Homework 2

1. Filling in the blanks (15').

(1) Given events A, B, with $P(A) = 0.5, P(B) = 0.6, P(A \cup B) = 0.7$, then $P(B|A) =$ ___.

(2) Suppose that the probabilities that a baby chimpanzees (黑猩猩) shall live elder than 25 years and 35 years old are 0.8 and 0.4, respectively. Then the probability that a 25-year old chimpanzee will live elder than 35 years old is _____.

(3) A store sells three brands of components. Of its components, 60% are brand 1, 30% are brand 2, and 10% are brand 3. Now randomly choose one components from them, and find that it is not brand 3. Then, the probability that it is brand 1 is _____?

(4) Assume that the defective rates of a kind of product in company A and B are 1% and 2%, respectively. Now, randomly choose one product from a population of them, which are supplied by company A and B in proportions as 60% and 40% , respectively, and find that it is a defective one. Then the probability that it is supplied by company A is _____.

(5) Suppose that soldiers A and B shoot independently at a target once time. The success hitting rates of them are 0.6 and 0.5, respectively. Now, the target is hit, then the probability that it is hit by A is _____.

2. Single Choice (12').

(1) Suppose events A and B satisfy $P(B|A) = 1$, then ( ).

A. A is certain event; B. $A \subset B$; C. $A \supset B$; D. $P(A\overline{B}) = 0$

(2) Suppose events A and B are mutually exclusive, and $P(A) > 0, P(B) > 0$. Then which of the follow statements is correct? ( ).

A. $P(A|B) = P(A)$; B. $P(A|B) = 0$; C. $P(AB) = P(A)P(B)$; D. $P(B|A) > 0$

(3) Let A and B be two events, $P(A) > 0, P(B) > 0, P(A|B) = P(A)$. Then which of the follow statements is not right? ( ).

A. $P(B|A) = P(B)$; B. $P(\overline{A}|\overline{B}) = P(\overline{A})$; C. A and B are compatible; D. A and B are incompatible

(4) Let A and B are two arbitrary events, then which one of the following propositions is correct ( ).

A. If $AB \neq \emptyset$, then A and B must be independent;

B. If $AB \neq \emptyset$, then A and B may be independent;

C. If $AB = \emptyset$, then A and B must be independent;

D. If $AB = \emptyset$, then A and B must be dependent;

3. Calculations.

1. A shopping mall sells TV sets of the same kind, of which 40%, 40% and 20% are produced by companies A, B, and C respectivley. Suppose that the defective rates for companies A, B, and C are 10%, 15% and 35%, respectively. Now, a customer randomly select a TV set from the storage. (1) Find the probability that this TV set is not defective; (2) If this TV set is not defective, what is the probability that it is made by company B? (20')

2. Suppose one forgets the last digit of a telephone number, and hence he tries to dial it randomly. Find the probability that he succeeds in connecting the telephone within three times ($\leq$ 3) for dialing. Furthermore, what is the probability if the last digit is odd? (20')

3. Suppose three people independently decode a password with success probabilities as $\frac{1}{5}, \frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the probability that at least one of them decodes the password. (13')

4. Three soldiers shoot at a plane independently and each one only shoot once a time. The probabilities that the plane is hit(击中) by each of them are, 0.9, 0.7, and 0.6, respectively. Assume that the probability that the plane is shot down(击落) are 0.3 and 0.7, respectively if it is hit exactly for one time and two times. If the plane is hit for three times, then it is definitely shot down. What is the probability that the plane is shot down? (20')