

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

考試日期：0302，節次：3

1. (6%) Show that a variable measured by different scales, such as meter and centimeter, will have the same coefficient of variation.
2. Consider the number of accidents occurring on a street.
 - (a) (6%) State the necessary properties for the number of accidents to follow a Poisson distribution.
 - (b) (4%) If the number of accidents occurring each day follows a Poisson distribution with parameter $\mu = 0.01$, what is the probability that more than 1 accidents occur in 3 days?
 - (c) (4%) One day, there is an accident occurred on the street 9:00am. What is the probability that the next accident will occur before 3:00pm that day?
3. (8%) In a real application for estimating a population proportion p , since p is unknown, how can we know that a sample size n is large enough to assume that the point estimator \bar{p} follows a normal distribution?
4. (8%) If we consider both Type I error (μ_0 and α are known) and Type II error (μ_a and β are known) to perform hypothesis testing for a population mean, state the procedure of accepting or rejecting the null hypothesis when the population variance σ^2 is known.
5. The following sample information is given concerning the English-writing scores of high school seniors from two local schools.

School A	School B
$n_1 = 14$	$n_2 = 15$
$\bar{x}_1 = 25$	$\bar{x}_2 = 23$
$\sigma_1^2 = 16$	$\sigma_2^2 = 10$

- (a) (6%) Develop a 95% confidence interval estimate for the difference between the two populations, and interpret it. ($z_{0.05} = 1.645$, $z_{0.025} = 1.96$, $t_{0.05,27} = 1.703$, $t_{0.025,27} = 2.052$)
- (b) (4%) Are the two population means significantly different at the 5% level of significance?
- (c) (4%) Is there any necessary assumption for the above statistical inferences? Why or why not?

(背面仍有題目,請繼續作答)

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

考試日期：0302 節次：3

6. a. (5%) A group of programmer was tested if they prefer some specific looping technique(ex.: For, Do, While). There are 90 programmer were randomly selected and same programming assignments were given to see which looping technique is used. The results were shown as below:

	Loop		
	For	Do	While
Observed frequency	23	36	31

Do the data present any evidence to show the programmers' preference if $\alpha=0.05$ ($z_{0.01}=0.0040$, $z_{0.05}=0.0199$, $z_{0.99}=0.3389$, $z_{0.95}=0.3289$, $t_{0.01}(df=2)=6.965$, $t_{0.01}(df=3)=4.541$, $t_{0.05}(df=3)=2.353$, $t_{0.05}(df=2)=2.920$, $\chi^2_{0.05}(df=3)=7.81473$, $\chi^2_{0.01}(df=3)=11.3449$, $\chi^2_{0.05}(df=2)=5.99147$, $\chi^2_{0.01}(df=2)=9.21034$)?

- b. (6%) In Regression analysis, we usually use two-tail t test and F test. What would be your null hypothesis for each test? What are the alternative hypothesis for the t tes and F test respectively? What are the purposes of them?
- c. (39%) A partial computer output from a regression analysis follows.

The regression equation is

$$\text{Salary} = 389 + 2.12 \text{ East} + 5.32 \text{ South} - 24.1 \text{ North}$$

Predictor	Coef	SE Coef	T
Constant	<u>A</u>	66.09	<u>E</u>
East	<u>B</u>	1.214	<u>F</u>
South	<u>C</u>	0.9629	<u>G</u>
North	<u>D</u>	1.869	<u>H</u>

$$S = 8.59782 \quad R\text{-Sq} = 87.4\% \quad R\text{-Sq(adj)} = \text{I}$$

Analysis of Variance

Source	DF	SS	MS	F
Regression	<u>J</u>	12833.9	<u>L</u>	57.87
Residual Error	25	1848.1	<u>M</u>	
Total	<u>K</u>	14681.9		

What are the values of A, B, C, D, E, F, G, H, I, J, K, L, and M?