

國立中央大學102學年度碩士班考試入學試題卷

所別：土木工程學系碩士班 運輸工程組(一般生) 科目：統計學 共 1 頁 第 1 頁
土木工程學系碩士班 運輸工程組(在職生)

本科考試可使用計算器，廠牌、功能不拘

*請在試卷答案卷(卡)內作答

參考用

1. (20%) Short Answers :
 - a. Estimate
 - b. Type II Error
 - c. Joint Probability Density Function
 - d. Alternative Hypothesis
 - e. p -value
2. (15%) The following data were gathered for saturation flow:
 1820, 1700, 1780, 1620, 1810, 1850, 1690, 1750, 1750, 1900, 1800, 1830
 Compare these measurements with the recommended value of 1800 for a 95% level of statistical confidence and decide which is the preferred value for the saturation flow. ($t_{11,0.025} = 2.19$, $t_{12,0.025} = 2.179$, $t_{11,0.05} = 1.796$, $t_{12,0.05} = 1.782$)
3. (15%) The following correlation matrix contains the simple correlation coefficients between pairs of variable computed using base-year data. Discuss the question of which explanatory variables X should be included in a linear multiple regression model.

	Y	X ₁	X ₂	X ₃	X ₄
Y	1.00	0.32	0.92	0.95	0.62
X ₁		1.00	0.25	0.19	0.03
X ₂			1.00	0.99	0.29
X ₃				1.00	0.33
X ₄					1.00

4. (15%) Airplanes arrive at an airport area at an average rate of six per hour. Assuming that the arrival pattern is Poisson distributed, calculate the probability that the headway between two successive arrivals will be greater than 20 minutes.
5. (15%) The following data were obtained from an experiment.

X	1	3	4	6	8	9	11	14
Y	9	8	7	5	4	4	2	1

Assuming $Y = aX^b$, please fit a line by linear regression with transformed variables, and calculate and interpret the coefficient of correlation.

6. (20%) The hypothetical data in the following table represent 5 random samples, each of size 5, from independent normal distributions with means $\mu_1, \mu_2, \mu_3, \mu_4, \mu_5$, and common variance σ^2 .

Test the hypothesis at the 0.05 level of significance that $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$.

(Note: $F_{0.05(4,20)} = 2.87$, $F_{0.05(5,20)} = 2.71$, $F_{0.05(4,25)} = 2.76$, $F_{0.05(5,25)} = 2.6$.)

	sample					
	A	B	C	D	E	
	5	9	3	2	7	
	4	7	5	3	6	
	8	8	2	4	9	
	6	6	3	1	4	
	3	9	7	4	7	
Total	26	39	20	14	33	132
Mean	5.2	7.8	4.0	2.8	6.6	5.28

