

99 - 1  
淡江大學 96 學年度碩士班招生考試試題

系別：財務金融學系 B 組

科目：統 計 學

准帶項目請打「V」	
✓	簡單型計算機

本試題共 / 頁

(共十題，每題均為十分。)

1. A pocket contains three coins, one of which had a head on both sides, while the other two coins are normal. A coin is chosen at random from the pocket and tossed three times. Find the probability of obtaining three heads.
2. Assume that  $X$  is a continuous random variable with pdf  $f(x) = \exp[-(x+2)]$  if  $-2 < x < \infty$  and zero otherwise. Find  $E(X)$  and  $\text{Var}(X)$ .
3. If  $X$  has a Poisson distribution and if  $P[X=0] = 0.2$ , find  $P[X > 4]$ . ( $\ln 0.2 = -1.60944$ )
4. Suppose that  $X$  and  $Y$  are discrete random variables with joint pdf of the form  $f(x, y) = \kappa \cdot (x+y)$ ,  $x = 0, 1, 2$ ;  $y = 0, 1, 2$ , and zero otherwise. Find the constant  $\kappa$ .
5. Let  $X$  be a random variable that is uniformly distributed,  $X \sim \text{UNIF}(0,1)$ . Determine the pdf of the random variables  $Y = e^{-X}$  and  $W = X^{1/4}$ .
6. Assume that  $X_1$  and  $X_2$  are independent normal random variables,  $X_i \sim N(\mu, \sigma^2)$ , and let  $Y_1 = X_1 + X_2$  and  $Y_2 = X_1 - X_2$ . Are  $Y_1$  and  $Y_2$  independent and normally distributed?
7. Let  $Y_1, Y_2, \dots, Y_n$  be a random sample from a log normal distribution,  $Y \sim \text{LOGN}(\mu, \sigma^2)$ . Find MLEs of  $\mu$  and  $E(Y)$ .
8. Let  $X_1, X_2, \dots, X_n$  be a random sample from a normal distribution,  $X \sim N(\mu, \sigma^2)$ . Find a sufficient statistic for  $\mu$  with  $\sigma^2$  known.
9. Assume that the random variable  $X \sim N(\mu, \sigma^2 = 40,000)$ . Find the probability of a Type II error when testing the null hypothesis  $H_0: \mu = 1,000$  at the  $\alpha = 0.05$  level if the true population mean is  $\mu = 1,200$ .
10. Consider a regression model,  $Y_i = \alpha + \beta X_i + \epsilon_i$ , for which all classical assumptions hold. Find the expected value of the least squares residuals,  $\hat{\epsilon}_i$ .