

中央警察大學 112 學年度碩士班入學考試試題

所 別：交通管理研究所

科 目：交通統計

作答注意事項：

- 1.本試題共 4 題，每題各占 25 分；共 6 頁。
- 2.不用抄題，可不按題目次序作答，但應書寫題號。
- 3.禁用鉛筆作答，違者不予計分。

一、某一路口過去連續 50 週的交通事件數如下：

1, 0, 0, 1, 1, 3, 0, 2, 2, 1, 1, 0, 0, 1, 0, 1, 1, 3, 0, 0,
3, 0, 0, 0, 2, 0, 0, 2, 1, 1, 1, 0, 2, 1, 3, 4, 0, 0, 2, 1,
0, 0, 2, 1, 3, 1, 0, 2, 1, 1

請問這些資料的平均數、眾數、中位數、標準差為何？上述資料的次數統計表及繪製適當之統計圖？假設該路口平均每週發生 2 件交通事故，請問未來 1 週發生 1 件以內的交通事故機率為何？上述資料如何檢定其是何種機率分配？

二、為比較區間平均速度科技執法對車輛行駛速度的影響，下表為抽樣 10 處地點區間測速執法設備設置前、設置後的車輛平均行駛速度統計：

地點	1	2	3	4	5	6	7	8	9	10
設置前	70	75	51	94	109	45	68	76	59	89
設置後	63	69	52	80	99	46	64	65	56	91

請問如何檢定 10 處地點的區間測速執法設備執行成效？假設上表為分別抽樣 10 處區間測速執法設備（原設置後數據）、10 處沒有區間測速執法設備（原設置前數據），請說明如何檢定有無設置區間測速執法設備的差異？

三、請說明多元迴歸分析 (Multiple Regression Analysis) 的基本假設為何？並舉一例在交通領域的應用，內容至少應包括問題描述、變數說明、統計量研判與迴歸式意涵的說明。

四、經調查某一地磅站於週一至週六 (A 因子)，每天上午6時至下午6時之6個時段 (B 因子，每個時段2小時) 的過磅車輛數，獲得以下變異數分析表 (ANOVA table)。假設此表資料符合變異數分析的各項假設，請回答以下問題：

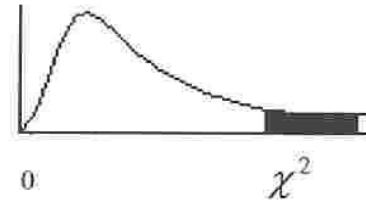
變異來源	平方和
工作日別(A 因子)	46,705
時段別(B 因子)	64,965
隨機	
總和	184,004

(一) 完成上列變異數分析表。(15分)

(二) 試檢定週一至週六每日過磅車輛數是否有顯著差異。(5分)

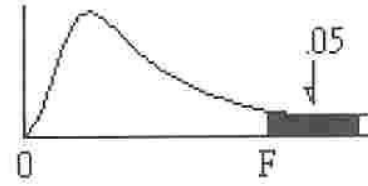
(三) 試檢定每個時段過磅車輛數是否有顯著差異。(5分)

附表 1、卡方分配表



卡方分配底下之右尾面積	
自由度	.995 .990 .975 .950 .900 .100 .050 .025 .010 .005
1	0.000 0.000 0.001 0.004 0.016 2.706 3.841 5.024 6.635 7.878
2	0.010 0.020 0.051 0.103 0.211 4.605 5.991 7.378 9.210 10.597
3	0.072 0.115 0.216 0.352 0.584 6.251 7.815 9.348 11.345 12.838
4	0.207 0.297 0.484 0.711 1.064 7.779 9.488 11.143 13.277 14.860
5	0.412 0.554 0.831 1.145 1.610 9.236 11.070 12.833 15.086 16.750
6	0.676 0.872 1.237 1.635 2.204 10.645 12.592 14.449 16.812 18.548
7	0.989 1.239 1.690 2.167 2.833 12.017 14.067 16.013 18.475 20.278
8	1.344 1.646 2.180 2.733 3.490 13.362 15.507 17.535 20.090 21.955
9	1.735 2.088 2.700 3.325 4.168 14.684 16.919 19.023 21.666 23.589
10	2.156 2.558 3.247 3.940 4.865 15.987 18.307 20.483 23.209 25.188
11	2.603 3.053 3.816 4.575 5.578 17.275 19.675 21.920 24.725 26.757
12	3.074 3.571 4.404 5.226 6.304 18.549 21.026 23.337 26.217 28.300
13	3.565 4.107 5.009 5.892 7.042 19.812 22.362 24.736 27.688 29.819
14	4.075 4.660 5.629 6.571 7.790 21.064 23.685 26.119 29.141 31.319
15	4.601 5.229 6.262 7.261 8.547 22.307 24.996 27.488 30.578 32.801
16	5.142 5.812 6.908 7.962 9.312 23.542 26.296 28.845 32.000 34.267
17	5.697 6.408 7.564 8.672 10.088 24.769 27.587 30.191 33.409 35.718
18	6.265 7.018 8.231 9.390 10.865 25.989 28.869 31.526 34.805 37.156
19	6.844 7.633 8.907 10.117 11.651 27.204 30.144 32.852 36.191 38.587
20	7.434 8.260 9.591 10.851 12.443 28.412 31.410 34.170 37.566 39.997
21	8.034 8.897 10.283 11.591 13.240 29.615 32.671 35.479 38.932 41.401
22	8.643 9.542 10.982 12.338 14.041 30.813 33.924 36.781 40.289 42.796
23	9.260 10.196 11.689 13.091 14.848 32.007 35.172 38.076 41.638 44.181
24	9.886 10.856 12.401 13.848 15.659 33.196 36.415 39.364 42.980 45.559
25	10.520 11.524 13.120 14.611 16.473 34.382 37.652 40.646 44.314 46.928
26	11.160 12.198 13.844 15.379 17.292 35.563 38.885 41.923 45.642 48.290
27	11.808 12.879 14.573 16.151 18.114 36.741 40.113 43.195 46.963 49.645
28	12.461 13.565 15.308 16.928 18.939 37.916 41.337 44.461 48.278 50.993
29	13.121 14.256 16.047 17.708 19.768 39.087 42.557 45.722 49.588 52.330
30	13.787 14.953 16.791 18.493 20.599 40.256 43.773 46.979 50.892 53.672
40	20.707 22.164 24.433 26.509 29.051 51.805 55.58 59.342 63.691 66.766
50	27.991 29.707 32.357 34.764 37.689 63.167 67.505 71.420 76.154 79.490
60	35.534 37.485 40.482 43.188 46.459 74.397 79.082 83.298 88.379 91.952
70	43.275 45.442 48.758 51.739 55.329 85.527 90.531 95.023 100.425 104.215
80	51.172 53.540 57.153 60.391 64.278 96.578 101.879 106.629 112.329 116.321
90	59.196 61.754 65.647 69.126 73.291 107.565 113.145 118.136 124.116 128.299
100	67.328 70.065 74.222 77.929 82.358 118.498 124.342 129.561 135.807 140.169

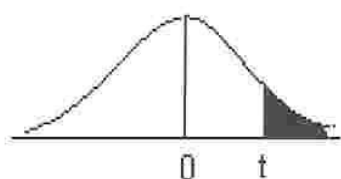
附表 2、F 分配表



$\alpha=0.05$	分子自由度									
	1	2	3	4	5	6	7	8	9	10
1	161.5	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.61	2.59	2.54
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08
50	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.03
100	3.94	3.07	2.70	2.46	2.31	2.19	2.10	2.03	1.97	1.93

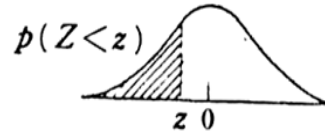
分母自由度

附表 3、t 分配



自由度	t 分配下之右尾面積					
	.10	.05	.025	.01	.005	.001
1	3.078	6.314	12.706	31.821	63.657	318.309
2	1.886	2.920	4.303	6.965	9.925	22.327
3	1.638	2.353	3.182	4.541	5.841	10.215
4	1.533	2.132	2.776	3.747	4.604	7.173
5	1.476	2.015	2.571	3.365	4.032	5.893
6	1.440	1.943	2.447	3.143	3.707	5.208
7	1.415	1.895	2.365	2.998	3.499	4.785
8	1.397	1.860	2.306	2.896	3.355	4.501
9	1.383	1.833	2.262	2.821	3.250	4.297
10	1.372	1.812	2.228	2.764	3.169	4.144
11	1.363	1.796	2.201	2.718	3.106	4.025
12	1.356	1.782	2.179	2.681	3.055	3.930
13	1.350	1.771	2.160	2.650	3.012	3.852
14	1.345	1.761	2.145	2.624	2.977	3.787
15	1.341	1.753	2.131	2.602	2.947	3.733
16	1.337	1.746	2.120	2.583	2.921	3.686
17	1.333	1.740	2.110	2.567	2.898	3.646
18	1.330	1.734	2.101	2.552	2.878	3.610
19	1.328	1.729	2.093	2.539	2.861	3.579
20	1.325	1.725	2.086	2.528	2.845	3.552
21	1.323	1.721	2.080	2.518	2.831	3.527
22	1.321	1.717	2.074	2.508	2.819	3.505
23	1.319	1.714	2.069	2.500	2.807	3.485
24	1.318	1.711	2.064	2.492	2.797	3.467
25	1.316	1.708	2.060	2.485	2.787	3.450
26	1.315	1.706	2.056	2.479	2.779	3.435
27	1.314	1.703	2.052	2.473	2.771	3.421
28	1.313	1.701	2.048	2.467	2.763	3.408
29	1.311	1.699	2.045	2.462	2.756	3.396
30	1.310	1.697	2.042	2.457	2.750	3.385
31	1.309	1.696	2.040	2.453	2.744	3.375
32	1.309	1.694	2.037	2.449	2.738	3.365
33	1.308	1.692	2.035	2.445	2.733	3.356
34	1.307	1.691	2.032	2.441	2.728	3.348
35	1.306	1.690	2.030	2.438	2.724	3.340

附表 4、Z 分配



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.5	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
-3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
-3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
-3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
-3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
-3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
-2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
-2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
-2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
-2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
-2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
-2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
-2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
-2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
-1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
-1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
-1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
-1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
-1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
-1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
-1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
-1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
-1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
-.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-.7	.2420	.2389	.2358	.2327	.2297	.2266	.2236	.2206	.2177	.2148
-.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
-.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
-.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
-.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
-.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
-.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
-.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641