一、選擇題 **(25%)**

1. In regression analysis, which of the following is **not** a required assumption about the error term ε?
   (A)The expected value of the error term is one.
   (B)The variance of the error term is the same for all values of X.
   (C)The values of the error term are independent.
   (D)The error term is normally distributed.
   (E)All of these alternatives are required assumptions.

2.The coefficient of correlation
   (A)is the square of the coefficient of determination.
   (B)is the square root of the coefficient of determination.
   (C)is the same as r-square.
   (D)can never be negative.
   (E)None of these alternatives is correct.

3.Which of the following is **not** a characteristic of the normal probability distribution?
   (A)The mean, median, and the mode are equal.
   (B)The mean of the distribution can be negative, zero, or positive.
   (C)The distribution is symmetrical.
   (D)The standard deviation must be 1.
   (E)All of these alternatives are correct.

4. In hypothesis testing, the hypothesis tentatively assumed to be true is
   (A)the alternative hypothesis.
   (B)the null hypothesis.
   (C)either the null or the alternative.
   (D)neither the null nor the alternative.
   (E)None of these alternatives is correct.

5. The sampling distribution used when making inferences about a single population's variance is
   (A)an F distribution
   (B)a t distribution
   (C)a chi-square distribution
   (D)a normal distribution
   (E)None of these alternatives is correct.

二、計算題

1.A local bank is reviewing its credit card policy with a view toward recalling some of its credit cards. In the past approximately 5% of cardholders have defaulted and the bank has been unable to collect the outstanding balance. Hence, management has established a prior probability of 0.05 that any particular cardholder will default. The bank has further found that the probability of missing one or more monthly payments is 0.2 for customers who do not default. Of course, the probability of missing one or more payments for those who default is 1. Given that a customer has missed a monthly payment, compute the posterior probability that the customer will default. **(15%)**

2.The number of hours Taiwanese sleep each night varies considerably with 12% of the population sleeping less than six hours to 3% sleeping more than eight hours. A following sample of 25 individuals reports the hours of sleep per night. Given that a sample deviation of 0.78, answer the following questions.

6.9 7.6 6.5 6.2 5.3 7.8 7.0 5.5 7.6 6.7 7.3 6.6 7.1
6.9 6.0 6.8 6.5 7.2 5.8 8.6 7.6 7.1 6.0 7.2 7.7

(1)What is the point estimate of the population mean number of hours of sleep each night? **(5%)**
(2)Assuming that the population has a normal distribution, develop a 95% confidence interval for the population mean number of sleep each night. **(10%)**

3.Three suppliers provide the following data on defective parts. Use α =0.05 and test for independence between supplier and part quality. **(15%)**

	Quality		
Supplier	Good	Minor Defect	Major defect
A	90	3	7
B	170	18	7
C	135	6	9

4. A market research firm used a sample of individuals to rate the purchase potential of a particular product before and after the individuals saw a new television commercial about the product. The purchase potential ratings were based on a 0 to 10 scale, with higher values indicating a higher purchase potential. The null hypothesis stated that the mean rating “after” would be less than or equal to the mean rating “before”. Rejection of this hypothesis would show that the commercial improved the mean purchase potential rating. Use α =0.05 and the following data (n=8) to test the hypothesis and comment on the value of the commercial. **(15%)**

Purchase Rating		Purchase Rating	
After	Before	After	Before
6	5	3	5
6	4	9	8
7	7	7	5
4	3	6	6

5. A sales manager has collected the following data on annual sales and years of experience.

Years of Experience	Annual Sales ($1000)
1	80
3	97
4	92
4	102
6	103
8	111
10	119
10	123
11	117
13	136

(1)Develop an estimated regression equation that can be used to predict annual sales given the years of experience. **(10%)**

(2)Use the estimated regression equation to predict annual sales for a salesperson with 9 years of experience. **(5%)**

參考數值：

$\chi^2_{0.025}(9)=19.0228$; $\chi^2_{0.05}(9)=16.9190$; $\chi^2_{0.05}(4)=9.48773$; $\chi^2_{0.025}(4)=11.1433$

$t_{0.025}(8)=2.306$; $t_{0.025}(7)=2.365$; $t_{0.05}(8)=1.86$; $t_{0.05}(7)=1.895$;

$t_{0.025}(24)=2.064$; $t_{0.025}(25)=2.060$; $t_{0.05}(24)=1.711$; $t_{0.05}(25)=1.708$;

$F_{0.025}(3,3)=15.44$; $F_{0.05}(3,3)=9.28$; $F_{0.025}(2,2)=39.00$; $F_{0.05}(2,2)=19.00$