

國立臺北科技大學九十六學年度碩士班招生考試

系所組別：3220 環境工程與管理研究所乙組

第二節 統計學 試題

第一頁 共二頁

注意事項：

1. 本試題共 4 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

Note: 95 % confidence interval ($\alpha=0.05$) and two-tailed test are used throughout the examination. Two tables are attached in the end of the test for your reference.

1. (40 分, 每小題 8 分) An ANOVA table from Excel printout for a simple linear regression is shown as follows, but some of the numbers have been left out:

迴歸統計					
r 平方	A				
標準誤	B				
觀察值個數	15				
ANOVA					
	自由度	SS	MS	F 統計	顯著值
迴歸	1	841.7664	D	F	I
殘差	13	69.75098	E		
總和	14	C			
	係數	標準誤	t 統計	P-值	
截距 (β_0)	10.2779285	1.420278	G	J	
X 變數 1(β_1)	4.91933073	0.392748	H	K	

- (a) Please tell me the values of A, B, C, D, E, F, G and H from the above table. (b) Among I, J and K, which one(or ones) is(are) less than 0.05? Why? (c) Write the prediction equation (d) Write the confidence intervals for β_0 and β_1 . (e) Interpret the test statistics for testing model adequacy.

2. (30 分, 每小題 15 分) Copper in fish was measured in four paired samples by an official standard method and a new method. Do the two methods differ significantly? Please compare them by (a) paired T-test (to test means) (b) F statistic (to test variances)

Sample No.	1	2	3	4
New method	2.964	3.030	2.994	2.678
Standard method	2.913	3.000	3.204	2.786

3. (10 分, 每小題 5 分) For a regression model, please explain (a) why sometimes a high coefficient of determination (r^2) does not mean the model is useful? (b) Could correlation coefficient (r) be negative? Why?
4. (20 分, 每小題 10 分) A laboratory was given five identical blind specimen of standard solution that contained C=2.5 mg/L. The measured values by this laboratory are shown in the table. (a) Quantify on the precision and bias of these results. (b) Would the laboratory be in compliance with the given samples?

2.8 mg/L	3.5 mg/L	2.3 mg/L	2.7 mg/L	2.3 mg/L
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References:

Critical values for t (two-tailed) for the 95% confidence interval.

df	$\alpha=0.05$
2	4.3027
3	3.1824
4	2.7765
5	2.5706
6	2.4469
7	2.3646
8	2.306
9	2.2622
10	2.2281
11	2.201
12	2.1788
13	2.1604
14	2.1448
15	2.1315

注意：背面尚有參考資料

MS-2

Table of F-statistics for $\alpha=0.05$

df2\df1	3	4	5	6	7	8	9	10	12	15
3	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.7
4	6.59	6.39	6.26	6.16	6.09	6.04	6	5.96	5.91	5.86
5	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62
6	4.76	4.53	4.39	4.28	4.21	4.15	4.1	4.06	4	3.94
7	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51
8	4.07	3.84	3.69	3.58	3.5	3.44	3.39	3.35	3.28	3.22
9	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01
10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85
11	3.59	3.36	3.2	3.09	3.01	2.95	2.9	2.85	2.79	2.72
12	3.49	3.26	3.11	3	2.91	2.85	2.8	2.75	2.69	2.62
13	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.6	2.53
14	3.34	3.11	2.96	2.85	2.76	2.7	2.65	2.6	2.53	2.46
15	3.29	3.06	2.9	2.79	2.71	2.64	2.59	2.54	2.48	2.4