淡江大學九十二學年度碩士班招生考試試題

系別：經濟學系　　　　　　科目：統　計　學

准帶項目請打「○」否則打「×」
簡單型計算機
X

依題號順序作答或空白，無計算過程不予計分，(1)～(10) 每題 10 分。

I.　(1)　Of 100 people, 40 are graduate students, 50 are undergraduate students, and 10 are high school students. The percentages of the people in these three categories who watch TV channel 56 are known to be 30, 60, and 40 percent, respectively. If one of these people is observed watching channel 56, what is the probability that he or she is a high school student?

II.　The joint probability distribution f (X, Y), of two random variables X and Y, is given below:

		X		
		1	2	3
	1	0.03	0.06	0.06
	2	0.02	0.04	0.04
Y	3	0.09	0.18	0.18
	4	0.06	0.12	0.12

(2) Find the marginal distributions of X and Y.

(3) Find the conditional PDF, f (X|Y) and f (Y|X).

(4) Find the conditional expectations, E(X|Y) and E(Y|X).

(5) Find the covariance between X and Y.

(6) Find the correlation coefficient.

(7) Are X and Y statistically independent? How do you tell?

III.　(8) Let X and Y represent the rates of return (in percent) on two stocks. You are told that $X \sim N(15,25)$ and $Y \sim N(8,4)$, and that the correlation coefficient between two rates of return is -0.4. Suppose you want to hold the two stocks in your portfolio in equal proportion. What is the probability distribution of the return on the portfolio? Is it better to hold this portfolio or to invest in only one of the two stocks? Why?

IV.　(9) The same English examination was given to students in two different universities. We obtained the following results:

$\overline{X}_1 = 70$, $S_1^2 = 7.2$, $N_1 = 40$

$\overline{X}_2 = 75$, $S_2^2 = 9.0$, $N_2 = 50$

where the $\overline{X}s$ denote the score averages in the two samples; the $S^2 s$, the two sample variances; and the Ns, the sample sizes. How would you test the hypothesis that the population variances of the test scores in the two universities are the same? Which probability distribution do you use? What are the assumptions underlying that distribution?

V.　(10) Suppose that $H_0 : \mu = \mu_0$ is tested against $H_1 : \mu > \mu_0$. If H_0 is rejected at the $\alpha = 0.05$ level of significance, will it necessarily be rejected at the $\alpha = 0.10$ level of significance? Why?