

104年公務人員升官等考試、104年關務人員升官等考試  
104年交通事業公路、港務人員升資考試試題

代號：16730  
18230

全六頁  
第一頁

等 級：簡任

類科(別)：衛生檢驗、衛生技術

科 目：生物統計學研究

考試時間：2 小時

座號：\_\_\_\_\_

※注意：(一)可以使用電子計算器，但需詳列解答過程。

(二)不必抄題，作答時請將試題題號及答案依照順序寫在試卷上，於本試題上作答者，不予計分。

一、某地方衛生局藉由電話訪問使用者對長期照顧的滿意度。某年度對新核定通過長照服務個案身分別：一般戶有 1707 人 (74.1%)、中低收入戶有 414 人 (18.0%)、低收入戶有 181 人 (7.9%)。因人力時間關係，按區域進行分層隨機抽樣得：一般戶有 627 人 (71.8%)、中低收入戶有 169 人 (19.4%)、低收入戶有 77 人 (8.8%)。設顯著水平( $\alpha$ )為 0.05，問此電話樣本與母體在身分別有沒有差異？

(一)請寫出虛無假說 ( $H_0$ ) 及對立假說 ( $H_1$ )。(5 分)

(二)應執行何種統計檢定及計算此統計檢定？(15 分)

(三)依(二)結果下結論，並作簡短說明。(5 分)

二、某研究對執業醫療人員採分層隨機抽樣，採用自填問卷，得到工作壓力的平均數±標準差。19-29 歲 32 人 ( $32.50 \pm 4.93$ )、30-39 歲 50 人 ( $33.16 \pm 6.93$ )、40 歲以上 44 人 ( $25.36 \pm 5.65$ )。設顯著水平( $\alpha$ )為 0.05，採用變異數分析 (ANOVA)，得  $F = 22.48$ ， $p < .001$ 。

(一)請寫出 ANOVA 適用於何種情形，即 ANOVA 之統計前提假設。(5 分)

(二)請用 Scheffe 法進行多重比較 (multiple comparison)，找出三種年齡層間工作壓力之差異。(20 分)

三、下列為某衛教方案介入後危險因素監控態度得分 (分數愈高，表態度愈正向) 之線性複迴歸統計結果，設  $\alpha = .05$ ：

|             |           | n  | 迴歸係數  | t     | p 值   |
|-------------|-----------|----|-------|-------|-------|
| 截距          |           |    | 4.74  | 1.06  | 0.000 |
| 組別          | 實驗組       | 50 | 4.69  | 5.73  | 0.000 |
|             | 對照組 (參考組) | 50 | -     | -     | -     |
| 高血脂         | 有         | 60 | 2.08  | 2.31  | 0.025 |
|             | 沒有 (參考組)  | 40 | -     | -     | -     |
| 前測態度分數      |           |    | -.066 | -.999 | 0.322 |
| $R^2 = .45$ |           |    |       |       |       |

(一)請分別說出組別、高血脂、前測態度分數對後測態度分數之影響所使用之單變量分析方法 (即只考慮一個自變數對依變數之影響) (不用計算)。(9 分)

(二)請解釋上表組別、高血脂、前測態度分數對後測態度分數之影響。(16 分)

四、在獨立樣本 t 檢定 (independent t-test)，請回答下列問題：

(一)適用於何種尺度的資料？及其檢定之統計前提假設 (statistical assumption)？(5 分)

(二)寫出此檢定之公式。(20 分)

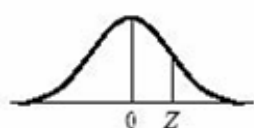
(請接第二頁)

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標準常態分配表



Example: If  $Z=1.00$ , then the area between the mean and this value of  $Z$  is .3413

| Z   | .00   | .01   | .02   | .03   | .04   | .05   | .06   | .07   | .08   | .09   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0160 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0753 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .2019 | .2054 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2257 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2518 | .2549 |
| 0.7 | .2580 | .2612 | .2642 | .2673 | .2704 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2995 | .3023 | .3051 | .3078 | .3106 | .3133 |
| 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4986 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |
| 4.0 | .4999 |       |       |       |       |       |       |       |       |       |

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科 目：生物統計學研究

Percentage points of the  $t$  distribution ( $t_{d,u}$ )<sup>a</sup>

| Degrees of<br>Freedom, $d$ | $u$   |       |       |       |       |        |        |        |         |
|----------------------------|-------|-------|-------|-------|-------|--------|--------|--------|---------|
|                            | .75   | .80   | .85   | .90   | .95   | .975   | .99    | .995   | .9995   |
| 1                          | 1.000 | 1.376 | 1.963 | 3.078 | 6.314 | 12.706 | 31.821 | 63.657 | 636.619 |
| 2                          | 0.816 | 1.061 | 1.386 | 1.886 | 2.920 | 4.303  | 6.965  | 9.925  | 31.598  |
| 3                          | 0.765 | 0.978 | 1.250 | 1.638 | 2.353 | 3.182  | 4.541  | 5.841  | 12.924  |
| 4                          | 0.741 | 0.941 | 1.190 | 1.533 | 2.132 | 2.776  | 3.747  | 4.604  | 8.610   |
| 5                          | 0.727 | 0.920 | 1.156 | 1.476 | 2.015 | 2.571  | 3.365  | 4.032  | 6.869   |
| 6                          | 0.718 | 0.906 | 1.134 | 1.440 | 1.943 | 2.447  | 3.143  | 3.707  | 5.959   |
| 7                          | 0.711 | 0.896 | 1.119 | 1.415 | 1.895 | 2.365  | 2.998  | 3.499  | 5.408   |
| 8                          | 0.706 | 0.889 | 1.108 | 1.397 | 1.860 | 2.306  | 2.896  | 3.355  | 5.041   |
| 9                          | 0.703 | 0.883 | 1.100 | 1.383 | 1.833 | 2.262  | 2.821  | 3.250  | 4.781   |
| 10                         | 0.700 | 0.879 | 1.093 | 1.372 | 1.812 | 2.228  | 2.764  | 3.169  | 4.587   |
| 11                         | 0.697 | 0.876 | 1.088 | 1.363 | 1.796 | 2.201  | 2.718  | 3.106  | 4.437   |
| 12                         | 0.695 | 0.873 | 1.083 | 1.356 | 1.782 | 2.179  | 2.681  | 3.055  | 4.318   |
| 13                         | 0.694 | 0.870 | 1.079 | 1.350 | 1.771 | 2.160  | 2.650  | 3.012  | 4.221   |
| 14                         | 0.692 | 0.868 | 1.076 | 1.345 | 1.761 | 2.145  | 2.624  | 2.977  | 4.140   |
| 15                         | 0.691 | 0.866 | 1.074 | 1.341 | 1.753 | 2.131  | 2.602  | 2.947  | 4.073   |
| 16                         | 0.690 | 0.865 | 1.071 | 1.337 | 1.746 | 2.120  | 2.583  | 2.921  | 4.015   |
| 17                         | 0.689 | 0.863 | 1.069 | 1.333 | 1.740 | 2.110  | 2.567  | 2.898  | 3.965   |
| 18                         | 0.688 | 0.862 | 1.067 | 1.330 | 1.734 | 2.101  | 2.552  | 2.878  | 3.922   |
| 19                         | 0.688 | 0.861 | 1.066 | 1.328 | 1.729 | 2.093  | 2.539  | 2.861  | 3.883   |
| 20                         | 0.687 | 0.860 | 1.064 | 1.325 | 1.725 | 2.086  | 2.528  | 2.845  | 3.850   |
| 21                         | 0.686 | 0.859 | 1.063 | 1.323 | 1.721 | 2.080  | 2.518  | 2.831  | 3.819   |
| 22                         | 0.686 | 0.858 | 1.061 | 1.321 | 1.717 | 2.074  | 2.508  | 2.819  | 3.792   |
| 23                         | 0.685 | 0.858 | 1.060 | 1.319 | 1.714 | 2.069  | 2.500  | 2.807  | 3.767   |
| 24                         | 0.685 | 0.857 | 1.059 | 1.318 | 1.711 | 2.064  | 2.492  | 2.797  | 3.745   |
| 25                         | 0.684 | 0.856 | 1.058 | 1.316 | 1.708 | 2.060  | 2.485  | 2.787  | 3.725   |
| 26                         | 0.684 | 0.856 | 1.058 | 1.315 | 1.706 | 2.056  | 2.479  | 2.779  | 3.707   |
| 27                         | 0.684 | 0.855 | 1.057 | 1.314 | 1.703 | 2.052  | 2.473  | 2.771  | 3.690   |
| 28                         | 0.683 | 0.855 | 1.056 | 1.313 | 1.701 | 2.048  | 2.467  | 2.763  | 3.674   |
| 29                         | 0.683 | 0.854 | 1.055 | 1.311 | 1.699 | 2.045  | 2.462  | 2.756  | 3.659   |
| 30                         | 0.683 | 0.854 | 1.055 | 1.310 | 1.697 | 2.042  | 2.457  | 2.750  | 3.646   |
| 40                         | 0.681 | 0.851 | 1.050 | 1.303 | 1.684 | 2.021  | 2.423  | 2.704  | 3.551   |
| 60                         | 0.679 | 0.848 | 1.046 | 1.296 | 1.671 | 2.000  | 2.390  | 2.660  | 3.460   |
| 120                        | 0.677 | 0.845 | 1.041 | 1.289 | 1.658 | 1.980  | 2.358  | 2.617  | 3.373   |
|                            | 0.674 | 0.842 | 1.036 | 1.282 | 1.645 | 1.960  | 2.326  | 2.576  | 3.291   |

<sup>a</sup>The  $u$ th percentile of a  $t$  distribution with  $d$  degrees of freedom.

[ Table 5 is taken from Table III of Fisher and Yates: "Statistical Tables for Biological, Agricultural and Medical Research," published by Longman Group Ltd., London (previously published by Oliver and Boyd Ltd., Edinburgh) and by permission of the authors and publishers. ]

(請接第四頁)

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| F分布           |          |           |        |       |       |       |       |       |       |       |       |
|---------------|----------|-----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 分子<br>自由度(df) | 右尾<br>機率 | 分母自由度(df) |        |       |       |       |       |       |       |       |       |
|               |          | 1         | 2      | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |
| 1             | 0.100    | 39.86     | 8.53   | 5.54  | 4.54  | 4.06  | 3.78  | 3.59  | 3.46  | 3.36  | 3.29  |
| 1             | 0.050    | 161.45    | 18.51  | 10.13 | 7.71  | 6.61  | 5.99  | 5.59  | 5.32  | 5.12  | 4.96  |
| 1             | 0.025    | 647.79    | 38.51  | 17.44 | 12.22 | 10.01 | 8.81  | 8.07  | 7.57  | 7.21  | 6.94  |
| 1             | 0.010    | 4052.18   | 98.50  | 34.12 | 21.20 | 16.26 | 13.75 | 12.25 | 11.26 | 10.56 | 10.04 |
| 1             | 0.005    | 16210.72  | 198.50 | 55.55 | 31.33 | 22.78 | 18.64 | 16.24 | 14.69 | 13.61 | 12.83 |
| 2             | 0.100    | 49.50     | 9.00   | 5.46  | 4.32  | 3.78  | 3.46  | 3.26  | 3.11  | 3.01  | 2.92  |
| 2             | 0.050    | 199.50    | 19.00  | 9.55  | 6.94  | 5.79  | 5.14  | 4.74  | 4.46  | 4.26  | 4.10  |
| 2             | 0.025    | 799.50    | 39.00  | 16.04 | 10.65 | 8.43  | 7.26  | 6.54  | 6.06  | 5.71  | 5.46  |
| 2             | 0.010    | 4999.50   | 99.00  | 30.82 | 18.00 | 13.27 | 10.92 | 9.55  | 8.65  | 8.02  | 7.56  |
| 2             | 0.005    | 19999.50  | 199.00 | 49.80 | 26.28 | 18.31 | 14.54 | 12.40 | 11.04 | 10.11 | 9.43  |
| 3             | 0.100    | 53.59     | 9.16   | 5.39  | 4.19  | 3.62  | 3.29  | 3.07  | 2.92  | 2.81  | 2.73  |
| 3             | 0.050    | 215.71    | 19.16  | 9.28  | 6.59  | 5.41  | 4.76  | 4.35  | 4.07  | 3.86  | 3.71  |
| 3             | 0.025    | 864.16    | 39.17  | 15.44 | 9.98  | 7.76  | 6.60  | 5.89  | 5.42  | 5.08  | 4.83  |
| 3             | 0.010    | 5403.35   | 99.17  | 29.46 | 16.69 | 12.06 | 9.78  | 8.45  | 7.59  | 6.99  | 6.55  |
| 3             | 0.005    | 21614.74  | 199.17 | 47.47 | 24.26 | 16.53 | 12.92 | 10.88 | 9.60  | 8.72  | 8.08  |
| 4             | 0.100    | 55.83     | 9.24   | 5.34  | 4.11  | 3.52  | 3.18  | 2.96  | 2.81  | 2.69  | 2.61  |
| 4             | 0.050    | 224.58    | 19.25  | 9.12  | 6.39  | 5.19  | 4.53  | 4.12  | 3.84  | 3.63  | 3.48  |
| 4             | 0.025    | 899.58    | 39.25  | 15.10 | 9.60  | 7.39  | 6.23  | 5.52  | 5.05  | 4.72  | 4.47  |
| 4             | 0.010    | 5624.58   | 99.25  | 28.71 | 15.98 | 11.39 | 9.15  | 7.85  | 7.01  | 6.42  | 5.99  |
| 4             | 0.005    | 22499.58  | 199.25 | 46.19 | 23.15 | 15.56 | 12.03 | 10.05 | 8.81  | 7.96  | 7.34  |
| 5             | 0.100    | 57.24     | 9.29   | 5.31  | 4.05  | 3.45  | 3.11  | 2.88  | 2.73  | 2.61  | 2.52  |
| 5             | 0.050    | 230.16    | 19.30  | 9.01  | 6.26  | 5.05  | 4.39  | 3.97  | 3.69  | 3.48  | 3.33  |
| 5             | 0.025    | 921.85    | 39.30  | 14.88 | 9.36  | 7.15  | 5.99  | 5.29  | 4.82  | 4.48  | 4.24  |
| 5             | 0.010    | 5763.65   | 99.30  | 28.24 | 15.52 | 10.97 | 8.75  | 7.46  | 6.63  | 6.06  | 5.64  |
| 5             | 0.005    | 23055.80  | 199.30 | 45.39 | 22.46 | 14.94 | 11.46 | 9.52  | 8.30  | 7.47  | 6.87  |
| 6             | 0.100    | 58.20     | 9.33   | 5.28  | 4.01  | 3.40  | 3.05  | 2.83  | 2.67  | 2.55  | 2.46  |
| 6             | 0.050    | 233.99    | 19.33  | 8.94  | 6.16  | 4.95  | 4.28  | 3.87  | 3.58  | 3.37  | 3.22  |
| 6             | 0.025    | 937.11    | 39.33  | 14.73 | 9.20  | 6.98  | 5.82  | 5.12  | 4.65  | 4.32  | 4.07  |
| 6             | 0.010    | 5858.99   | 99.33  | 27.91 | 15.21 | 10.67 | 8.47  | 7.19  | 6.37  | 5.80  | 5.39  |
| 6             | 0.005    | 23437.11  | 199.33 | 44.84 | 21.97 | 14.51 | 11.07 | 9.16  | 7.95  | 7.13  | 6.54  |
| 7             | 0.100    | 58.91     | 9.35   | 5.27  | 3.98  | 3.37  | 3.01  | 2.78  | 2.62  | 2.51  | 2.41  |
| 7             | 0.050    | 236.77    | 19.35  | 8.89  | 6.09  | 4.88  | 4.21  | 3.79  | 3.50  | 3.29  | 3.14  |
| 7             | 0.025    | 948.22    | 39.36  | 14.62 | 9.07  | 6.85  | 5.70  | 4.99  | 4.53  | 4.20  | 3.95  |
| 7             | 0.010    | 5928.36   | 99.36  | 27.67 | 14.98 | 10.46 | 8.26  | 6.99  | 6.18  | 5.61  | 5.20  |
| 7             | 0.005    | 23714.57  | 199.36 | 44.43 | 21.62 | 14.20 | 10.79 | 8.89  | 7.69  | 6.88  | 6.30  |
| 8             | 0.100    | 59.44     | 9.37   | 5.25  | 3.95  | 3.34  | 2.98  | 2.75  | 2.59  | 2.47  | 2.38  |
| 8             | 0.050    | 238.88    | 19.37  | 8.85  | 6.04  | 4.82  | 4.15  | 3.73  | 3.44  | 3.23  | 3.07  |
| 8             | 0.025    | 956.66    | 39.37  | 14.54 | 8.98  | 6.76  | 5.60  | 4.90  | 4.43  | 4.10  | 3.85  |
| 8             | 0.010    | 5981.07   | 99.37  | 27.49 | 14.80 | 10.29 | 8.10  | 6.84  | 6.03  | 5.47  | 5.06  |
| 8             | 0.005    | 23925.41  | 199.38 | 44.13 | 21.35 | 13.96 | 10.57 | 8.68  | 7.50  | 6.69  | 6.12  |
| 9             | 0.100    | 59.86     | 9.38   | 5.24  | 3.94  | 3.32  | 2.96  | 2.72  | 2.56  | 2.44  | 2.35  |
| 9             | 0.050    | 240.54    | 19.39  | 8.81  | 6.00  | 4.77  | 4.10  | 3.68  | 3.39  | 3.18  | 3.02  |
| 9             | 0.025    | 963.28    | 39.39  | 14.47 | 8.90  | 6.68  | 5.52  | 4.82  | 4.36  | 4.03  | 3.78  |
| 9             | 0.010    | 6022.47   | 99.39  | 27.35 | 14.66 | 10.16 | 7.98  | 6.72  | 5.91  | 5.35  | 4.94  |
| 9             | 0.005    | 24091.00  | 199.39 | 43.88 | 21.14 | 13.77 | 10.39 | 8.51  | 7.34  | 6.54  | 5.97  |
| 10            | 0.100    | 60.19     | 9.39   | 5.23  | 3.92  | 3.30  | 2.94  | 2.70  | 2.54  | 2.42  | 2.32  |
| 10            | 0.050    | 241.88    | 19.40  | 8.79  | 5.96  | 4.74  | 4.06  | 3.64  | 3.35  | 3.14  | 2.98  |
| 10            | 0.025    | 968.63    | 39.40  | 14.42 | 8.84  | 6.62  | 5.46  | 4.76  | 4.30  | 3.96  | 3.72  |
| 10            | 0.010    | 6055.85   | 99.40  | 27.23 | 14.55 | 10.05 | 7.87  | 6.62  | 5.81  | 5.26  | 4.85  |
| 10            | 0.005    | 24224.49  | 199.40 | 43.69 | 20.97 | 13.62 | 10.25 | 8.38  | 7.21  | 6.42  | 5.85  |
| 100           | 0.100    | 63.01     | 9.48   | 5.14  | 3.78  | 3.13  | 2.75  | 2.50  | 2.32  | 2.19  | 2.09  |
| 100           | 0.050    | 253.04    | 19.49  | 8.55  | 5.66  | 4.41  | 3.71  | 3.27  | 2.97  | 2.76  | 2.59  |
| 100           | 0.025    | 1013.17   | 39.49  | 13.96 | 8.32  | 6.08  | 4.92  | 4.21  | 3.74  | 3.40  | 3.15  |
| 100           | 0.010    | 6334.11   | 99.49  | 26.24 | 13.58 | 9.13  | 6.99  | 5.75  | 4.96  | 4.42  | 4.01  |
| 100           | 0.005    | 25337.45  | 199.49 | 42.02 | 19.50 | 12.30 | 9.03  | 7.22  | 6.09  | 5.32  | 4.77  |

(請接第五頁)

104年公務人員升官等考試、104年關務人員升官等考試  
104年交通事業公路、港務人員升資考試試題

代號：16730  
18230

全六頁  
第五頁

等 級：簡任

類科(別)：衛生檢驗、衛生技術

科 目：生物統計學研究

F分布(續)

| 分子<br>自由度(df) | 右尾<br>機率 | 分母自由度(df) |      |      |      |      |      |      |      |      |      |
|---------------|----------|-----------|------|------|------|------|------|------|------|------|------|
|               |          | 15        | 20   | 25   | 30   | 35   | 40   | 60   | 80   | 100  | 1000 |
| 1             | 0.100    | 3.07      | 2.97 | 2.92 | 2.88 | 2.85 | 2.84 | 2.79 | 2.77 | 2.76 | 2.71 |
| 1             | 0.050    | 4.54      | 4.35 | 4.24 | 4.17 | 4.12 | 4.08 | 4.00 | 3.96 | 3.94 | 3.85 |
| 1             | 0.025    | 6.20      | 5.87 | 5.69 | 5.57 | 5.48 | 5.42 | 5.29 | 5.22 | 5.18 | 5.04 |
| 1             | 0.010    | 8.68      | 8.10 | 7.77 | 7.56 | 7.42 | 7.31 | 7.08 | 6.96 | 6.90 | 6.66 |
| 1             | 0.005    | 10.80     | 9.94 | 9.48 | 9.18 | 8.98 | 8.83 | 8.49 | 8.33 | 8.24 | 7.91 |
| 2             | 0.100    | 2.70      | 2.59 | 2.53 | 2.49 | 2.46 | 2.44 | 2.39 | 2.37 | 2.36 | 2.31 |
| 2             | 0.050    | 3.68      | 3.49 | 3.39 | 3.32 | 3.27 | 3.23 | 3.15 | 3.11 | 3.09 | 3.00 |
| 2             | 0.025    | 4.77      | 4.46 | 4.29 | 4.18 | 4.11 | 4.05 | 3.93 | 3.86 | 3.83 | 3.70 |
| 2             | 0.010    | 6.36      | 5.85 | 5.57 | 5.39 | 5.27 | 5.18 | 4.98 | 4.88 | 4.82 | 4.63 |
| 2             | 0.005    | 7.70      | 6.99 | 6.60 | 6.35 | 6.19 | 6.07 | 5.79 | 5.67 | 5.59 | 5.33 |
| 3             | 0.100    | 2.49      | 2.38 | 2.32 | 2.28 | 2.25 | 2.23 | 2.18 | 2.15 | 2.14 | 2.09 |
| 3             | 0.050    | 3.29      | 3.10 | 2.99 | 2.92 | 2.87 | 2.84 | 2.76 | 2.72 | 2.70 | 2.61 |
| 3             | 0.025    | 4.15      | 3.86 | 3.69 | 3.59 | 3.52 | 3.46 | 3.34 | 3.28 | 3.25 | 3.13 |
| 3             | 0.010    | 5.42      | 4.94 | 4.68 | 4.51 | 4.40 | 4.31 | 4.13 | 4.04 | 3.98 | 3.80 |
| 3             | 0.005    | 6.48      | 5.82 | 5.46 | 5.24 | 5.09 | 4.98 | 4.73 | 4.61 | 4.54 | 4.30 |
| 4             | 0.100    | 2.36      | 2.25 | 2.18 | 2.14 | 2.11 | 2.09 | 2.04 | 2.02 | 2.00 | 1.95 |
| 4             | 0.050    | 3.06      | 2.87 | 2.76 | 2.69 | 2.64 | 2.61 | 2.53 | 2.49 | 2.46 | 2.38 |
| 4             | 0.025    | 3.80      | 3.51 | 3.35 | 3.25 | 3.18 | 3.13 | 3.01 | 2.95 | 2.92 | 2.80 |
| 4             | 0.010    | 4.89      | 4.43 | 4.18 | 4.02 | 3.91 | 3.83 | 3.65 | 3.56 | 3.51 | 3.34 |
| 4             | 0.005    | 5.80      | 5.17 | 4.84 | 4.62 | 4.48 | 4.37 | 4.14 | 4.03 | 3.96 | 3.74 |
| 5             | 0.100    | 2.27      | 2.16 | 2.09 | 2.05 | 2.02 | 2.00 | 1.95 | 1.92 | 1.91 | 1.85 |
| 5             | 0.050    | 2.90      | 2.71 | 2.60 | 2.53 | 2.49 | 2.45 | 2.37 | 2.33 | 2.31 | 2.22 |
| 5             | 0.025    | 3.58      | 3.29 | 3.13 | 3.03 | 2.96 | 2.90 | 2.79 | 2.73 | 2.70 | 2.58 |
| 5             | 0.010    | 4.56      | 4.10 | 3.85 | 3.70 | 3.59 | 3.51 | 3.34 | 3.26 | 3.21 | 3.04 |
| 5             | 0.005    | 5.37      | 4.76 | 4.43 | 4.23 | 4.09 | 3.99 | 3.76 | 3.65 | 3.59 | 3.37 |
| 6             | 0.100    | 2.21      | 2.09 | 2.02 | 1.98 | 1.95 | 1.93 | 1.87 | 1.85 | 1.83 | 1.78 |
| 6             | 0.050    | 2.79      | 2.60 | 2.49 | 2.42 | 2.37 | 2.34 | 2.25 | 2.21 | 2.19 | 2.11 |
| 6             | 0.025    | 3.41      | 3.13 | 2.97 | 2.87 | 2.80 | 2.74 | 2.63 | 2.57 | 2.54 | 2.42 |
| 6             | 0.010    | 4.32      | 3.87 | 3.63 | 3.47 | 3.37 | 3.29 | 3.12 | 3.04 | 2.99 | 2.82 |
| 6             | 0.005    | 5.07      | 4.47 | 4.15 | 3.95 | 3.81 | 3.71 | 3.49 | 3.39 | 3.33 | 3.11 |
| 7             | 0.100    | 2.16      | 2.04 | 1.97 | 1.93 | 1.90 | 1.87 | 1.82 | 1.79 | 1.78 | 1.72 |
| 7             | 0.050    | 2.71      | 2.51 | 2.40 | 2.33 | 2.29 | 2.25 | 2.17 | 2.13 | 2.10 | 2.02 |
| 7             | 0.025    | 3.29      | 3.01 | 2.85 | 2.75 | 2.68 | 2.62 | 2.51 | 2.45 | 2.42 | 2.30 |
| 7             | 0.010    | 4.14      | 3.70 | 3.46 | 3.30 | 3.20 | 3.12 | 2.95 | 2.87 | 2.82 | 2.66 |
| 7             | 0.005    | 4.85      | 4.26 | 3.94 | 3.74 | 3.61 | 3.51 | 3.29 | 3.19 | 3.13 | 2.92 |
| 8             | 0.100    | 2.12      | 2.00 | 1.93 | 1.88 | 1.85 | 1.83 | 1.77 | 1.75 | 1.73 | 1.68 |
| 8             | 0.050    | 2.64      | 2.45 | 2.34 | 2.27 | 2.22 | 2.18 | 2.10 | 2.06 | 2.03 | 1.95 |
| 8             | 0.025    | 3.20      | 2.91 | 2.75 | 2.65 | 2.58 | 2.53 | 2.41 | 2.35 | 2.32 | 2.20 |
| 8             | 0.010    | 4.00      | 3.56 | 3.32 | 3.17 | 3.07 | 2.99 | 2.82 | 2.74 | 2.69 | 2.53 |
| 8             | 0.005    | 4.67      | 4.09 | 3.78 | 3.58 | 3.45 | 3.35 | 3.13 | 3.03 | 2.97 | 2.77 |
| 9             | 0.100    | 2.09      | 1.96 | 1.89 | 1.85 | 1.82 | 1.79 | 1.74 | 1.71 | 1.69 | 1.64 |
| 9             | 0.050    | 2.59      | 2.39 | 2.28 | 2.21 | 2.16 | 2.12 | 2.04 | 2.00 | 1.97 | 1.89 |
| 9             | 0.025    | 3.12      | 2.84 | 2.68 | 2.57 | 2.50 | 2.45 | 2.33 | 2.28 | 2.24 | 2.13 |
| 9             | 0.010    | 3.89      | 3.46 | 3.22 | 3.07 | 2.96 | 2.89 | 2.72 | 2.64 | 2.59 | 2.43 |
| 9             | 0.005    | 4.54      | 3.96 | 3.64 | 3.45 | 3.32 | 3.22 | 3.01 | 2.91 | 2.85 | 2.64 |
| 10            | 0.100    | 2.06      | 1.94 | 1.87 | 1.82 | 1.79 | 1.76 | 1.71 | 1.68 | 1.66 | 1.61 |
| 10            | 0.050    | 2.54      | 2.35 | 2.24 | 2.16 | 2.11 | 2.08 | 1.99 | 1.95 | 1.93 | 1.84 |
| 10            | 0.025    | 3.06      | 2.77 | 2.61 | 2.51 | 2.44 | 2.39 | 2.27 | 2.21 | 2.18 | 2.06 |
| 10            | 0.010    | 3.80      | 3.37 | 3.13 | 2.98 | 2.88 | 2.80 | 2.63 | 2.55 | 2.50 | 2.34 |
| 10            | 0.005    | 4.42      | 3.85 | 3.54 | 3.34 | 3.21 | 3.12 | 2.90 | 2.80 | 2.74 | 2.54 |
| 100           | 0.100    | 1.79      | 1.65 | 1.56 | 1.51 | 1.47 | 1.43 | 1.36 | 1.32 | 1.29 | 1.20 |
| 100           | 0.050    | 2.12      | 1.91 | 1.78 | 1.70 | 1.63 | 1.59 | 1.48 | 1.43 | 1.39 | 1.26 |
| 100           | 0.025    | 2.47      | 2.17 | 2.00 | 1.88 | 1.80 | 1.74 | 1.60 | 1.53 | 1.48 | 1.32 |
| 100           | 0.010    | 2.98      | 2.54 | 2.29 | 2.13 | 2.02 | 1.94 | 1.75 | 1.65 | 1.60 | 1.38 |
| 100           | 0.005    | 3.39      | 2.83 | 2.52 | 2.32 | 2.19 | 2.09 | 1.86 | 1.75 | 1.68 | 1.43 |

(請接第六頁)

104年公務人員升官等考試、104年關務人員升官等考試  
104年交通事業公路、港務人員升資考試試題

代號：16730  
18230

全六頁  
第六頁

等 級：簡任

類科(別)：衛生檢驗、衛生技術

科 目：生物統計學研究

Percentage points of the chi-square distribution ( $\chi^2_{d,u}$ )<sup>a</sup>

| d   | u                                 |                                   |                                   |         |       |       |       |        |        |        |        |        |        |        |  |
|-----|-----------------------------------|-----------------------------------|-----------------------------------|---------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--|
|     | .005                              | .01                               | .025                              | .05     | .10   | .25   | .50   | .75    | .90    | .95    | .975   | .99    | .995   | .999   |  |
| 1   | 0.0 <sup>4</sup> 393 <sup>b</sup> | 0.0 <sup>3</sup> 157 <sup>c</sup> | 0.0 <sup>3</sup> 982 <sup>d</sup> | 0.00393 | 0.02  | 0.10  | 0.45  | 1.32   | 2.71   | 3.84   | 5.02   | 6.63   | 7.88   | 10.83  |  |
| 2   | 0.0100                            | 0.0201                            | 0.0506                            | 0.103   | 0.21  | 0.58  | 1.39  | 2.77   | 4.61   | 5.99   | 7.38   | 9.21   | 10.60  | 13.81  |  |
| 3   | 0.0717                            | 0.115                             | 0.216                             | 0.352   | 0.58  | 1.21  | 2.37  | 4.11   | 6.25   | 7.81   | 9.35   | 11.34  | 12.84  | 16.27  |  |
| 4   | 0.207                             | 0.297                             | 0.484                             | 0.711   | 1.06  | 1.92  | 3.36  | 5.39   | 7.78   | 9.49   | 11.14  | 13.28  | 14.86  | 18.47  |  |
| 5   | 0.412                             | 0.554                             | 0.831                             | 1.15    | 1.61  | 2.67  | 4.35  | 6.63   | 9.24   | 11.07  | 12.83  | 15.09  | 16.75  | 20.52  |  |
| 6   | 0.676                             | 0.872                             | 1.24                              | 1.64    | 2.20  | 3.45  | 5.35  | 7.84   | 10.64  | 12.59  | 14.45  | 16.81  | 18.55  | 22.46  |  |
| 7   | 0.989                             | 1.24                              | 1.69                              | 2.17    | 2.83  | 4.25  | 6.35  | 9.04   | 12.02  | 14.07  | 16.01  | 18.48  | 20.28  | 24.32  |  |
| 8   | 1.34                              | 1.65                              | 2.18                              | 2.73    | 3.49  | 5.07  | 7.34  | 10.22  | 13.36  | 15.51  | 17.53  | 20.09  | 21.95  | 26.12  |  |
| 9   | 1.73                              | 2.09                              | 2.70                              | 3.33    | 4.17  | 5.90  | 8.34  | 11.39  | 14.68  | 16.92  | 19.02  | 21.67  | 23.59  | 27.88  |  |
| 10  | 2.16                              | 2.56                              | 3.25                              | 3.94    | 4.87  | 6.74  | 9.34  | 12.55  | 15.99  | 18.31  | 20.48  | 23.21  | 25.19  | 29.59  |  |
| 11  | 2.60                              | 3.05                              | 3.82                              | 4.57    | 5.58  | 7.58  | 10.34 | 13.70  | 17.28  | 19.68  | 21.92  | 24.72  | 26.76  | 31.26  |  |
| 12  | 3.07                              | 3.57                              | 4.40                              | 5.23    | 6.30  | 8.44  | 11.34 | 14.85  | 18.55  | 21.03  | 23.34  | 26.22  | 28.30  | 32.91  |  |
| 13  | 3.57                              | 4.11                              | 5.01                              | 5.89    | 7.04  | 9.30  | 12.34 | 15.98  | 19.81  | 22.36  | 24.74  | 27.69  | 29.82  | 34.53  |  |
| 14  | 4.07                              | 4.66                              | 5.63                              | 6.57    | 7.79  | 10.17 | 13.34 | 17.12  | 21.06  | 23.68  | 26.12  | 29.14  | 31.32  | 36.12  |  |
| 15  | 4.60                              | 5.23                              | 6.27                              | 7.26    | 8.55  | 11.04 | 14.34 | 18.25  | 22.31  | 25.00  | 27.49  | 30.58  | 32.80  | 37.70  |  |
| 16  | 5.14                              | 5.81                              | 6.91                              | 7.96    | 9.31  | 11.91 | 15.34 | 19.37  | 23.54  | 26.30  | 28.85  | 32.00  | 34.27  | 39.25  |  |
| 17  | 5.70                              | 6.41                              | 7.56                              | 8.67    | 10.09 | 12.79 | 16.34 | 20.49  | 24.77  | 27.59  | 30.19  | 33.41  | 35.72  | 40.79  |  |
| 18  | 6.26                              | 7.01                              | 8.23                              | 9.39    | 10.86 | 13.68 | 17.34 | 21.60  | 25.99  | 28.87  | 31.53  | 34.81  | 37.16  | 42.31  |  |
| 19  | 6.84                              | 7.63                              | 8.91                              | 10.12   | 11.65 | 14.56 | 18.34 | 22.72  | 27.20  | 30.14  | 32.85  | 36.19  | 38.58  | 43.82  |  |
| 20  | 7.43                              | 8.26                              | 9.59                              | 10.85   | 12.44 | 15.45 | 19.34 | 23.83  | 28.41  | 31.41  | 34.17  | 37.57  | 40.00  | 45.32  |  |
| 21  | 8.03                              | 8.90                              | 10.28                             | 11.59   | 13.24 | 16.34 | 20.34 | 24.93  | 29.62  | 32.67  | 35.48  | 38.93  | 41.40  | 46.80  |  |
| 22  | 8.64                              | 9.54                              | 10.98                             | 12.34   | 14.04 | 17.24 | 21.34 | 26.04  | 30.81  | 33.92  | 36.78  | 40.29  | 42.80  | 48.27  |  |
| 23  | 9.26                              | 10.20                             | 11.69                             | 13.09   | 14.85 | 18.14 | 22.34 | 27.14  | 32.01  | 35.17  | 38.08  | 41.64  | 44.18  | 49.73  |  |
| 24  | 9.89                              | 10.86                             | 12.40                             | 13.85   | 15.66 | 19.04 | 23.34 | 28.24  | 33.20  | 36.42  | 39.36  | 42.98  | 45.56  | 51.18  |  |
| 25  | 10.52                             | 11.52                             | 13.12                             | 14.61   | 16.47 | 19.94 | 24.34 | 29.34  | 34.38  | 37.65  | 40.65  | 44.31  | 46.93  | 52.62  |  |
| 26  | 11.16                             | 12.20                             | 13.84                             | 15.38   | 17.29 | 20.84 | 25.34 | 30.43  | 35.56  | 38.89  | 41.92  | 45.64  | 48.29  | 54.05  |  |
| 27  | 11.81                             | 12.88                             | 14.57                             | 16.15   | 18.11 | 21.75 | 26.34 | 31.53  | 36.74  | 40.11  | 43.19  | 46.96  | 49.64  | 55.48  |  |
| 28  | 12.46                             | 13.56                             | 15.31                             | 16.93   | 18.94 | 22.66 | 27.34 | 32.62  | 37.92  | 41.34  | 44.46  | 48.28  | 50.99  | 56.89  |  |
| 29  | 13.12                             | 14.26                             | 16.05                             | 17.71   | 19.77 | 23.57 | 28.34 | 33.71  | 39.09  | 42.56  | 45.72  | 49.59  | 52.34  | 58.30  |  |
| 30  | 13.79                             | 14.95                             | 16.79                             | 18.49   | 20.60 | 24.48 | 29.34 | 34.80  | 40.26  | 43.77  | 46.98  | 50.89  | 53.67  | 59.70  |  |
| 40  | 20.71                             | 22.16                             | 24.43                             | 26.51   | 29.05 | 33.66 | 39.34 | 45.62  | 51.81  | 55.76  | 59.34  | 63.69  | 66.77  | 73.40  |  |
| 50  | 27.99                             | 29.71                             | 32.36                             | 34.76   | 37.69 | 42.94 | 49.33 | 56.33  | 63.17  | 67.50  | 71.42  | 76.15  | 79.49  | 86.66  |  |
| 60  | 35.53                             | 37.48                             | 40.48                             | 43.19   | 46.46 | 52.29 | 59.33 | 66.98  | 74.40  | 79.08  | 83.30  | 88.38  | 91.95  | 99.61  |  |
| 70  | 43.28                             | 45.44                             | 48.76                             | 51.74   | 55.33 | 61.70 | 69.33 | 77.58  | 85.53  | 90.53  | 95.02  | 100.42 | 104.22 | 112.32 |  |
| 80  | 51.17                             | 53.54                             | 57.15                             | 60.39   | 64.28 | 71.14 | 79.33 | 88.13  | 96.58  | 101.88 | 106.63 | 112.33 | 116.32 | 124.84 |  |
| 90  | 59.20                             | 61.75                             | 65.65                             | 69.13   | 73.29 | 80.62 | 89.33 | 98.64  | 107.56 | 113.14 | 118.14 | 124.12 | 128.30 | 137.21 |  |
| 100 | 67.33                             | 70.06                             | 74.22                             | 77.93   | 82.36 | 90.13 | 99.33 | 109.14 | 118.50 | 124.34 | 129.56 | 135.81 | 140.17 | 149.45 |  |

<sup>a</sup>  $\chi^2_{d,u}$  = *u*th percentile of a  $\chi^2$  distribution with *d* degrees of freedom.

b=0.0000393

c=0.000157

d=0.000982

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