

國立臺灣海洋大學一〇二學年度研究所碩士班暨碩士在職專班招生考試試題

考試科目： 統計學

系所名稱： 應用經濟研究所碩士班不分組

※可使用計算器

1.答案以橫式由左至右書寫。2.請依題號順序作答。

說明：(1)本部份題目共四大題，總分 100 分

(2)若您對考試題目有問題，請自行做假設(make your own assumptions)，並在答案紙上寫明。

(3) 各題作答時請盡量呈現解該題相關的要點與理由。

1. Explanation of terms (30%)

a. p-value (5%)

b. Significance level (5%)

c. BLUE (5%)

d. Random variable (5%)

e. Probability distribution (5%)

f. Non-parametric statistics (5%)

2. Two kinds of feed A and B are studied to reveal the effects for raising pigs. After three weeks, the weight increments (kg) are listed below:

A	46	44	56	32	47	38	53	49	30	49	35	46	30
B	36	46	52	41	42	56	40	50	45	40	39	51	

Can farmers tell two kinds of feed are significantly different from each other of the "mean" weight increment of pigs? (Assume two samples all come from populations with normal distribution, and standard deviations of two populations are identical). Please list and explain needed requirements for solving the problem. (20%)

$t_{0.025(23)}=2.069$, $t_{0.025(24)}=2.064$, $t_{0.025(25)}=2.060$ $t_{0.05(23)}=1.714$, $t_{0.05(24)}=1.711$, $t_{0.05(25)}=1.708$

3. The table below contains data collected on the KuanDu for a project on bird activity. The data are numbers of sightings of common bird species in the early morning (5:00 – 7:00) and in the afternoon (15:00 – 17:00). Is the distribution of bird species the same at both times of a day? $\alpha = 0.05$. Please list and explain needed requirements for solving the problem. (20%)

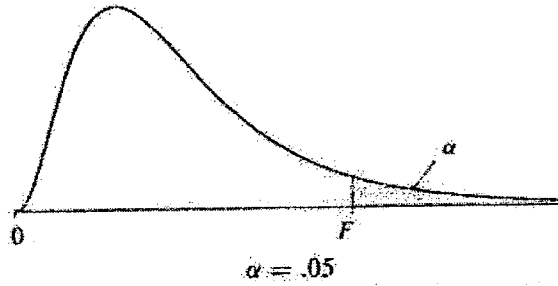
Species	5:00 – 7:00	15:00 – 17:00
A	107	22
B	39	50
C	10	37
D	16	7
E	2	30
F	3	15

$$\chi_{12} = 21.03, \chi_{11} = 19.68, \chi_{10} = 18.30, \chi_9 = 16.92, \chi_8 = 15.51, \chi_7 = 14.07, \chi_6 = 12.59, \chi_5 = 11.07$$

4. An agricultural researcher is developing methods to reduce the use of chemical pesticides on the specific crop. His approach is to use alternative planting methods A, B and C. In order to control for variables such as microclimate and soil conditions, he plants 3 methods on each of 6 farmlands. From your analysis of the data, are three methods as good as each other? Were 6 farmlands important to this analysis? Please list and explain hypothesis, detailed AVONA table, and other needed requirements for solving the problem. (30% for complete two tests)

farmland	Agricultural methods		
	A	B	C
1	70	73	77
2	88	89	92
3	75	70	79
4	65	81	81
5	81	85	60
6	60	60	75

F distribution table



df_2	df_1									
	1	2	3	4	5	6	8	12	24	∞
1	161.4	199.5	215.7	224.6	230.2	234.0	238.9	243.9	249.0	254.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.37	19.41	19.45	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.84	8.74	8.64	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.04	5.91	5.77	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.82	4.68	4.53	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.15	4.00	3.84	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.73	3.57	3.41	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.44	3.28	3.12	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.23	3.07	2.90	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.07	2.91	2.74	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	2.95	2.79	2.61	2.40
12	4.75	3.88	3.49	3.26	3.11	3.00	2.85	2.69	2.50	2.30
13	4.67	3.80	3.41	3.18	3.02	2.92	2.77	2.60	2.42	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.70	2.53	2.35	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.64	2.48	2.29	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.59	2.42	2.24	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.55	2.38	2.19	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.51	2.34	2.15	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.48	2.31	2.11	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.45	2.28	2.08	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.42	2.25	2.05	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.40	2.23	2.03	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.38	2.20	2.00	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.36	2.18	1.98	1.73
25	4.24	3.38	2.99	2.76	2.60	2.49	2.34	2.16	1.96	1.71
26	4.22	3.37	2.98	2.74	2.59	2.47	2.32	2.15	1.95	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.30	2.13	1.93	1.67
28	4.20	3.34	2.95	2.71	2.56	2.44	2.29	2.12	1.91	1.65
29	4.18	3.33	2.93	2.70	2.54	2.43	2.28	2.10	1.90	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.27	2.09	1.89	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.18	2.00	1.79	1.51
60	4.00	3.15	2.76	2.52	2.37	2.25	2.10	1.92	1.70	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.02	1.83	1.61	1.25
∞	3.84	2.99	2.60	2.37	2.21	2.09	1.94	1.75	1.52	1.00

Source: From Table V of R. A. Fisher and F. Yates, *Statistical Tables for Biological, Agricultural and Medical Research*, published by Longman Group Ltd., London, 1974. (Previously published by Oliver & Boyd, Edinburgh.) Reprinted by permission of the authors and publishers.