



以下皆為單選題，直接寫題號與答案不要有計算過程。

**1-10 題每題 5 分**

1. A survey was conducted on the monthly salaries in Taiwan, where a random sample of eight employees working in public and private enterprises was selected. The salaries are 30,000, 37,000, 40,000, 52,000, 29,000, 43,000, 57,000, 63000 NT dollars. What is the term for the average monthly salary derived from the above data?  
(A) a parameter (B) a statistic (C) a population (D) a standard deviation
2. Research reports that 10% of people aged 20 to 25 smoke. A random sample of 5 people is selected from this age group. What is the probability that at least one person in the sample smokes?  
(A) 0.33 (B) 0.59 (C) 0.41 (D) 0.52
3. Which of the following data has an interval measurement scale?  
(A) Temperature in Yunlin County (B) Height of elementary school students  
(C) The amount of money spent (D) Gender
4. Given the events A and B, where  $P(A) = 0.1$ ,  $P(B) = 0.3$ , and  $P(A|B) = 0.1$ , what is  $P(B|A)$ ?  
(A) 0.03 (B) 0.15 (C) 0.25 (D) 0.3
5. Given Table 1, where x represents the number of credit cards owned by an adult, and  $P(x)$  represents the probability of an adult owning exactly x credit cards, what is the average number of credit cards an adult owns?  
(A) 1.23 (B) 1.31 (C) 2.05 (D) 2.32

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| x    | 0    | 1    | 2    | 3    | 4    |
| P(x) | 0.07 | 0.65 | 0.21 | 0.04 | 0.03 |

( Table 1 )

6. A survey aims to estimate the support rate for a presidential candidate. How many samples are needed to ensure a 98% confidence level within a margin of error of 2%?  
(A) 1067 (B) 1068 (C) 3393 (D) 3394
7. Given that the average weight of high school female students in Taiwan is 48 kg with a standard deviation of 7 kg, a random sample of 49 high school female students is selected. What is the probability that the average weight of these 49 students is greater than 50 kg?  
(A) 0.4772 (B) 0.9772 (C) 0.0228 (D) 0.0010



8. A group wants to determine the average time teenagers spend online. Assume the internet usage time follows a normal distribution. A random sample of 15 teenagers was selected, with a sample mean of 5 hours and a standard deviation of 3 hours. What is the 99% confidence interval for the average internet usage time of teenagers?  
(A) (2.69, 7.31)      (B) (2.72, 7.28)      (C) (3.01, 6.99)      (D) (3.48, 6.52)
9. Which of the following is **not** suitable for describing the distribution of blood types among the people of Taiwan?  
(A) Box plot      (B) Bar chart      (C) Pareto diagram      (D) Pie chart
10. A survey was conducted on the daily sleep hours of students at YunTech. A random sample of 5 students was surveyed, and their sleep hours were recorded as 6.5, 7.5, 8.5, 7, and 8 hours. What is the coefficient of variation (C.V.) for this data?  
(A) 8.6%      (B) 10.5%      (C) 11.6%      (D) 9.4%

**11-15 題，每題 2 分**

11. Which of the following does **not** need to be known in order to compute the  $p$ -value?  
(A) knowledge of whether the test is one-tailed or two-tailed  
(B) the value of the test statistic  
(C) the level of significance  
(D) None of these alternatives is correct.
12. The average life expectancy of tires produced by the Whitney Tire Company has been 40,000 miles. Management believes that due to a new production process, the life expectancy of their tires has increased. In order to test the validity of their belief, the correct set of hypotheses is  
(A)  $H_0: \mu < 40,000$        $H_a: \mu \geq 40,000$   
(B)  $H_0: \mu \leq 40,000$        $H_a: \mu > 40,000$   
(C)  $H_0: \mu > 40,000$        $H_a: \mu \leq 40,000$   
(D)  $H_0: \mu \geq 40,000$        $H_a: \mu < 40,000$
13. An important application of the chi-square distribution is  
(A) making inferences about a single population variance  
(B) testing for goodness of fit  
(C) testing for the independence of two variables  
(D) All of these alternatives are correct.



14. In regression analysis, which of the following is **not** a required assumption about the error term  $\varepsilon$ ?
- (A) The expected value of the error term is one.  
 (B) The variance of the error term is the same for all values of  $X$ .  
 (C) The values of the error term are independent.  
 (D) The error term is normally distributed.
15. If the coefficient of determination is a positive value, then the regression equation
- (A) must have a positive slope  
 (B) must have a negative slope  
 (C) could have either a positive or a negative slope  
 (D) must have a positive intercept

#### 16-25 題，每題 4 分

(16, 17 為題組)

Let  $(x_1, \dots, x_{25})$  be a sample from a normal distribution having a variance of 100.

16. If the rejection region for a test at level  $\alpha = 0.01$  of  $H_0 : \mu \leq 0$  versus  $H_1 : \mu > 0$  is

$R = \{\bar{x} > x_0\}$ . The value of  $x_0$  is

- (A) 4.26                      (B) 4.36                      (C) 4.56                      (D) 4.66

17. If the true  $\mu = 1.5$ , the power of the test will be

- (A) 0.057                      (B) 0.157                      (C) 0.257                      (D) 0.357

(18, 19 為題組)

Samples of each of the three types of stopwatches were tested. Table 2 gives thousands of cycles (on-off-restart) survived until some part of the mechanism failed.

|          |                                           |
|----------|-------------------------------------------|
| Type I   | 1.7 1.9 6.1 12.5 16.5 25.1 30.5 42.1 82.5 |
| Type II  | 13.6 19.8 25.2 46.2 46.2 61.1             |
| Type III | 13.4 20.9 25.1 29.7 46.9                  |

(Table 2)

18. To test whether there is a significant difference of mean life among the three stopwatch types. The sum of squares due to type is
- (A) 426.6                      (B) 436.6                      (C) 446.6                      (D) 456.6
19. The value of test statistic  $F$  is
- (A) 0.1974                      (B) 0.2974                      (C) 0.3974                      (D) 0.4974



(20, 21, 22 為題組)

The stopping distance of an automobile on a certain road was studied as a function of velocity (See Table 3).

|                            |      |      |      |      |       |       |
|----------------------------|------|------|------|------|-------|-------|
| velocity of a car x (mi/h) | 20.5 | 20.5 | 30.5 | 40.5 | 48.8  | 57.8  |
| stopping distance y (ft)   | 15.4 | 13.3 | 33.9 | 73.1 | 113.0 | 142.6 |

(Table 3)

Fit a linear regression equation between y and x.

20. The estimated regression coefficient of x with the least square method is

- (A) -3.94                      (B) -3.49                      (C) 3.49                      (D) 3.94

21. The coefficient of determination is

- (A) 0.884                      (B) 0.984                      (C) 0.848                      (D) 0.948

22. The coefficient of correlation between x and y is

- (A) -0.940                      (B) 0.992                      (C) 0.921                      (D) -0.974

(23, 24, 25 為題組)

The following output (Table 4) are the results from a hypothesis test of two sample means:

| Two-Sample T-Test and CI                            |    |       |       |         |
|-----------------------------------------------------|----|-------|-------|---------|
| Sample                                              | N  | Mean  | StDev | SE Mean |
| 1                                                   | 25 | 12.00 | 3.00  | 0.60    |
| 2                                                   | 25 | 11.00 | 4.00  | 0.80    |
| Difference = mu (1) - mu (2)                        |    |       |       |         |
| Estimate for difference: 1.00                       |    |       |       |         |
| 95% CI for difference: (x.xx, 3.01)                 |    |       |       |         |
| T-Test of difference = 0 (vs not =): T-Value = x.xx |    |       |       |         |
| P-Value = 0.322 DF = xx                             |    |       |       |         |
| Both use Pooled StDev = x.xxxx                      |    |       |       |         |

(Table 4)

23. The test statistic is

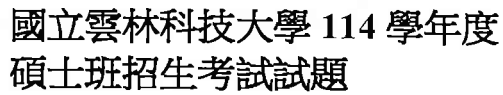
- (A) 0.5                      (B) 1.0                      (C) 1.5                      (D) 2.0

24. The pooled sample variance is

- (A) 10.5                      (B) 11.5                      (C) 12.5                      (D) 13.5

25. The lower limit of 95% CI for the difference is

- (A) -1.01                      (B) 1.01                      (C) -2.01                      (D) 2.01



系所：工管系、企管系



Entries in the table give the area under the curve between the mean and  $z$  standard deviations above the mean. For example, for  $z = 1.25$  the area under the curve between the mean (0) and  $z$  is 0.3944.

| <b>Z</b>   | <b>0.00</b> | <b>0.01</b> | <b>0.02</b> | <b>0.03</b> | <b>0.04</b> | <b>0.05</b> | <b>0.06</b> | <b>0.07</b> | <b>0.08</b> | <b>0.09</b> |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>0.0</b> | 0.0000      | 0.0040      | 0.0080      | 0.0120      | 0.0160      | 0.0190      | 0.0239      | 0.0279      | 0.0319      | 0.0359      |
| <b>0.1</b> | 0.0398      | 0.0438      | 0.0478      | 0.0517      | 0.0557      | 0.0596      | 0.0636      | 0.0675      | 0.0714      | 0.0753      |
| <b>0.2</b> | 0.0793      | 0.0832      | 0.0871      | 0.0910      | 0.0948      | 0.0987      | 0.1026      | 0.1064      | 0.1103      | 0.1141      |
| <b>0.3</b> | 0.1179      | 0.1217      | 0.1255      | 0.1293      | 0.1331      | 0.1368      | 0.1406      | 0.1443      | 0.1480      | 0.1517      |
| <b>0.4</b> | 0.1554      | 0.1591      | 0.1628      | 0.1664      | 0.1700      | 0.1736      | 0.1772      | 0.1808      | 0.1844      | 0.1879      |
| <b>0.5</b> | 0.1915      | 0.1950      | 0.1985      | 0.2019      | 0.2054      | 0.2088      | 0.2123      | 0.2157      | 0.2190      | 0.2224      |
| <b>0.6</b> | 0.2257      | 0.2291      | 0.2324      | 0.2357      | 0.2389      | 0.2422      | 0.2454      | 0.2486      | 0.2517      | 0.2549      |
| <b>0.7</b> | 0.2580      | 0.2611      | 0.2642      | 0.2673      | 0.2704      | 0.2734      | 0.2764      | 0.2794      | 0.2823      | 0.2852      |
| <b>0.8</b> | 0.2881      | 0.2910      | 0.2939      | 0.2969      | 0.2995      | 0.3023      | 0.3051      | 0.3078      | 0.3106      | 0.3133      |
| <b>0.9</b> | 0.3159      | 0.3186      | 0.3212      | 0.3238      | 0.3264      | 0.3289      | 0.3315      | 0.3340      | 0.3365      | 0.3389      |
| <b>1.0</b> | 0.3413      | 0.3438      | 0.3461      | 0.3485      | 0.3508      | 0.3513      | 0.3554      | 0.3577      | 0.3529      | 0.3621      |
| <b>1.1</b> | 0.3643      | 0.3665      | 0.3686      | 0.3708      | 0.3729      | 0.3749      | 0.3770      | 0.3790      | 0.3810      | 0.3830      |
| <b>1.2</b> | 0.3849      | 0.3869      | 0.3888      | 0.3907      | 0.3925      | 0.3944      | 0.3962      | 0.3980      | 0.3997      | 0.4015      |
| <b>1.3</b> | 0.4032      | 0.4049      | 0.4066      | 0.4082      | 0.4099      | 0.4115      | 0.4131      | 0.4147      | 0.4162      | 0.4177      |
| <b>1.4</b> | 0.4192      | 0.4207      | 0.4222      | 0.4236      | 0.4251      | 0.4265      | 0.4279      | 0.4292      | 0.4306      | 0.4319      |
| <b>1.5</b> | 0.4332      | 0.4345      | 0.4357      | 0.4370      | 0.4382      | 0.4394      | 0.4406      | 0.4418      | 0.4429      | 0.4441      |
| <b>1.6</b> | 0.4452      | 0.4463      | 0.4474      | 0.4484      | 0.4495      | 0.4505      | 0.4515      | 0.4525      | 0.4535      | 0.4545      |
| <b>1.7</b> | 0.4554      | 0.4564      | 0.4573      | 0.4582      | 0.4591      | 0.4599      | 0.4608      | 0.4616      | 0.4625      | 0.4633      |
| <b>1.8</b> | 0.4641      | 0.4649      | 0.4656      | 0.4664      | 0.4671      | 0.4678      | 0.4686      | 0.4693      | 0.4699      | 0.4706      |
| <b>1.9</b> | 0.4713      | 0.4719      | 0.4726      | 0.4732      | 0.4738      | 0.4744      | 0.4750      | 0.4756      | 0.4761      | 0.4767      |
| <b>2.0</b> | 0.4772      | 0.4778      | 0.4783      | 0.4788      | 0.4793      | 0.4798      | 0.4803      | 0.4808      | 0.4812      | 0.4817      |
| <b>2.1</b> | 0.4821      | 0.4826      | 0.4830      | 0.4834      | 0.4838      | 0.4842      | 0.4846      | 0.4850      | 0.4854      | 0.4857      |
| <b>2.2</b> | 0.4861      | 0.4864      | 0.4868      | 0.4871      | 0.4875      | 0.4878      | 0.4881      | 0.4884      | 0.4887      | 0.4890      |
| <b>2.3</b> | 0.4893      | 0.4896      | 0.4898      | 0.4901      | 0.4904      | 0.4906      | 0.4909      | 0.4911      | 0.4913      | 0.4916      |
| <b>2.4</b> | 0.4918      | 0.4920      | 0.4922      | 0.4925      | 0.4927      | 0.4929      | 0.4931      | 0.4932      | 0.4934      | 0.4936      |
| <b>2.5</b> | 0.4938      | 0.4940      | 0.4941      | 0.4943      | 0.4945      | 0.4946      | 0.4948      | 0.4949      | 0.4951      | 0.4952      |
| <b>2.6</b> | 0.4953      | 0.4955      | 0.4956      | 0.4957      | 0.4959      | 0.4960      | 0.4961      | 0.4962      | 0.4963      | 0.4964      |
| <b>2.7</b> | 0.4965      | 0.4966      | 0.4967      | 0.4968      | 0.4969      | 0.4970      | 0.4971      | 0.4972      | 0.4973      | 0.4974      |
| <b>2.8</b> | 0.4974      | 0.4975      | 0.4976      | 0.4977      | 0.4977      | 0.4978      | 0.4979      | 0.4979      | 0.4980      | 0.4981      |
| <b>2.9</b> | 0.4981      | 0.4982      | 0.4982      | 0.4983      | 0.4984      | 0.4984      | 0.4985      | 0.4985      | 0.4986      | 0.4986      |
| <b>3.0</b> | 0.4987      | 0.4987      | 0.4987      | 0.4988      | 0.4988      | 0.4989      | 0.4989      | 0.4989      | 0.4990      | 0.4990      |



國立雲林科技大學 114 學年度  
碩士班招生考試試題

系所：工管系、企管系  
科目：統計學

| TABLE F The <i>t</i> Distribution |                      |                    |                    |        |                    |                    |
|-----------------------------------|----------------------|--------------------|--------------------|--------|--------------------|--------------------|
| d.f.                              | Confidence intervals | 80%                | 90%                | 95%    | 98%                | 99%                |
|                                   | One tail, $\alpha$   | 0.10               | 0.05               | 0.025  | 0.01               | 0.005              |
|                                   | Two tails, $\alpha$  | 0.20               | 0.10               | 0.05   | 0.02               | 0.01               |
| 1                                 |                      | 3.078              | 6.314              | 12.706 | 31.821             | 63.657             |
| 2                                 |                      | 1.886              | 2.920              | 4.303  | 6.965              | 9.925              |
| 3                                 |                      | 1.638              | 2.353              | 3.182  | 4.541              | 5.841              |
| 4                                 |                      | 1.533              | 2.132              | 2.776  | 3.747              | 4.604              |
| 5                                 |                      | 1.476              | 2.015              | 2.571  | 3.365              | 4.032              |
| 6                                 |                      | 1.440              | 1.943              | 2.447  | 3.143              | 3.707              |
| 7                                 |                      | 1.415              | 1.895              | 2.365  | 2.998              | 3.499              |
| 8                                 |                      | 1.397              | 1.860              | 2.306  | 2.896              | 3.355              |
| 9                                 |                      | 1.383              | 1.833              | 2.262  | 2.821              | 3.250              |
| 10                                |                      | 1.372              | 1.812              | 2.228  | 2.764              | 3.169              |
| 11                                |                      | 1.363              | 1.796              | 2.201  | 2.718              | 3.106              |
| 12                                |                      | 1.356              | 1.782              | 2.179  | 2.681              | 3.055              |
| 13                                |                      | 1.350              | 1.771              | 2.160  | 2.650              | 3.012              |
| 14                                |                      | 1.345              | 1.761              | 2.145  | 2.624              | 2.977              |
| 15                                |                      | 1.341              | 1.753              | 2.131  | 2.602              | 2.947              |
| 16                                |                      | 1.337              | 1.746              | 2.120  | 2.583              | 2.921              |
| 17                                |                      | 1.333              | 1.740              | 2.110  | 2.567              | 2.898              |
| 18                                |                      | 1.330              | 1.734              | 2.101  | 2.552              | 2.878              |
| 19                                |                      | 1.328              | 1.729              | 2.093  | 2.539              | 2.861              |
| 20                                |                      | 1.325              | 1.725              | 2.086  | 2.528              | 2.845              |
| 21                                |                      | 1.323              | 1.721              | 2.080  | 2.518              | 2.831              |
| 22                                |                      | 1.321              | 1.717              | 2.074  | 2.508              | 2.819              |
| 23                                |                      | 1.319              | 1.714              | 2.069  | 2.500              | 2.807              |
| 24                                |                      | 1.318              | 1.711              | 2.064  | 2.492              | 2.797              |
| 25                                |                      | 1.316              | 1.708              | 2.060  | 2.485              | 2.787              |
| 26                                |                      | 1.315              | 1.706              | 2.056  | 2.479              | 2.779              |
| 27                                |                      | 1.314              | 1.703              | 2.052  | 2.473              | 2.771              |
| 28                                |                      | 1.313              | 1.701              | 2.048  | 2.467              | 2.763              |
| 29                                |                      | 1.311              | 1.699              | 2.045  | 2.462              | 2.756              |
| 30                                |                      | 1.310              | 1.697              | 2.042  | 2.457              | 2.750              |
| 32                                |                      | 1.309              | 1.694              | 2.037  | 2.449              | 2.738              |
| 34                                |                      | 1.307              | 1.691              | 2.032  | 2.441              | 2.728              |
| 36                                |                      | 1.306              | 1.688              | 2.028  | 2.434              | 2.719              |
| 38                                |                      | 1.304              | 1.686              | 2.024  | 2.429              | 2.712              |
| 40                                |                      | 1.303              | 1.684              | 2.021  | 2.423              | 2.704              |
| 45                                |                      | 1.301              | 1.679              | 2.014  | 2.412              | 2.690              |
| 50                                |                      | 1.299              | 1.676              | 2.009  | 2.403              | 2.678              |
| 55                                |                      | 1.297              | 1.673              | 2.004  | 2.396              | 2.668              |
| 60                                |                      | 1.296              | 1.671              | 2.000  | 2.390              | 2.660              |
| 65                                |                      | 1.295              | 1.669              | 1.997  | 2.385              | 2.654              |
| 70                                |                      | 1.294              | 1.667              | 1.994  | 2.381              | 2.648              |
| 75                                |                      | 1.293              | 1.665              | 1.992  | 2.377              | 2.643              |
| 80                                |                      | 1.292              | 1.664              | 1.990  | 2.374              | 2.639              |
| 90                                |                      | 1.291              | 1.662              | 1.987  | 2.368              | 2.632              |
| 100                               |                      | 1.290              | 1.660              | 1.984  | 2.364              | 2.626              |
| 200                               |                      | 1.286              | 1.653              | 1.972  | 2.345              | 2.601              |
| 300                               |                      | 1.284              | 1.650              | 1.968  | 2.339              | 2.592              |
| 400                               |                      | 1.284              | 1.649              | 1.966  | 2.336              | 2.588              |
| 500                               |                      | 1.283              | 1.648              | 1.965  | 2.334              | 2.586              |
| (z) $\infty$                      |                      | 1.282 <sup>a</sup> | 1.645 <sup>b</sup> | 1.960  | 2.326 <sup>c</sup> | 2.576 <sup>d</sup> |

<sup>a</sup>This value has been rounded to 1.28 in the textbook.

<sup>b</sup>This value has been rounded to 1.65 in the textbook.

<sup>c</sup>This value has been rounded to 2.33 in the textbook.

<sup>d</sup>This value has been rounded to 2.58 in the textbook.

