

國立成功大學

111學年度碩士班招生考試試題

編 號：90

系 所：資源工程學系

科 目：統計學

日 期：0219

節 次：第 3 節

備 註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

選擇題 (20 題，每題 5 分)

- If A and B are independent events with $P(A) = 0.65$ and $P(A \cap B) = 0.26$, then, $P(B) =$
 - 0.400
 - 0.169
 - 0.390
 - 0.650
- A six-sided die is tossed 3 times. The probability of observing three ones in a row is
 - 1/3
 - 1/6
 - 1/27
 - 1/216
- A simple random sample of 100 observations was taken from a large population. The sample mean and the standard deviation were determined to be 80 and 12 respectively. The standard error of the mean is
 - 1.20
 - 0.12
 - 8.00
 - 0.80

Exhibit AA

The following information was obtained from independent random samples.
Assume normally distributed populations with equal variances.

	Sample 1	Sample 2
Sample Mean	45	42
Sample Variance	85	90
Sample Size	10	12

- Refer to Exhibit AA. The 95% confidence interval for the difference between the two population means is
 - 5.36 to 11.36
 - 5 to 3
 - 4.86 to 10.86
 - 2.65 to 8.65
- Refer to Exhibit AA. The null hypothesis to be tested is $H_0: \mu_1 - \mu_2 \geq 0$. The test statistic for the difference between the two population means is
 - .186
 - .32
 - .748
 - 1

Exhibit BB

The table below gives beverage preferences for random samples of teens and adults.

	Teens	Adults	Total
Coffee	50	200	250
Tea	100	150	250
Soft Drink	200	200	400
Other	<u>50</u>	<u>50</u>	<u>100</u>
	400	600	1,000

We are asked to test for independence between age (i.e., adult and teen) and drink preferences.

6. Refer to Exhibit BB. With a .05 level of significance, the critical value for the test is
- 1.645
 - 7.815
 - 14.067
 - 15.507
7. Refer to Exhibit BB. The expected number of adults who prefer coffee is
- 0.25
 - 0.33
 - 150
 - 200

Exhibit CC

You want to test whether or not the following sample of 30 observations follows a normal distribution. The mean of the sample equals 11.83, and the standard deviation equals 4.53.

2	3	5	5	7	8	8	9	9	10
11	11	12	12	12	12	13	13	13	14
15	15	15	16	16	17	17	18	18	19

8. Refer to Exhibit CC. The calculated value for the test statistic equals
- 0
 - 1.67
 - 2
 - 6
9. Refer to Exhibit CC. The hypothesis is to be tested at the 5% level of significance. The critical value from the table equals
- 1.645
 - 1.96
 - 7.815
 - 12.592
10. Refer to Exhibit CC. The conclusion of the test is that the
- data follows a normal distribution
 - data does not follow a normal distribution
 - test is inconclusive
 - None of these alternatives is correct.

11. In application of statistics on quality control, consumer's risk is
- the same concept as the Producer's risk
 - the probability of Type II error
 - the probability of Type I error
 - None of these alternatives is correct.
12. A graph showing the probability of accepting the lot as a function of the percent defective in the lot is
- a power curve
 - a control chart
 - an operating characteristic curve
 - None of these alternatives is correct.

Exhibit DD

Part of an ANOVA table is shown below. (hint: you need to fill the table first)

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Treatments	64			8
Within Treatments			2	
Error				
Total	100			

13. Refer to Exhibit DD. If at 95% confidence we want to determine whether or not the means of the populations are equal, the critical value of F is
- 5.80
 - 2.93
 - 3.16
 - 2.90
14. Refer to Exhibit DD. The conclusion of the test is that the means
- are equal
 - may be equal
 - are not equal
 - None of these alternatives is correct.

15. In a regression model involving more than one independent variable, which of the following tests must be used in order to determine if the relationship between the dependent variable and the set of independent variables is significant?
- t test
 - F test
 - Either a t test or a chi-square test can be used.
 - chi-square test
16. In simple linear regression analysis, which of the following is not true?
- The F test and the t test yield the same results.
 - The F test and the t test may or may not yield the same results.
 - The relationship between X and Y is represented by means of a straight line.
 - The value of $F = t^2$.
17. In a regression and correlation analysis if $r^2 = 1$, then
- SSE must also be equal to one
 - SSE must be equal to zero
 - SSE can be any positive value
 - SSE must be negative

Exhibit EE

The following information regarding a dependent variable (Y) and an independent variable (X) is provided.

Y	X
4	2
3	1
4	4
6	3
8	5

$$SSE = 6$$

$$SST = 16$$

18. Refer to Exhibit EE. The least squares estimate of the Y intercept is
- 1
 - 2
 - 3
 - 4

編號：90

國立成功大學 111 學年度碩士班招生考試試題

系 所：資源工程學系

考試科目：統計學

考試日期：0219，節次：3

第5頁，共8頁

19. Refer to Exhibit EE. The least squares estimate of the slope is

- a. 1
- b. 2
- c. 3
- d. 4

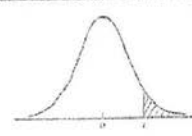
20. Refer to Exhibit EE. The coefficient of determination is

- a. 0.7096
- b. -0.7906
- c. 0.625
- d. 0.375

表 標準常態分配之面積或機率



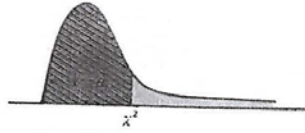
表 右尾面積的 z 分數表，例如，若右尾面積為 10%，則 $z_{0.10} = 1.28$



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7518	0.7549
0.7	0.7580	0.7612	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7853
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9986	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990

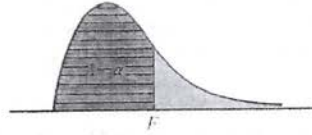
右尾面積	0.10	0.05	0.025	0.01	0.005
1	1.282	1.645	1.960	2.326	2.576
2	1.650	1.960	2.326	2.576	2.807
3	1.645	1.960	2.326	2.576	2.807
4	1.535	1.753	2.170	2.576	2.807
5	1.476	1.646	2.054	2.576	2.807
6	1.440	1.549	1.943	2.576	2.807
7	1.415	1.475	1.881	2.576	2.807
8	1.393	1.432	1.835	2.576	2.807
9	1.381	1.418	1.821	2.576	2.807
10	1.372	1.412	1.815	2.576	2.807
11	1.365	1.406	1.810	2.576	2.807
12	1.358	1.401	1.805	2.576	2.807
13	1.352	1.396	1.801	2.576	2.807
14	1.346	1.392	1.797	2.576	2.807
15	1.341	1.388	1.793	2.576	2.807
16	1.337	1.384	1.789	2.576	2.807
17	1.333	1.380	1.785	2.576	2.807
18	1.330	1.377	1.782	2.576	2.807
19	1.328	1.375	1.780	2.576	2.807
20	1.325	1.372	1.778	2.576	2.807
21	1.322	1.370	1.776	2.576	2.807
22	1.321	1.369	1.775	2.576	2.807
23	1.319	1.368	1.774	2.576	2.807
24	1.318	1.367	1.773	2.576	2.807
25	1.316	1.366	1.772	2.576	2.807
26	1.315	1.365	1.771	2.576	2.807
27	1.314	1.364	1.770	2.576	2.807
28	1.313	1.363	1.769	2.576	2.807
29	1.311	1.362	1.768	2.576	2.807
30	1.310	1.361	1.767	2.576	2.807
40	1.303	1.354	1.761	2.576	2.807
60	1.296	1.347	1.754	2.576	2.807
120	1.289	1.339	1.747	2.576	2.807
∞	1.282	1.342	1.760	2.576	2.807

附表 4 χ^2 分配



自由 度	機 率 $1 - \alpha$							
	.005	.010	.025	.050	.950	.975	.990	.995
1				.004	3.84	5.02	6.63	7.88
2	.01	.02	.05	.10	5.99	7.38	9.21	10.60
3	.07	.11	.22	.35	7.81	9.35	11.34	12.84
4	.21	.30	.48	.71	9.49	11.14	13.28	14.86
5	.41	.55	.83	1.15	11.07	12.83	15.09	16.75
6	.68	.87	1.24	1.64	12.59	14.45	16.81	18.55
7	.99	1.24	1.69	2.17	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	15.51	17.53	20.09	21.96
9	1.73	2.09	2.70	3.33	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	27.59	30.19	33.41	35.72
18	6.26	7.01	8.23	9.39	28.87	31.53	34.81	37.16
19	6.84	7.63	8.91	10.12	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	31.41	34.17	37.57	40.00
21	8.03	8.90	10.28	11.59	32.67	35.48	38.93	41.40
22	8.64	9.54	10.98	12.34	33.92	36.78	40.29	42.80
23	9.26	10.20	11.69	13.09	35.17	38.08	41.64	44.18
24	9.89	10.86	12.40	13.85	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	37.65	40.65	44.31	46.93
26	11.16	12.20	13.84	15.38	38.89	41.92	45.64	48.29
27	11.81	12.88	14.57	16.15	40.11	43.19	46.96	49.64
28	12.46	13.56	15.31	16.93	41.34	44.46	48.28	50.99
29	13.12	14.26	16.05	17.71	42.56	45.72	49.59	52.34
30	13.79	14.95	16.79	18.49	43.77	46.98	50.89	53.67
40	20.71	22.16	24.43	26.51	55.76	59.34	63.69	66.77
50	27.99	29.71	32.36	34.76	67.50	71.42	76.15	79.49
60	35.53	37.48	40.48	43.19	79.08	83.30	88.38	91.95
70	43.28	45.41	48.76	51.74	90.53	95.02	100.43	104.22
80	51.17	53.54	57.15	60.39	101.88	106.63	112.33	116.32
90	59.20	61.75	65.65	69.13	113.14	118.14	124.12	128.30
100	67.33	70.06	74.22	77.93	124.34	129.56	135.81	140.17

附表 0 F 分配



$1 - \alpha = 0.95$

$\frac{v_1}{v_2}$	1	2	3	4	5	6	7	8	9
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385
3	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8868	8.8452	8.8123
4	7.7086	6.9413	6.5914	6.3883	6.2560	6.1631	6.0942	6.0410	5.9988
5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725
6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2066	4.1468	4.0990
7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767
8	5.3177	4.4590	4.0662	3.8378	3.6875	3.5806	3.5005	3.4381	3.3881
9	5.1174	4.2565	3.8626	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789
10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0201
11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962
12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964
13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144
14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458
15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876
16	4.4940	3.6337	3.2389	3.0069	2.8521	2.7413	2.6572	2.5911	2.5377
17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943
18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563
19	4.3808	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227
20	4.3513	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928
21	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3661
22	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419
23	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201
24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002
25	4.2417	3.3852	2.9912	2.7587	2.6030	2.4904	2.4047	2.3371	2.2821
26	4.2252	3.3690	2.9751	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655
27	4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501
28	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360
29	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2782	2.2229
30	4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107
40	4.0848	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240
60	4.0012	3.1504	2.7581	2.5252	2.3683	2.2540	2.1665	2.0970	2.0401
120	3.9201	3.0718	2.6802	2.4472	2.2900	2.1750	2.0867	2.0164	1.9588
∞	3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799