國立中央大學99學年度碩士班考試入學試題卷

所別：企業管理學系碩士班 一般丙組(一般生)　科目：統計學　共 1 頁 第 1 頁

一般丁組(一般生)　＊請在試卷答案卷（卡）內作答

企業電子化辛組(一般生)　＊本科考試禁用計算器

1. If we think of the sequence of items emerging from a manufacturing processes as defective (*F*) or nondefective (*S*), suppose that a sequence consists of n1=5 *S* elements and n2=3 *F* elements, find the probability of observing the number of *runs* R less than 4, i.e. Pr(R<4). (15%)
2. The number of parking tickets issued in a certain street on any given weekday has a Poisson distribution with parameter θ=50. What is the approximate probability that the total number of tickets given out during five–day week is between 225 and 275? (15%)
3. (a) What is the *observed* significant level? How to use it to conduct hypothesis testing. (10%)
   (b) Draw the *power curve* for testing the null hypothesis H0 u=u0 vs Ha u≠u0 with significant level α, discuss the situation at minimum testing power. (10%)
   (c) Propose at least one statistic to test the assumption of *homogeneity of variances* in One-way ANOVA. Provide an alternative approach to conduct further test if the assumption of homogeneity of variances does not hold. (10%)
   (d) Given two sample data $\{n_1, \bar{x}_1, S_1^2; n_2, \bar{x}_2, S_2^2\}$, what is the *degree of freedom* ν of *t* statistic being used for the two-sample mean inference under the case on unequal variances? (5%)
4. Develop a linear regression model which may predict the weight(W) by height(H) for both female and male. State the assumptions given in your model. (15%)
5. Suppose that a manager wishes to compare the number of complaints per week filed by union stewards for two shifts at a manufacturing plant. One hundred independent observations on the number of complaints gave means $\bar{x} = 20$ for shift 1 and $\bar{y} = 22$ for shift 2. Assume that the number of complaints per week on the *i*-th shift has a Poisson distribution with a mean θ_i, i=1, 2. Test H0: $\theta_1 = \theta_2$ vs Ha: $\theta_1 \neq \theta_2$ by the *likelihood ratio method*, with significant level 0.01. (20%)

Pr(0≦Z≦1.61)=0.4463　Pr(0≦Z≦3.5)=0.4997　Pr(Z≧4.5)=0.000003

$\chi^2_{.01,1} = 6.63$　$\chi^2_{.01,2} = 9.21$　ln(20)=2.99573　ln(21)=3.04452　ln(22)=3.09104