注意: 計算題請寫出計算式，否則將不予計分!

1. Explain the following terms (35% , 5% each)

   (1) Significant level   (2) Coefficient of determination   (3) Interaction

   (4) Categorical data   (5) Standard deviation   (6) Mann-Whitney U test

   (7) Spearman rank correlation coefficient

2. It is proposed that animals with a northerly distribution have shorter appendages than animals from a southerly distribution. Test an appropriate hypothesis, using the following wing-length data for birds (data are in millimeters). (10%)

Northern	120	112	118	115	114	119		
Southern	116	117	120	113	116	119	123	120

3. The following statistics were obtained from measurements of the weight of white-tailed deer of three States. Weights were recorded in kilograms and represent 100 randomly chosen records from each State. Are there significant differences in weights of deer among these States? Assume normality. (15 %)

	State A	State B	State C
Mean	92.5	84.6	82.1
Standard deviation S	7.1	7.4	6.9

4. The heights and arm spans of 10 adult males were measured (in cm). Is there a correlation between these two measurements? Carry out an appropriate analysis.(10 %)

Males	1	2	3	4	5	6	7	8	9	10
Height	161	185	170	182	180	165	167	168	182	192
Arm span	163	183	178	175	176	168	172	172	182	191

5. Given a binomial variable with a mean of 20 and a variance of 16, find n and p. (10 %)

6. In a population where the proportion of people who have the ability to taste umami (鮮味) is unknown, a random sample of 100 people were tested and 75 could clearly distinguish umami from saltiness. Calculate the 95 % population proportion confidence intervals for this finding. (10 %)

7. Consider the following data for the abundance of a certain species of bird. Using chi-square, test the null hypothesis that the ratio of numbers of males to females was the same in all four seasons. (10 %)

Sex	Spring	Summer	Fall	Winter
Males	160	130	70	40
Females	85	75	50	30

$t_{0.05,8}=2.306$ $t_{0.05,11}=2.201$ $F_{0.05,2,297}=3$ $\chi^2_{0.05,3}=7.81$

$t_{0.05,9}=2.262$ $t_{0.05,12}=2.179$ $F_{0.05,2,97}=3.09$ $\chi^2_{0.05,4}=9.49$

試題隨卷繳回