1. (20%)請詳答並舉例說明：
   a. 何謂敘述（descriptive）統計？其主要用處為何（10%）？
   b. 何謂推論（inferential）統計？其主要用處為何（10%）？

2. (15%) 何謂 α（型I誤差）？何謂 β（型II誤差）？α與β關係為何？α與β的概念如何應用在管理、工程、或法律問題上（擇一舉例即可）？

3. (15%) 已知 A 系統如下（假設各零件互相獨立，零件之數字表該零件作用機率），求
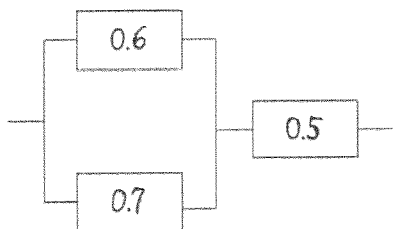


   (1) A系統的可靠度（作用機會）為何？（5%）

   (2)若上述三個零件都能再增加一個，則系統並聯（即並聯兩個A系統）或零件並聯（將相同零件兩兩並聯）哪一種組合方式的可靠度較高？（10%）

4. Match the following numbered clues (1-7) with the lettered responses given in the column (a-g) on the right. （每小題3分；共27分）

| | |
|---|---|
| (1). Estimators of population parameters. | a. Point estimate |
| (2). Point estimate for μ, the population mean. | b. Unbiased estimator |
| (3). Point estimate for Π, the population percent. | c. The sample percent |
| (4). Point estimate for $\sigma^2$, the population variance. | d. An interval estimate |
| (5). If the expected value of the statistic equals the corresponding population parameter, we say the statistic is a(n) _____? | e. Sample statistics |
| (6). A range of values used to estimate a population parameter. | f. The sample mean |
| (7). A single value used as an estimator for a population parameter. | g. The sample variance |

--------------------------------------------------------------------

   (8). The difference between the population mean and the mean of a sample is most likely to be _____.
   (a). zero    (b). a large value    (c). a small value
   (9). An interval estimate will _____ fall around the population mean.
   (a). always    (b). probably    (c). occasionally    (d). never

5. Before hiring new employees, the personnel director for Worldwide Things, Inc., decides to do a regression analysis of the companys current salary structure. She believes that an employee's salary is related to the number of years of work experience (YEARS) and to the number of years of post-high school education (POSTHSED). The following MINITAB output is produced from the sample data she has gathered:

The regression equation is

SALARY = 29436 + 1306 POSTHSED + --------- YEARS

| Predictor | Coef | Stdev | T | p |
|---|---|---|---|---|
| Constant | 29436.2 | 581.3 | -------- | 0.000 |
| POSTHSED | 1306.1 | ------- | 5.12 | 0.000 |
| YEARS | -------- | 44.49 | 18.71 | 0.000 |

s= 3164    R-sq = 88.6%    R-sq(adj) = 88.4%

Analysis of Variance

| Source | DF | SS | MS | F | p |
|---|---|---|---|---|---|
| Regression | 2 | 14792118272 | ---------- | 738.79 | 0.00 |
| Error | 191 | --------------- | 10011007 | | |
| Total | 193 | 16704221184 | | | |

a.) 請將空白處填上（每個空白 3 分；共 18 分）

b.) Predict a salary for one with 6 years of work experience and with 4 years of post-high school education. （2 分）

c.) Interpret the POSTHSED coefficient of 1,306. (3 分)