國立嘉義大學九十七學年度

行銷與流通管理研究所碩士班招生考試試題

科目：統計學

1. An expert witness in a labor dispute concluded that there was no significant difference between the wage paid at SUNVIEW ($13.45/hour) and the national average ($14.78/hour). The sample standard deviation was $3.99 for a sample of 36.

   (a) Please state null hypothesis (H0) and H1. (5 分)

   (b) What was the maximum Type I error level at which this expert could have been testing? (5 分)

   (c) However the labor union of SUNVIEW claimed that the sampling scheme held by the expert was not precise enough. In order to increase the precision, Union suggested increasing the sample size. What's the appropriate size for controlling type I error below 0.01 ? (Assuming that σ=4.2) (10 分)

2. Consider the following sample space for home ownership status and income (in $1000) of families.

	Family income		
Ownership Status	Under 30 B1	30-60 B2	more than 60 B3
A1: own			
A2: rent			

   The probabilities are known: $P(A2)=0.52$, $P(B1)=0.50$, $P(B3)=0.10$, $P(A1\cap B1)=0.10$, $P(A1\cap B3)=0.08$.

   (a) Obtain the joint p.d.f. (5 分)

   (b) Is income level independent of home ownership status? Please show your proof. (5 分)

   (c) Obtain the conditional p.d.f for family income, given that the family owns its home. (10 分)

3. 台灣地區 1981 至 2007 年間 GNP 的時間數列為 $\{Y_t\}$，若欲估計 Y_t 之長期趨勢，考慮下列的模型：

   (a) $Y_t = \alpha + \beta t + \varepsilon_t$ (b) $Y_t = \alpha + \beta t + \gamma t^2 + \varepsilon_t$

   (c) $Y_t = e^{\alpha + \beta t}\varepsilon_t$ (d) $Y_t = \alpha t^\beta \varepsilon_t$

   試問應以何種標準或方法來判斷哪一個模型較佳？請說明您的理由。(20 分)

4. 假設某市政府想知道A、B、C三個地點的交通流量是否受車種的影響，以作為道路規劃的參考，現委託一民間機構做調查。該機構以30分鐘為一區段，從早上7點到晚上9點，隨機選取10個區段，計算在每一區段的時間內通過這三個地點的各種車輛的個數，得每個地點每種車10個區段的平均數如下：

	計程車	自用車	公共汽車	摩托車
A地點	360	650	40	690
B地點	400	710	160	710
C地點	260	590	100	670

   若上述資料符合變異數分析的各種假設，且已知總變異為7,651,000。

   (a)試列出二因子變異數分析表。(5分)

   (b)試檢定不同的地點其交通流量是否相同(α=5%)？($F_{2,108,0.05}$=3.07) (5分)

   (c)試檢定交通流量是否受車種的影響(α=5%)？($F_{3,108,0.05}$=2.68) (5分)

   (d)試檢定地點與車種是否有交叉影響(α=5%)？($F_{6,108,0.05}$=2.18) (5 分)

5. 「是非題」：請逐題說明您認為「是」或「否」的理由，否則以零分計算。

   (a)若 Z_X, Z_Y 分別是 X,Y 的標準化變數，X,Y 的相關係數等於 Z_X, Z_Y 的相關係數。(5分)

   (b)Cov（$aX+b, cY+d$）=acCov（X, Y），a, b, c, d 為任意常數。(5 分)

   (c)若已知 X、Y 彼此獨立，則 Cov（X, Y）=0；若已知 X、Y 彼此不獨立，則 Cov（X, Y）$\neq 0$。(5 分)

   (d)若 $Y=a+bX$，其中 a, b 為常數，則 Y 之變異係數等於 X 之變異係數。(5 分)