※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

注意:計算題請寫出計算式,否則不予計分!

1. Explain the following terms (30 %, 5 % each)
   - (1) Mann-Whitney U test
   - (2) Type I error
   - (3) Standard deviation
   - (4) Regression coefficient
   - (5) Standard normal distribution
   - (6) Interaction

2. Please list the assumptions of Model I ANOVA. (10 %)

3. The poison dart frog, *Dendrobates auratus*, is native to Kauai Island . A small sample of these frogs was collected on Kauai Island and their overall lengths measured in cm. The data appear below.

   $$4.1 \quad 5.2 \quad 4.3 \quad 5.5 \quad 6.2 \quad 5.4 \quad 4.2 \qquad t_{0.05,6} = 3.45$$

   For this sample find the following: (1) the sample mean; (2) the standard deviation; (3) the median; (4) the standard error; and (5) the 95% confidence interval for the population mean. (15 %)

4. While working as a volunteer at a Red Cross blood drive, you learn that the ABO blood groups are distributed in the following way: 40% A, 35% O, 20% B, and 5% AB. At the end of the drive 200 units of blood were collected and typed with the following results.

Type	A	O	B	AB
Donors	90	70	30	10

   $$\chi^2_{0.05,3} = 7.81$$

   Do the units collected in the drive fit the hypothesized frequencies for the various blood types? (15 %)

5. Workers at a tree farm decided to test the efficacy of three fertilizer mixtures (A, B, and C) on the growth of Norway maple seedlings, *Acer platanoides*. The table below contains the heights of seedlings (in cm) for the three fertilizer treatments. Determine if there are significant differences in the heights among the three treatments. (15%)

A	60	63	72	75	85	90	85	96
B	68	85	49	55	56	60	63	75
C	70	55	66	85	52	59	61	55

   $$F_{0.05,2,21} = 3.47$$

6. The yield of cotton is particularly sensitive to rainfall. Dry weather during the critical growth period in June appears to slow growth considerably judging from these records of an agricultural experiment station about June rainfall and yield of cotton.
   (1) Calculate r (correlation coefficient) for these data.

   $$t_{0.05,6} = 3.45$$

   (2) Are rainfall and cotton yield correlated? Include a test of H_0: $\rho = 0$. (15 %)

June rainfall (cm)	3	6	7	9	11	15	17	19
Yield (Kg/acre)	600	840	880	1000	1080	1150	1400	1420

   ρ: linear correlation coefficient of a population

試題隨卷繳回