銘傳大學九十學年度轉學生招生考試

應統　轉三

七月三十日　第四節

應用機率論　試題

*可以使用計算機

1.試述中央極限定理〈The Central Limit Theorem, C.L.T.〉(10%)

2.設 X ~ Poisson(λ)，試求其動差母函數〈the moment generating function, MGF〉(10%)

3.袋中有 3 黑球、2 白球。今任意取出 3 球，問得 2 黑球 1 白球的機率為何？
　a)每次皆不放回
　b)每次皆放回

4.設 X、Y 的 joint density function 為 $f(x,y)=e^{-\frac{x}{y}}e^{-\frac{y}{y}}$　$0<x<\infty$，$0<y<\infty$；$f(x,y)=0$ otherwise。求 $E[X|Y=y]$(10%)

5.A laboratory blood test is 0.95 effective in detecting a certain disease when it is, in fact, present. However, if a healthy person is tested, with probability 0.01 the test will imply this person has the disease. Suppose 0.005 of the populatin has the disease, what is the probability a person has the disease given that the test result implies this person has the disease given that the test result implies this pperson has the disease? (Bayes' Theorem)(10%)

6.設 X 的 density function 為 $f=3_e^{-3}$　$0<x$；f(x)=0 otherwise。求 $P(2<X<7)$ (10%)

7.設 $X\sim N(0,1)$，即 X 的 density function 為 $f(x,y)=\frac{1}{\sqrt{2\pi}}e^{-\frac{x^2}{2}}, -\infty<x<\infty$，求的 $Y=X^2$ density function, h(y)。(10%)

8.Suppose X is uniformly distributed over the interval (0.1). The density function of X is f(x)=1 of 0<x<1; f(x)=0 otherwise. Compute E[X] and Var(X)(10%)

9.設 X1、X2、X3 為 i.i.d.(independently identically distributed) random variables. 設

X_i 的 density function $f(x)=\lambda e^{-\lambda x}$ $0<x<\infty$；f(x)=0 otherwise，$(\lambda>0)$。求 $Y = X_1+X_2+X_3$ 的 density function。(10%)

〈試題完〉