國立中山大學 101 學年度碩士暨碩士專班招生考試試題

題號：4011

科目：統計學【經濟所碩士班】

請依序作答，否則該題不計分

5 題 共 100 分

1 (20 %)

Let X and Y be independent, and let $f_1(x)=e^{-x}$, $x>0$, $f_2(y)=e^{-y}$, $y>0$. Suppose $U=Y/X$, $V=X$. Find the marginal density of U.

2. (20 %)

Let X and Y have joint density $f(x,y)= y/10$, $(x,y)=(1,1), (1,2), (1,3), (2,1), (2,2), (3,1)$. Find $Var(Y|x=1)$.

3. (20 %)

Let $X_1,....,X_n$ be independent, $n \geqq 2$, and $X_i \sim N(\mu,\sigma^2)$, where(μ,σ^2) are unknown parameters. Find maximum likelihood estimator (MLE) of (μ/σ).

4. (20 %)

Let V_i be independent, $V_i \sim N(\mu, \sigma^2)$ and $U_n = V_1+...+V_n$. Find the probability limit of (U_n /n) as n tends to infinty, i.e., plim (U_n /n) = ?

5. (20 %)

Two diets are compared. Suppose that 35 men on the first diet had a sample mean weight loss of 20 pounds with a sample standard deviation of 4 pounds, while 60 men on the second diet had a sample mean weight loss of 17.5 pounds with a sample standard deviation of 8 pounds.

Do a two sample test to test the null hypothesis that there was no significant difference in the mean weight losses for the mean on the two diets. Use a 0.05 test. (If Z is a standard normal distribution, then Prob $(Z \leqq z)=0.95$, when $z=1.64$ and Prob $(Z \leqq z)=0.975$, when $z=1.96$.)