

# 國立中央大學八十五學年度碩士班研究生入學試題卷

所別: 人力資源管理研究所 甲組 科目: 統計學

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## 一、填充題 (40% · 每個空格四分):

1. The t-statistic is used to test  $H_0: \mu = K$ , when \_\_\_\_\_ is unknown.
2. If  $H_0$  is true but has been rejected, what type of error has been made? \_\_\_\_\_.
3. If  $n$  is increased from 25 to 100, the value of the standard error of the mean,  $\sigma_{\bar{x}}$ , will be reduced from 3 to \_\_\_\_\_.
4. If  $r_{xy} = 1$  and  $z_x = -5$ , what is  $z_y$ ? \_\_\_\_\_.
5. What is  $\beta$  (power of test)? \_\_\_\_\_.
6. If  $S_1^2 = 50$  and  $S_2^2 = 100$ , when will the pooled variance estimate  $S^2$  equal to 75?  
\_\_\_\_\_.
7. List the two required conditions for a random sample?
  - (1) \_\_\_\_\_.
  - (2) \_\_\_\_\_.
8. If 25% of the area in a probability distribution falls between 90 and 100, what is the probability that a case selected at random will fall between 90 and 100?  
\_\_\_\_\_.
9. How many five-item tests can be formed by ten items split into two tests of five items each? \_\_\_\_\_.

參考用

## 貳、計算題 (60% · 每題 15%):

1. In a random sample of 5000 consumers, 2200 expressed a preference for product A while 2800 expressed a preference for product B. Construct a 95% confidence interval for the actual proportion of consumers preferring product A to product B.
2. A test item in an objective test is good if it discriminates between good and poor students. Is a certain test item good if it is answered correctly by 190 of 250 good

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students and by 75 of 150 poor students? ( $\alpha = .05$ )

3. In a remedial reading study the 125 students who scored more than 2.0 grade equivalents below their current grade level participated in a remedial reading program. The pupils were retested after eight months in the program. The results are given as below. Do these results prove the remedial reading program was very effective?

Pretest	Posttest
$\bar{X}_1 = 4.5$	$\bar{X}_2 = 5.9$
$s_1 = 1.8$	$s_2 = 1.9$
$s_{\bar{X}_1} = .16$	$s_{\bar{X}_2} = .17$

4. A survey was conducted to study the relationship between the number of personal computer per household and family income. The survey based on  $n = 200$  interviews produced the following results (monthly incomes in NT dollars)

number of personal computer per household	less than 10,000	10,001 - 20,000	20,001 - 30,000	over 30,001
0	37 (25)	10 (15)	3 (7.5)	0 (2.5)
1	63 (75)	50 (45)	27 (22.5)	10 (7.5)

Do the data present sufficient evidence to indicate that the number of personal computer per household is dependent on family income? ( $\alpha = .05$ )

## Student's t Distribution

df	Area in both tails					
	.50	.20	.10	.05	.02	.01
	Area in one tail					
	.25	.10	.05	.025	.01	.005
1	1.000	3.078	6.314	12.706	31.821	63.657
2	0.816	1.886	2.920	4.303	6.965	9.925
3	0.765	1.638	2.353	3.182	4.541	5.841
4	0.711	1.533	2.132	2.776	3.747	4.604
5	0.727	1.476	2.015	2.571	3.365	4.032
6	0.718	1.440	1.943	2.447	3.143	3.707
7	0.711	1.415	1.895	2.365	2.998	3.499
8	0.706	1.397	1.860	2.306	2.896	3.355
9	0.703	1.383	1.833	2.262	2.821	3.250
10	0.700	1.372	1.812	2.228	2.764	3.169
11	0.697	1.363	1.796	2.201	2.718	3.106
12	0.695	1.356	1.782	2.179	2.681	3.055
13	0.694	1.350	1.771	2.160	2.650	3.012
14	0.692	1.345	1.761	2.145	2.624	2.972
15	0.691	1.341	1.753	2.132	2.602	2.947
16	0.690	1.337	1.746	2.120	2.583	2.921
17	0.689	1.333	1.740	2.110	2.567	2.898
18	0.688	1.330	1.734	2.101	2.552	2.878
19	0.688	1.328	1.729	2.093	2.539	2.861
20	0.687	1.325	1.725	2.086	2.528	2.845
21	0.686	1.323	1.721	2.080	2.518	2.831
22	0.686	1.321	1.717	2.074	2.508	2.819
23	0.685	1.319	1.714	2.069	2.500	2.807
24	0.685	1.318	1.711	2.064	2.492	2.797
25	0.684	1.316	1.708	2.060	2.485	2.787
26	0.684	1.315	1.706	2.056	2.479	2.779
27	0.684	1.314	1.703	2.052	2.473	2.771
28	0.683	1.313	1.701	2.048	2.467	2.763
29	0.683	1.311	1.699	2.045	2.462	2.756
30	0.683	1.310	1.697	2.042	2.457	2.750
40	0.681	1.303	1.684	2.021	2.423	2.704
60	0.679	1.296	1.671	2.000	2.390	2.660
120	0.677	1.289	1.658	1.980	2.358	2.617
∞	0.674	1.282	1.645	1.960	2.326	2.576

Appendix G is taken from Table III of Fisher & Yates: *Statistical Tables for Biological, Agricultural and Medical Research*, 6th ed., Longman Group Ltd. London, 1974 (previously published by Oliver & Boyd Ltd., Edinburgh), and by permission of the authors and publishers.

## The $\chi^2$ Distribution

df	Area in the upper tail				
	.10	.05	.025	.01	.005
1	2.71	3.84	5.02	6.63	7.88
2	4.61	5.99	7.38	9.21	10.60
3	6.25	7.81	9.35	11.34	12.84
4	7.78	9.49	11.14	13.28	14.86
5	9.24	11.07	12.83	15.09	16.75
6	10.64	12.59	14.45	16.81	18.55
7	12.02	14.07	16.01	18.48	20.28
8	13.36	15.51	17.53	20.09	21.96
9	14.68	16.92	19.02	21.67	23.59

df	Area in the upper tail					
	.10	.05	.025	.01	.005	.001
10	15.99	18.31	20.48	23.21	25.19	29.59
11	17.28	19.68	21.92	24.72	26.76	30.83
12	18.55	21.03	23.34	26.22	28.30	32.01
13	19.81	22.36	24.74	27.69	29.82	33.18
14	21.06	23.68	26.12	29.14	31.32	34.29
15	22.31	25.00	27.49	30.58	32.80	35.31
16	23.54	26.30	28.85	32.00	34.27	36.27
17	24.77	27.59	30.19	33.41	35.72	37.16
18	25.99	28.87	31.53	34.81	37.16	38.01
19	27.20	30.14	32.85	36.19	38.58	38.91
20	28.41	31.41	34.17	37.57	40.00	39.79
21	29.62	32.67	35.48	38.93	41.40	40.66
22	30.81	33.92	36.78	40.29	42.80	41.51
23	32.01	35.17	38.08	41.64	44.18	42.33
24	33.20	36.42	39.36	42.98	45.56	43.16
25	34.38	37.65	40.65	44.31	46.93	43.99
26	35.56	38.89	41.92	45.64	48.29	44.81
27	36.74	40.11	43.19	46.96	49.64	45.63
28	37.92	41.34	44.46	48.28	50.99	46.45
29	39.09	42.56	45.72	49.59	52.34	47.27
30	40.26	43.77	46.98	50.89	53.67	48.08
40	51.81	55.76	59.34	63.69	66.77	72.60
50	63.17	67.50	71.42	76.15	79.49	85.53
60	74.40	79.08	83.30	88.38	91.95	99.00
70	85.53	90.53	95.02	100.42	104.21	112.32
80	96.58	101.88	106.63	112.32	116.32	125.01
90	107.56	113.14	118.14	124.12	128.30	137.57
100	118.50	124.34	129.56	135.81	140.17	150.00

Modified from Table B: E. Pearson, and H. Hooley, *Biometrika Tables for Statisticians*, Vol. 1, 3rd ed., University Press, Cambridge, 1966, with permission of the Biometrika Trustees.