※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、(48%) 單選題: 每題 4 分，答錯倒扣 2 分

1. For a quality control problem, the maximum number of defective items that can be found in the sample and still lead to acceptance of the lot is
   a. the upper-control limit
   b. the lower-control limit
   c. the acceptance criterion
   d. None of these alternatives is correct.

2. For a quality control problem, Consumer's risk is
   a. the same concept as the Producer's risk
   b. the probability of Type II error
   c. the probability of Type I error
   d. None of these alternatives is correct.

題組3~6題: Fifteen people were given two types of cereal, Brand X and Brand Y. Two people preferred Brand X and thirteen people preferred Brand Y. We want to determine whether or not customers prefer one brand over the other.

3. The null hypothesis that is being tested is
   a. H_0: $\mu = 5$
   b. H_0: $\mu = 0.5$
   c. H_0: $p = 5$
   d. H_0: $p = 0.5$

4. To test the null hypothesis, the appropriate probability distribution to use is
   a. normal
   b. chi-square
   c. Poisson
   d. binomial

5. The p-value for this test is
   a. 0.0005
   b. 0.001
   c. 0.0037
   d. 0.0074

6. At 95% confidence, the null hypothesis should
   a. be rejected
   b. not be rejected
   c. be revised
   d. None of these alternatives is correct.

7. The forecasting method that is appropriate when the time series has no significant trend, cyclical, or seasonal effect is
   a. moving averages
   b. mean squared error
   c. mean average deviation
   d. qualitative forecasting methods

8. A forecasting method that uses a weighted average of past values for arriving at smoothed time series values is known as
   a. a smoothing average
   b. a moving average
   c. an exponential average
   d. an exponential smoothing

(背面仍有題目,請繼續作答)

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9. A qualitative forecasting method that obtains forecasts through "group consensus" is known as the
   a. Autoregressive model
   b. Delphi approach
   c. mean absolute deviation
   d. None of these alternatives is correct.

題組10~12題:Consider the following time series.

t	1	2	3	4
Y_i	4	7	9	10

10. The slope of linear trend equation, b_1, is
    a. 2.5
    b. 2.0
    c. 1.0
    d. 1.25
11. The intercept, b_0, is
    a. 2.5
    b. 2.0
    c. 1.0
    d. 1.25
12. The forecast for period 5 is
    a. 10.0
    b. 2.5
    c. 12.5
    d. 4.5

二、(52%) 計算題

1. (18%) In a regression analysis involving 21 observations and 4 independent variables, the following information was obtained.
   r^2 (Coefficient of determination) = 0.80 and s (standard error of the estimate) = 5.0
   Based on the above information, fill in all the blanks in the following ANOVA.

Source	DF	SS	MS	F
Regression	____?	____?	____?	____?
Error (Residual)	____?	____?	____?	
Total	____?	____?		

2. (14%) In a population a variable X takes only three distinct values: -1 with probability $P_1 = 1/8$; 0 with $P_2 = 3/4$; and $+1$ with $P_3 = 1/8$. Calculate μ and σ.

3. (20%) When coded messages are sent, there are sometimes errors in transmission. In particular, Morse code uses "dots" and "dashes," which are known to occur in the proportion of 3:4. This means that for any given symbol

   The probability: P(dot sent)=3/7 and P(dash sent) = 4/7.

   Suppose there is inference on the transmission line, and with probability 1/8 a dot is mistakenly received as a dash, and vice versa. If we receive a dot, can we be sure that a dot was sent? (Hint: You may use Bayes' Rule to solve the probability of correctly receiving a dot.)