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國立中央大學94學年度碩士班考試入學試題卷 共 2 頁 第 1 頁
 所別：資訊管理學系碩士班甲乙組 科目：統計學

請注意：答案請務必 1. 橫式書寫，且 2. 依序作答，違反前述任一項者各扣總分 3 分。

(14分) 1. You are trying to develop a strategy for investing in two different stocks. The anticipated annual return for a \$1,000 investment in each stock has the following probability distribution:

Probability	Returns	
	Stock X	Stock Y
0.1	-\$50	-\$100
0.3	20	50
0.4	100	130
0.2	150	200

Compute the

- expected return for stock X. (2分)
- expected return for stock Y. (2分)
- standard deviation for stock X. (3分)
- standard deviation for stock Y. (3分)
- covariance of stock X and stock Y. (2分)
- Do you think you will invest in stock X or stock Y? Explain. (2分)

(10分) 2. Answer the following two questions.

- What is the coefficient of determination? (4分) What is the range of it? (2分)
- What is the standard error of the estimate? (4分)

(6分) 3. Sales and number of orders were used to predict distribution costs at a mail-order catalog business. The following ANOVA summary table was obtained:

ANOVA	df	SS	MS	F-ratio	Significance
Regression	A	12.61020	C	D	0.0001
Residual	12	10.77453	0.8978		
Total	B	13.38473			

- What are the values of A, B, C, and D? (4分)
- Interpret the meaning of the p-value. (2分)

(10分) 4. The number of potential customers accessed to the front page of a company's network station is normally distributed with an average of 100 persons per hour and a standard deviation of 10 persons per hour. If you take four consecutive hours to average, what is the mean of the averages? What is the standard deviation of the averages? (You have to state the detailed of your answers, otherwise, you won't get any score.)

(5分) 5. The number of electronic parts to be examined is 500. The electronic parts are numbered from 1 to 500. It is decided to use stratified sampling to draw five sample. The electronic parts are divided into five strata equally, i.e., 1-100, 101-200, 201-300, 301-400, 401-500. If the random numbers chosen are 0.136, 0.585, 0.038, 0.814, 0.594, what are the coded numbers of chosen parts?

注意：背面有試題

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(10分) 6. A hi-tech company recruits employee by two separated tests with the same qualified level of 60. An applicant may choose either A or B test to participate. According to the historical data, the scores of the two tests are normally distributed. The average and standard deviation of the scores for A test are 70 and 5; for B test, they are 68 and 8. If the degree of difficulty of A and B tests are the same to you, which test would you choose to participate to take advantage of experience of the historical data? (You have to state the detailed of your choice, otherwise, you won't get any score.)

(10分) 7. There are two sets of nano materials ($1 \text{ nano} = 10^{-9} \text{ m}$) with the thickness of normal distribution. To compare the degree of diversification of the two materials, we draw five sample from each materials. The average and variance of A material are 1000 nano and 400 nano^2 ; for B material, they are 100 nano and 100 nano^2 . Which material is less diversified, A or B? (You have to state the detailed of your conclusion, otherwise, you won't get any score.)

(10分) 8. 何謂型 I 錯誤？何謂型 II 錯誤？如何降低錯誤的風險？

(10分) 9. 何謂 p-value？p-value 在假說檢定中通常是越大還是越小越可能拒絕虛無假說？為什麼？

(15分) 10. 中大公司的研發人員主要有兩種學歷：大學學歷及研究所學歷。其年度研發績效如下表，是以 Mann-Whitney U 檢定法，在顯著水準 0.05 下，列出其虛無假說及對立假說，並檢定研發績效是否因學歷不同有差別？(參考 Mann-Whitney U 檢定臨界值 $U_{0.05, 12, 11} = 33$, $U_{0.1, 12, 11} = 38$)

大學學歷	研究所學歷
7.1	8.7
4.2	7.2
6.9	9.4
9.8	4.9
7.8	5.6
8.4	8.8
5.7	7.4
6.4	6.1
7.8	8.0
7.3	5.2
8.5	7.4
9.1	*