

大同大學 九十二 學年度研究所碩士班入學考試試題

考試科目：統計學

所別：事業經營研究所

第 1/2 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

- Answer the following questions with examples: **(50 points)**
 - What is Statistics? How to describe a set of measurements in Statistics? **(10 points)**
 - Describe any three probability distributions. What kinds of target populations are properly described by them? And why? **(10 points)**
 - What is probability? How probability values are assessed objectively and subjectively? **(10 points)**
 - Describe the criteria used in Statistics to evaluate a good estimator to estimate the population parameter of interest? **(10 points)**
 - Describe the two types of inferential errors and their associated risks. How to decrease each of them? **(10 points)**
- The operations manager at a light bulb factory wants to determine whether there is any difference in the average life expectancy of bulbs manufactured on two different types of machines. The process standard deviation of Machine 1 is 100 hours and Machine 2 is 115 hours. A random sample of 14 light bulbs obtained from Machine 1 indicates a sample mean of 375 hours, and a similar sample of 14 from Machine 2 indicates a sample mean of 362 hours. (Assume that the samples are from normal populations.)
 - At the 0.05 level of significance, is there evidence of a difference in the variance of the life of bulbs between the two types of machines? ($F_{0.025, 13, 13} = 3.12$)
 - Is there any evidence of a difference in the average life of bulbs produced by the two types of machines, using the 0.05 level of significance? **(15 points)**
- For the 0.025 desired level of significance, to test $H_0: \mu \leq 80$ vs. $H_1: \mu \geq 80$, if the researcher wishes to obtain a 0.99 level of power of the test, what is the minimal sample size he should select? Given the true mean is 81 and population variance is 25. **(10 points)**

- Two samples of 15 employees randomly and respectively selected from the Plant 1 and Plant 2 yield the following results: (salaries in thousands of dollars)

	Plant 1	Plant 2
Mean	21	19
variance	4.5	3.9

Assuming that the population variances from both plants are equal, using F test and establishing its corresponding ANOVA table to detect whether the average employee's salaries between the two plants are different. ($\alpha = 0.05$) **(15 points)**

- A manager asked 100 customers in store A, B, and C, respectively, which brand, X, Y, or Z, they preferred. The results are as follows:

	Store A	Store B	Store C
Brand X	30	36	30
Brand Y	28	28	30
Brand Z	42	36	40
Total	100	100	100

Is there sufficient evidence to reject the null hypothesis that the customers in different stores show the same preference for brands at the 0.05 level of significance? (Given the critical value of $\chi^2 = 9.49$)

(10 points)

大同大學 九十二 學年度研究所碩士班入學考試試題

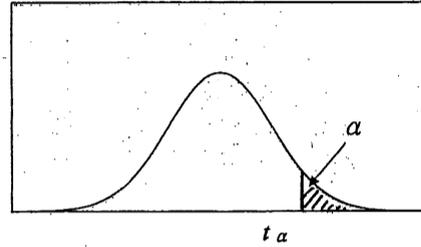
考試科目：統計學

所別：事業經營研究所

第 2/2 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

$$P(t > t_\alpha) = \alpha$$



<i>d.f.</i>	<i>t</i> _{.100}	<i>t</i> _{.050}	<i>t</i> _{.025}	<i>t</i> _{.010}	<i>t</i> _{.005}	<i>d.f.</i>
1	3.078	6.314	12.706	31.821	63.656	1
2	1.886	2.920	4.303	6.965	9.925	2
3	1.638	2.353	3.182	4.541	5.841	3
4	1.533	2.132	2.776	3.747	4.604	4
5	1.476	2.015	2.571	3.365	4.032	5
6	1.440	1.943	2.447	3.143	3.707	6
7	1.415	1.895	2.365	2.998	3.499	7
8	1.397	1.860	2.306	2.896	3.355	8
9	1.383	1.833	2.262	2.821	3.250	9
10	1.372	1.812	2.228	2.764	3.169	10
11	1.363	1.796	2.201	2.718	3.106	11
12	1.356	1.782	2.179	2.681	3.055	12
13	1.350	1.771	2.160	2.650	3.012	13
14	1.345	1.761	2.145	2.624	2.977	14
15	1.341	1.753	2.131	2.602	2.947	15
16	1.337	1.746	2.120	2.583	2.921	16
17	1.333	1.740	2.110	2.567	2.898	17
18	1.330	1.734	2.101	2.552	2.878	18
19	1.328	1.729	2.093	2.539	2.861	19
20	1.325	1.725	2.086	2.528	2.845	20
21	1.323	1.721	2.080	2.518	2.831	21
22	1.321	1.717	2.074	2.508	2.819	22
23	1.319	1.714	2.069	2.500	2.807	23
24	1.318	1.711	2.064	2.492	2.797	24
25	1.316	1.708	2.060	2.485	2.787	25
26	1.315	1.706	2.056	2.479	2.779	26
27	1.314	1.703	2.052	2.473	2.771	27
28	1.313	1.701	2.048	2.467	2.763	28
29	1.311	1.699	2.045	2.462	2.756	29
∞	1.282	1.645	1.960	2.326	2.576	∞