 cats if the order is not important?

2. A student prepares for an exam by studying a list of 10 problems. She can solve 6 of them. For the exam, the instructor selects 5 questions at random from the list of 10.

   (a) (4 points) What is the probability that the student can solve all 5 problems on the exam?

   (b) (4 points) What is the probability that the student can solve exactly 4 problems on the exam?

3. An experiment can result in none, one, or both of the events A and B with the probabilities shown in the following table.

	A	A^c
B	.1	.2
B^c	.3	.4

(a) (4 points) Find $P(A|B)$.

(b) (4 points) Find $P(B|A)$.

(c) (2 points) Are A and B independent events? Explain briefly.

(d) (2 points) Are A and B mutually exclusive events? Explain briefly.

4. (6 points) A survey of people in a given region showed that 20% were smokers. The probability of death due to lung cancer, given that a person smoked, was roughly 10 times the probability of death due to lung cancer, given that a person did not smoke. If the probability of death due to lung cancer in the region is .006, what is the probability of death due to lung cancer given that a person is a smoker?

5. (6 points) Player A has entered a golf tournament but it is not certain whether player B will enter. Player A has probability 1/6 of winning the tournament if player B enters and probability 3/4 of winning if player B does not enter the tournament. If the probability that player B enters is 1/3, find the probability that player A wins the tournament.

Bonus

6. (4 points (bonus)) In a certain lake, the probability of catching a fish is uniform and independent across time. If the probability that you catch at least one fish in an hour is 64%, what is the probability that you catch at least one fish in a half-hour?