

一、選擇題 (10 題，每題 5 分，共 50 分)

請分別選出以下各題你(妳)認為最正確的答案。注意：答案請依題目順序寫在答案紙上的「選擇題作答區」，寫在這份試題上不會得分。因為是選擇題，請勿列出計算過程。

1. 已知在估計簡單迴歸式  $y_i = a + b x_i + e_i$  時，樣本大小  $n=12$ ，且  $\sum_{i=1}^{12} (y_i - \bar{y})^2 = 1000$ ， $\sum_{i=1}^{12} (x_i - \bar{x})^2 = 3$ ， $R^2 = 0.25$ 。請問  $b$  的估計量其標準差為何？

- (A) 25
- (B) 15
- (C) 75
- (D) 45
- (E) 以上皆非

2. 已知在以  $Y$  對四個變數  $X_1, X_2, X_3, X_4$  做複迴歸的分析中，樣本大小為  $n=15$ ，且  $R^2=90\%$ 。又已知在將  $Y$  改對兩個變數  $X_2, X_4$  做複迴歸時， $R^2$  變成了  $89\%$ 。假設研究者想檢定  $X_1, X_3$  之迴歸係數是否為零，即虛無假設為  $H_0: \beta_1 = \beta_3 = 0$ 。請問此檢定之  $F$  統計量之值為何？

- (A) 1
- (B) 0.5
- (C) 5
- (D) 2
- (E) 以上皆非

3. 已知在  $A$  城市人們每週買一隻新牙膏。只有黑人牙膏與白人牙膏可以選擇。如果一個人這週用的是黑人牙膏，則下週他(她)會買黑人牙膏與白人牙膏的機率分別為  $0.3$  與  $0.7$ ；而如果一個人這週用的是白人牙膏，則下週他(她)會買黑人牙膏與白人牙膏的機率分別為  $0.5$  與  $0.5$ 。目前在第一週，我們已知王小姐買的是黑人牙膏。如果到第四週時王小姐買的是白人牙膏，請問王小姐在第二週與第三週買的牙膏品牌不相同的機率是介於

- (A)  $0.39$  與  $0.49$  之間
- (B)  $0.5$  與  $0.579$  之間
- (C)  $0.58$  與  $0.62$  之間
- (D)  $0.63$  與  $0.64$  之間
- (E) 以上皆非

4. 已知隨機變數  $x$  之累積分配函數  $F(x)$  具以下特性：若  $x < 0$  則  $F(x) = 0$ ；若  $0 \leq x < 1$  則  $F(x) = x/6$ ；若  $1 \leq x < 2$  則  $F(x) = (4+x)/6$ ；若  $2 \leq x$  則  $F(x) = 1$ 。則此隨機變數  $x$  之變異數為何？

- (A)  $1/8$
- (B)  $1/7$
- (C)  $1/11$
- (D)  $1/9$
- (E) 以上皆非

5. 一家企業正考慮該不該在 B 城市的電視頻道廣告其新產品。已知在 B 城市有三百萬人住在市區，兩百五十萬人住在郊區。住在市區的人年所得皆超過 50 萬元，而住在郊區的人年所得超過 50 萬元的佔六成。如果決定做廣告，則有四成的市區人口和八成的郊區人口會接收到廣告訊息。假設一個人會不會接收到廣告訊息與其年所得高低互為獨立事件。已知一個人會願意以 100 元來購買該企業正欲推出之新產品，若且唯若他（她）的年所得超過 50 萬元且他（她）接收到廣告訊息。假設此企業欲極大化其期望利潤，且其生產該新產品之單位成本為 90 元。請問要使該企業願意在 B 城市的電視上廣告其新產品，廣告成本不能超過的上限為何？

- (A) 2000 萬
- (B) 2150 萬
- (C) 2250 萬
- (D) 2320 萬
- (E) 以上皆非

6. 王小姐和她的鄰居李小姐正分別考慮要到本區三家精品店中的那一家去挑一個新皮包。王小姐認為三家的皮包品質相同，因此只想買到最低價的皮包。李小姐則認為第一、二家的皮包品質相同，但她願意多花 9,000 元買第三家的皮包。王小姐唯一知道的是這三家店皮包的售價必有一家為 18,000 元、一家為 9,000 元、還有一家為 8,000 元，但她不清楚那家店的價格是 8,000 元，她認為各家店都有  $1/3$  的機率可能定價在 18,000 元、9,000 元、和 8,000 元。因為李小姐是財經記者，王小姐猜測有 40% 的機率李小姐可能知道最低價的店是那一家，但有 60% 的機率李小姐知道的價格資訊和王小姐完全一樣。請問如果王小姐尾隨李小姐之後去同一家店，王小姐買皮包的錢預期可以省多少？

- (A) 1,333 元
- (B) 2,100 元
- (C) 1,800 元
- (D) 890 元
- (E) 以上皆非

7. 已知  $y$  是一隨機變數，且  $y$  與第 4 題的隨機變數  $x$  有如下的關係：當  $x$  之值高於 1 時， $y$  之值皆為 2；當  $x$  之值低於 1 時， $y$  之值皆為 -2；當  $x$  之值等於 1 時， $y$  之值為 0。則  $y$  與  $x$  之共變異數為何？

- (A)  $1/4$
- (B)  $1/3$
- (C)  $1/12$
- (D)  $1/6$
- (E) 以上皆非

8. 已知  $z$  是一隨機變數，且其累積分配函數  $G(z)$  具以下特性：若  $z < 0$  則  $G(z) = 0$ ；若  $0 \leq z < 1$  則  $G(z) = (2z+1)/3$ ；若  $1 \leq z$  則  $G(z) = 1$ 。令  $m(t) = E[\exp(tz)]$  為  $z$  之動差母函數。則  $m(1)$  為何？

- (A)  $(3e-1)/4$
- (B)  $(e+2)/3$
- (C)  $(2e-1)/3$
- (D)  $(2e+1)/6$
- (E) 以上皆非

9. 已知生產相同產品的 2 家競爭廠商，在同時決定價格時，都採用隨機的方式定價。兩家價格的隨機選取為彼此獨立，且各有 0.5 的機率價格可能是 1 元或 2 元。消費者只有甲乙 2 人，每人願付至少 2 元來買一單位該產品。已知甲知道兩家店中之價格較低者，因而只會向出價較低的店購買（如果兩家價格一樣，則甲會以 0.5 的機率任挑一家購買），而乙則因不知何家出價較低，總會以 0.5 的機率任挑一家購買。請問各家店的期望銷貨收入為何？

- (A)  $7/4$
- (B)  $4/9$
- (C)  $7/8$
- (D)  $11/8$
- (E) 以上皆非

10. 下列敘述何者最為正確？

- (A) 兩個常態隨機變數之加權平均必為一常態隨機變數
- (B) 兩個隨機變數若各自變異數皆大於零，其加權平均之變異數也必大於零
- (C) 若兩個隨機變數之共變異數為零，則它們必為統計獨立
- (D) 若兩個隨機變數之期望值與共變異數皆為零，則它們必為統計獨立
- (E) 以上皆非

二、計算題：3 題共 50 分（第 1 題 20 分，第 2 題 10 分，第 3 題 20 分）。請列  
示計算過程。

1. Tammy wants to compare the cost of one- and two-bedroom apartments in the area of NTU campus. She collects data for a random sample of 10 advertisements of each type. Here are the data:

| Apartment Type | Rent Per Month (in 1,000 NT dollars) |      |      |      |      |      |      |      |      |      |
|----------------|--------------------------------------|------|------|------|------|------|------|------|------|------|
| One-bedroom    | 20.0                                 | 26.0 | 24.0 | 20.2 | 18.0 | 22.0 | 20.6 | 19.8 | 24.8 | 15.8 |
| Two-bedroom    | 23.8                                 | 20.0 | 23.2 | 26.0 | 27.0 | 27.0 | 30.0 | 20.0 | 19.8 | 26.8 |

- Find a 95% confidence interval for the additional cost of a second bedroom.
- Tammy wonders if two-bedroom apartments rent for significantly more than one-bedroom apartments. State appropriate null and alternative hypotheses.
- Report the test statistic, its degrees of freedom, and the P-value ( $\alpha=0.05$ ). What do you conclude?
- Which do you think is more useful to someone planning to rent an apartment, a confidence interval or a significance test? Why?

2. Mark, the project manager of a marketing research firm, is wondering whether he could increase the response rate for a mail survey by contacting the respondents before they receive the questionnaire. He compares three groups of subjects. The first group received a preliminary letter about the survey, the second group was phoned, and the third received no preliminary contact. A positive response was defined as returning the survey within two weeks. Here are the counts:

| Response within two weeks | Preliminary Contact |            |      |
|---------------------------|---------------------|------------|------|
|                           | Letter              | Phone Call | None |
| Yes                       | 195                 | 166        | 135  |
| No                        | 251                 | 78         | 519  |
| Total                     | 446                 | 244        | 654  |

- State the appropriate null and alternative hypotheses for Mark's question.
- Give the test statistic, degrees of freedom, and the p-value for the significant test ( $\alpha=0.05$ ). What do you conclude?

3. Twenty workers were randomly selected to participate in an experiment to determine the effects of work scheduling and method of payment on attitude toward the job. Two types of scheduling were employed: the standard 8 to 5 workday and a modified workday allowing the worker to start at either 7 or 8 as desired on any day. Two methods of payment were employed: a standard hourly rate and a reduced hourly rate with an added piece rate based on the worker's production. Five workers were randomly assigned to each of the four Scheduling/Payment combinations. Each worker completed an attitude test after 1 month on the job (with a higher score indicating a more positive attitude).

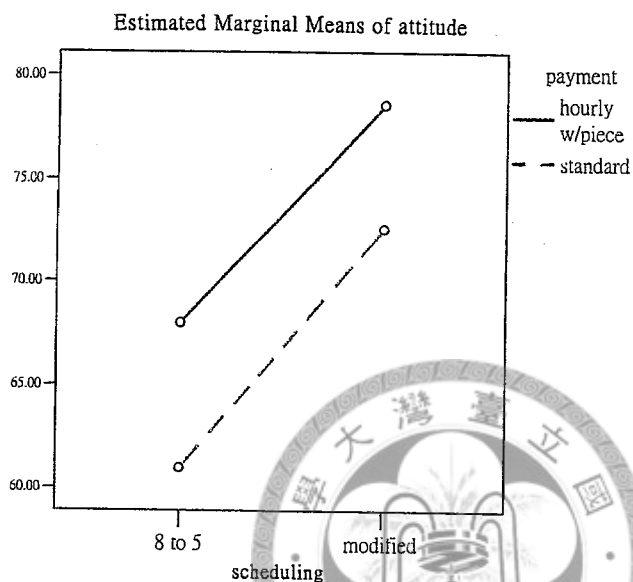
Here's partial computer output of a 2-way ANOVA ( $\alpha=0.05$ ):

Dependent Variable: Attitude

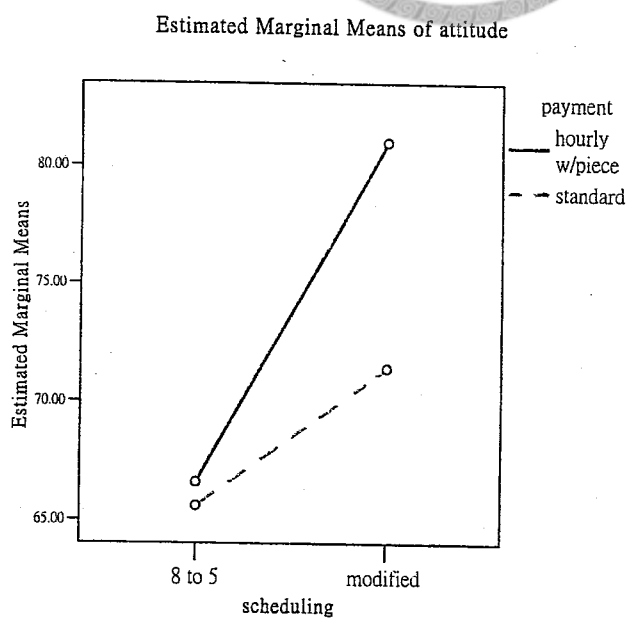
| Source               | Type III<br>Sum of Squares | df  | Mean<br>Square | F         |
|----------------------|----------------------------|-----|----------------|-----------|
| Corrected Model      | 742.950(a)                 | 3   | 247.650        | 25.465    |
| Intercept            | 101246.450                 | 1   | 101246.450     | 10410.946 |
| scheduling           | 510.050                    | 1   | 510.050        | (iii)     |
| payment              | 140.450                    | 1   | 140.450        | (iv)      |
| scheduling * payment | 92.450                     | 1   | 92.450         | (v)       |
| Error                | 155.600                    | (i) | (ii)           |           |
| Total                | 102145.000                 | 20  |                |           |
| Corrected Total      | 898.550                    | 19  |                |           |

a R Squared = .827 (Adjusted R Squared = .794)

- Fill in the missing values in the ANOVA table.
- Is there an interaction between work scheduling and payment method? Justify your answer.
- Which of the following plots (Plot A, Plot B, Plot C) is most likely to be the plot of the four group means? Justify your answer.
- Based on the computer output and your answers to (a)(b)(c), explain the results in plain language to a friend who has no training in statistics.



Plot A



Plot B

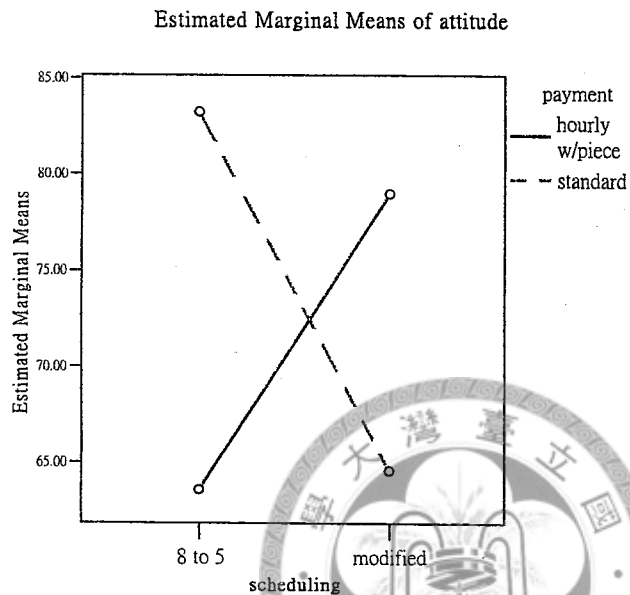
題號：390

國立臺灣大學95學年度碩士班招生考試試題

科目：統計學(H)

題號：390

共 10 頁之第 7 頁



Plot C

接背面

F Values for  $\alpha = 0.05$

| $d_2$ | $d_1$ |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| 1     | 161.4 | 199.5 | 215.7 | 224.6 | 230.2 | 234.0 | 236.8 | 238.9 | 240.5 |
| 2     | 18.51 | 19.00 | 19.16 | 19.25 | 19.3  | 19.33 | 19.35 | 19.37 | 19.38 |
| 3     | 10.13 | 9.55  | 9.28  | 9.12  | 9.01  | 8.94  | 8.89  | 8.85  | 8.81  |
| 4     | 7.71  | 6.94  | 6.59  | 6.39  | 6.26  | 6.16  | 6.09  | 6.04  | 6.00  |
| 5     | 6.61  | 5.79  | 5.41  | 5.19  | 5.05  | 4.95  | 4.88  | 4.82  | 4.77  |
| 6     | 5.99  | 5.14  | 4.76  | 4.53  | 4.39  | 4.28  | 4.21  | 4.15  | 4.10  |
| 7     | 5.59  | 4.74  | 4.35  | 4.12  | 3.97  | 3.87  | 3.79  | 3.73  | 3.68  |
| 8     | 5.32  | 4.46  | 4.07  | 3.84  | 3.69  | 3.58  | 3.50  | 3.44  | 3.39  |
| 9     | 5.12  | 4.26  | 3.86  | 3.63  | 3.48  | 3.37  | 3.29  | 3.23  | 3.18  |
| 10    | 4.96  | 4.10  | 3.71  | 3.48  | 3.33  | 3.22  | 3.14  | 3.07  | 3.02  |
| 11    | 4.84  | 3.98  | 3.59  | 3.36  | 3.20  | 3.09  | 3.01  | 2.95  | 2.90  |
| 12    | 4.75  | 3.89  | 3.49  | 3.26  | 3.11  | 3.00  | 2.91  | 2.85  | 2.80  |
| 13    | 4.67  | 3.81  | 3.41  | 3.18  | 3.03  | 2.92  | 2.83  | 2.77  | 2.71  |
| 14    | 4.60  | 3.74  | 3.34  | 3.11  | 2.96  | 2.85  | 2.76  | 2.70  | 2.65  |
| 15    | 4.54  | 3.68  | 3.29  | 3.06  | 2.90  | 2.79  | 2.71  | 2.64  | 2.59  |
| 16    | 4.49  | 3.63  | 3.24  | 3.01  | 2.85  | 2.74  | 2.66  | 2.59  | 2.54  |
| 17    | 4.45  | 3.59  | 3.20  | 2.96  | 2.81  | 2.70  | 2.61  | 2.55  | 2.49  |
| 18    | 4.41  | 3.55  | 3.16  | 2.93  | 2.77  | 2.66  | 2.58  | 2.51  | 2.46  |
| 19    | 4.38  | 3.52  | 3.13  | 2.90  | 2.74  | 2.63  | 2.54  | 2.48  | 2.42  |
| 20    | 4.35  | 3.49  | 3.10  | 2.87  | 2.71  | 2.60  | 2.51  | 2.45  | 2.39  |
| 21    | 4.32  | 3.47  | 3.07  | 2.84  | 2.68  | 2.57  | 2.49  | 2.42  | 2.37  |
| 22    | 4.30  | 3.44  | 3.05  | 2.82  | 2.66  | 2.55  | 2.46  | 2.40  | 2.34  |
| 23    | 4.28  | 3.42  | 3.03  | 2.80  | 2.64  | 2.53  | 2.44  | 2.37  | 2.32  |
| 24    | 4.26  | 3.40  | 3.01  | 2.78  | 2.62  | 2.51  | 2.42  | 2.36  | 2.30  |
| 25    | 4.24  | 3.39  | 2.99  | 2.76  | 2.60  | 2.49  | 2.40  | 2.34  | 2.28  |
| 26    | 4.23  | 3.37  | 2.98  | 2.74  | 2.59  | 2.47  | 2.39  | 2.32  | 2.27  |
| 27    | 4.21  | 3.35  | 2.96  | 2.73  | 2.57  | 2.46  | 2.37  | 2.31  | 2.25  |
| 28    | 4.20  | 3.34  | 2.95  | 2.71  | 2.56  | 2.45  | 2.36  | 2.29  | 2.24  |
| 29    | 4.18  | 3.33  | 2.93  | 2.70  | 2.55  | 2.43  | 2.35  | 2.28  | 2.22  |
| 30    | 4.17  | 3.32  | 2.92  | 2.69  | 2.53  | 2.42  | 2.33  | 2.27  | 2.21  |
| 40    | 4.08  | 3.23  | 2.84  | 2.61  | 2.45  | 2.34  | 2.25  | 2.18  | 2.12  |
| 60    | 4.00  | 3.15  | 2.76  | 2.53  | 2.37  | 2.25  | 2.17  | 2.10  | 2.04  |
| 120   | 3.92  | 3.07  | 2.68  | 2.45  | 2.29  | 2.17  | 2.09  | 2.02  | 1.96  |
| inf   | 3.84  | 3.00  | 2.60  | 2.37  | 2.21  | 2.10  | 2.01  | 1.94  | 1.88  |

Table entry for  $p$  and  $C$  is the critical value  $t^*$  with probability  $p$  lying to its right and probability  $c$  lying between  $-t^*$  and  $t^*$

| t distribution critical values |                            |       |       |       |       |       |       |       |       |       |       |       |
|--------------------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| df                             | Upper tail probability $p$ |       |       |       |       |       |       |       |       |       |       |       |
|                                | .25                        | .20   | .15   | .10   | .05   | .025  | .02   | .01   | .005  | .0025 | .001  | .0005 |
| 1                              | 1.000                      | 1.376 | 1.963 | 3.078 | 6.314 | 12.71 | 15.89 | 31.82 | 63.66 | 127.3 | 318.3 | 636.6 |
| 2                              | 0.816                      | 1.061 | 1.386 | 1.886 | 2.920 | 4.303 | 4.849 | 6.965 | 9.925 | 14.09 | 22.33 | 31.60 |
| 3                              | 0.765                      | 0.978 | 1.250 | 1.638 | 2.353 | 3.182 | 3.482 | 4.541 | 5.841 | 7.453 | 10.21 | 12.92 |
| 4                              | 0.741                      | 0.941 | 1.190 | 1.533 | 2.132 | 2.776 | 2.999 | 3.747 | 4.604 | 5.598 | 7.173 | 8.610 |
| 5                              | 0.727                      | 0.920 | 1.156 | 1.476 | 2.015 | 2.571 | 2.757 | 3.365 | 4.032 | 4.773 | 5.893 | 6.869 |
| 6                              | 0.718                      | 0.906 | 1.134 | 1.440 | 1.943 | 2.447 | 2.612 | 3.143 | 3.707 | 4.317 | 5.208 | 5.959 |
| 7                              | 0.711                      | 0.896 | 1.119 | 1.415 | 1.895 | 2.365 | 2.517 | 2.998 | 3.499 | 4.029 | 4.785 | 5.408 |
| 8                              | 0.706                      | 0.889 | 1.108 | 1.397 | 1.860 | 2.306 | 2.449 | 2.896 | 3.355 | 3.833 | 4.501 | 5.041 |
| 9                              | 0.703                      | 0.883 | 1.100 | 1.383 | 1.833 | 2.262 | 2.398 | 2.821 | 3.250 | 3.690 | 4.297 | 4.781 |
| 10                             | 0.700                      | 0.879 | 1.093 | 1.372 | 1.812 | 2.228 | 2.359 | 2.764 | 3.169 | 3.581 | 4.144 | 4.587 |
| 11                             | 0.697                      | 0.876 | 1.088 | 1.363 | 1.796 | 2.201 | 2.328 | 2.718 | 3.106 | 3.497 | 4.025 | 4.437 |
| 12                             | 0.695                      | 0.873 | 1.083 | 1.356 | 1.782 | 2.179 | 2.303 | 2.681 | 3.055 | 3.428 | 3.930 | 4.318 |
| 13                             | 0.694                      | 0.870 | 1.079 | 1.350 | 1.771 | 2.160 | 2.282 | 2.650 | 3.012 | 3.372 | 3.852 | 4.221 |
| 14                             | 0.692                      | 0.868 | 1.076 | 1.345 | 1.761 | 2.145 | 2.264 | 2.624 | 2.977 | 3.326 | 3.787 | 4.140 |
| 15                             | 0.691                      | 0.866 | 1.074 | 1.341 | 1.753 | 2.131 | 2.249 | 2.602 | 2.947 | 3.286 | 3.733 | 4.073 |
| 16                             | 0.690                      | 0.865 | 1.071 | 1.337 | 1.746 | 2.120 | 2.235 | 2.583 | 2.921 | 3.252 | 3.686 | 4.015 |
| 17                             | 0.689                      | 0.863 | 1.069 | 1.333 | 1.740 | 2.110 | 2.224 | 2.567 | 2.898 | 3.222 | 3.646 | 3.965 |
| 18                             | 0.688                      | 0.862 | 1.067 | 1.330 | 1.734 | 2.101 | 2.214 | 2.552 | 2.878 | 3.197 | 3.611 | 3.922 |
| 19                             | 0.688                      | 0.861 | 1.066 | 1.328 | 1.729 | 2.093 | 2.205 | 2.539 | 2.861 | 3.174 | 3.579 | 3.883 |
| 20                             | 0.687                      | 0.860 | 1.064 | 1.325 | 1.725 | 2.086 | 2.197 | 2.528 | 2.845 | 3.153 | 3.552 | 3.850 |
| 21                             | 0.686                      | 0.859 | 1.063 | 1.323 | 1.721 | 2.080 | 2.189 | 2.518 | 2.831 | 3.135 | 3.527 | 3.819 |
| 22                             | 0.686                      | 0.858 | 1.061 | 1.321 | 1.717 | 2.074 | 2.183 | 2.508 | 2.819 | 3.119 | 3.505 | 3.792 |
| 23                             | 0.685                      | 0.858 | 1.060 | 1.319 | 1.714 | 2.069 | 2.177 | 2.500 | 2.807 | 3.104 | 3.485 | 3.768 |
| 24                             | 0.685                      | 0.857 | 1.059 | 1.318 | 1.711 | 2.064 | 2.172 | 2.492 | 2.797 | 3.091 | 3.467 | 3.745 |
| 25                             | 0.684                      | 0.856 | 1.058 | 1.316 | 1.708 | 2.060 | 2.167 | 2.485 | 2.787 | 3.078 | 3.450 | 3.725 |
| 26                             | 0.684                      | 0.856 | 1.058 | 1.315 | 1.706 | 2.056 | 2.162 | 2.479 | 2.779 | 3.067 | 3.435 | 3.707 |
| 27                             | 0.684                      | 0.855 | 1.057 | 1.314 | 1.703 | 2.052 | 2.158 | 2.473 | 2.771 | 3.057 | 3.421 | 3.690 |
| 28                             | 0.683                      | 0.855 | 1.056 | 1.313 | 1.701 | 2.048 | 2.154 | 2.467 | 2.763 | 3.047 | 3.408 | 3.674 |
| 29                             | 0.683                      | 0.854 | 1.055 | 1.311 | 1.699 | 2.045 | 2.150 | 2.462 | 2.756 | 3.038 | 3.396 | 3.659 |
| 30                             | 0.683                      | 0.854 | 1.055 | 1.310 | 1.697 | 2.042 | 2.147 | 2.457 | 2.750 | 3.030 | 3.385 | 3.646 |
| 40                             | 0.681                      | 0.851 | 1.050 | 1.303 | 1.684 | 2.021 | 2.123 | 2.423 | 2.704 | 2.971 | 3.307 | 3.551 |
| 50                             | 0.679                      | 0.849 | 1.047 | 1.299 | 1.676 | 2.009 | 2.109 | 2.403 | 2.678 | 2.937 | 3.261 | 3.496 |
| 60                             | 0.679                      | 0.848 | 1.045 | 1.296 | 1.671 | 2.000 | 2.099 | 2.390 | 2.660 | 2.915 | 3.232 | 3.460 |
| 80                             | 0.678                      | 0.846 | 1.043 | 1.292 | 1.664 | 1.990 | 2.088 | 2.374 | 2.639 | 2.887 | 3.195 | 3.416 |
| 100                            | 0.677                      | 0.845 | 1.042 | 1.290 | 1.660 | 1.984 | 2.081 | 2.364 | 2.626 | 2.871 | 3.174 | 3.390 |
| 1000                           | 0.675                      | 0.842 | 1.037 | 1.282 | 1.646 | 1.962 | 2.056 | 2.330 | 2.581 | 2.813 | 3.098 | 3.300 |
| $z^*$                          | 0.674                      | 0.841 | 1.036 | 1.282 | 1.645 | 1.960 | 2.054 | 2.326 | 2.576 | 2.807 | 3.091 | 3.291 |
|                                | 50%                        | 60%   | 70%   | 80%   | 90%   | 95%   | 96%   | 98%   | 99%   | 99.5% | 99.8% | 99.9% |
|                                | Confidence level $C$       |       |       |       |       |       |       |       |       |       |       |       |

題號：390

國立臺灣大學95學年度碩士班招生考試試題

科目：統計學(H)

題號：390

共 10 頁之第 10 頁

Table entry for  $p$  is the critical value ( $\chi^2$ ) with probability  $p$  lying to its right

| $\chi^2$ distribution critical values |                      |       |       |       |       |       |       |       |       |       |       |
|---------------------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| df                                    | Tail probability $p$ |       |       |       |       |       |       |       |       |       |       |
|                                       | .25                  | .20   | .15   | .10   | .05   | .025  | .02   | .01   | .005  | .0025 | .0005 |
| 1                                     | 1.32                 | 1.64  | 2.07  | 2.71  | 3.84  | 5.02  | 5.41  | 6.63  | 7.88  | 9.14  | 10.83 |
| 2                                     | 2.77                 | 3.22  | 3.79  | 4.61  | 5.99  | 7.38  | 7.82  | 9.21  | 10.60 | 11.98 | 13.82 |
| 3                                     | 4.11                 | 4.64  | 5.32  | 6.25  | 7.81  | 9.35  | 9.84  | 11.34 | 12.84 | 14.32 | 16.27 |
| 4                                     | 5.39                 | 5.99  | 6.74  | 7.78  | 9.49  | 11.14 | 11.67 | 13.28 | 14.86 | 16.42 | 18.47 |
| 5                                     | 6.63                 | 7.29  | 8.12  | 9.24  | 11.07 | 12.83 | 13.39 | 15.09 | 16.75 | 18.39 | 20.51 |
| 6                                     | 7.84                 | 8.56  | 9.45  | 10.64 | 12.59 | 14.45 | 15.03 | 16.81 | 18.55 | 20.25 | 22.46 |
| 7                                     | 9.04                 | 9.80  | 10.75 | 12.02 | 14.07 | 16.01 | 16.62 | 18.48 | 20.28 | 22.04 | 24.32 |
| 8                                     | 10.22                | 11.03 | 12.03 | 13.36 | 15.51 | 17.53 | 18.17 | 20.09 | 21.95 | 23.77 | 26.12 |
| 9                                     | 11.39                | 12.24 | 13.29 | 14.68 | 16.92 | 19.02 | 19.68 | 21.67 | 23.59 | 25.46 | 27.88 |
| 10                                    | 12.55                | 13.44 | 14.53 | 15.99 | 18.31 | 20.48 | 21.16 | 23.21 | 25.19 | 27.11 | 29.59 |
| 11                                    | 13.70                | 14.63 | 15.77 | 17.28 | 19.68 | 21.92 | 22.62 | 24.72 | 26.76 | 28.73 | 31.26 |
| 12                                    | 14.85                | 15.81 | 16.99 | 18.55 | 21.03 | 23.34 | 24.05 | 26.22 | 28.30 | 30.32 | 32.91 |
| 13                                    | 15.98                | 16.98 | 18.20 | 19.81 | 22.36 | 24.74 | 25.47 | 27.69 | 29.82 | 31.88 | 34.53 |
| 14                                    | 17.12                | 18.15 | 19.41 | 21.06 | 23.68 | 26.12 | 26.87 | 29.14 | 31.32 | 33.43 | 36.12 |
| 15                                    | 18.25                | 19.31 | 20.60 | 22.31 | 25.00 | 27.49 | 28.26 | 30.58 | 32.80 | 34.95 | 37.70 |
| 16                                    | 19.37                | 20.47 | 21.79 | 23.54 | 26.30 | 28.85 | 29.63 | 32.00 | 34.27 | 36.46 | 39.25 |
| 17                                    | 20.49                | 21.61 | 22.98 | 24.77 | 27.59 | 30.19 | 31.00 | 33.41 | 35.72 | 37.95 | 40.79 |
| 18                                    | 21.60                | 22.76 | 24.16 | 25.99 | 28.87 | 31.53 | 32.35 | 34.81 | 37.16 | 39.42 | 42.31 |
| 19                                    | 22.72                | 23.90 | 25.33 | 27.20 | 30.14 | 32.85 | 33.69 | 36.19 | 38.58 | 40.88 | 43.82 |
| 20                                    | 23.83                | 25.04 | 26.50 | 28.41 | 31.41 | 34.17 | 35.02 | 37.57 | 40.00 | 42.34 | 45.31 |
| 21                                    | 24.93                | 26.17 | 27.66 | 29.62 | 32.67 | 35.48 | 36.34 | 38.93 | 41.40 | 43.78 | 46.80 |
| 22                                    | 26.04                | 27.30 | 28.82 | 30.81 | 33.92 | 36.78 | 37.66 | 40.29 | 42.80 | 45.20 | 48.27 |
| 23                                    | 27.14                | 28.43 | 29.98 | 32.01 | 35.17 | 38.08 | 38.97 | 41.64 | 44.18 | 46.62 | 49.73 |
| 24                                    | 28.24                | 29.55 | 31.13 | 33.20 | 36.42 | 39.36 | 40.27 | 42.98 | 45.56 | 48.03 | 51.18 |
| 25                                    | 29.34                | 30.68 | 32.28 | 34.38 | 37.65 | 40.65 | 41.57 | 44.31 | 46.93 | 49.44 | 52.62 |
| 26                                    | 30.43                | 31.79 | 33.43 | 35.56 | 38.89 | 41.92 | 42.86 | 45.64 | 48.29 | 50.83 | 54.05 |
| 27                                    | 31.53                | 32.91 | 34.57 | 36.74 | 40.11 | 43.19 | 44.14 | 46.96 | 49.64 | 52.22 | 55.48 |
| 28                                    | 32.62                | 34.03 | 35.71 | 37.92 | 41.34 | 44.46 | 45.42 | 48.28 | 50.99 | 53.59 | 56.89 |
| 29                                    | 33.71                | 35.14 | 36.85 | 39.09 | 42.56 | 45.72 | 46.69 | 49.59 | 52.34 | 54.97 | 58.30 |
| 30                                    | 34.80                | 36.25 | 37.99 | 40.26 | 43.77 | 46.98 | 47.96 | 50.89 | 53.67 | 56.33 | 59.70 |
| 40                                    | 45.62                | 47.27 | 49.24 | 51.81 | 55.76 | 59.34 | 60.44 | 63.69 | 66.77 | 69.70 | 73.40 |
| 50                                    | 56.33                | 58.16 | 60.35 | 63.17 | 67.50 | 71.42 | 72.61 | 76.15 | 79.49 | 82.66 | 86.66 |
| 60                                    | 66.98                | 68.97 | 71.34 | 74.40 | 79.08 | 83.30 | 84.58 | 88.38 | 91.95 | 95.34 | 99.61 |
| 80                                    | 88.13                | 90.41 | 93.11 | 96.58 | 101.9 | 106.6 | 108.1 | 112.3 | 116.3 | 120.1 | 124.8 |
| 100                                   | 109.1                | 111.7 | 114.7 | 118.5 | 124.3 | 129.6 | 131.1 | 135.8 | 140.2 | 144.3 | 149.4 |

試題隨卷繳回