

國立高雄第一科技大學 101 學年度 碩士班 招生考試 試題紙

系所別：資訊管理系

組別：管理組

考科代碼：2324

考科：統計學

注意事項：

- 1、本科目得使用本校提供之電子計算器。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

You would **award 4 points for a correct answer** and can **deduct 1 point for each wrong answer**. The total score for all correct answers is 100.

1. The difference between the sample mean and the population mean is called
  - A) Population mean.
  - B) Population standard deviation.
  - C) Standard error of the mean.
  - D) Sampling error.
2. The  $t$  distribution is used when the population distribution is normal and
  - A) The  $t$  distribution is used when the population distribution is normal and
  - B) When the sample size is more than 30.
  - C) When sample size is less than 30 and the population standard deviation is not known.
  - D) Both A and B are correct.
3. A variable such as  $Z$ , whose value is  $Z = X_1X_2$  is added to a general linear model in order to account for potential effects of two variables  $X_1$  and  $X_2$  acting together. This type of effect is
  - A) impossible to occur
  - B) called interaction
  - C) called multicollinearity effect
  - D) called transformation effect

**Exhibit 1**

Part of an ANOVA table is shown below.

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

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4. Refer to Exhibit 1. The number of degrees of freedom corresponding to within treatments is
- A) 22
  - B) 4
  - C) 5
  - D) 18
5. Refer to Exhibit 1. The mean square between treatments (MSTR) is
- A) 4
  - B) 16
  - C) 36
  - D) 64
6. Refer to Exhibit 1. Given the critical value of  $F_{\alpha=0.05}$  is 2.93, the conclusion of the test is that the means
- A) are not equal
  - B) may be equal
  - C) are equal
  - D) None of these alternatives is correct.

Use the following to answer 7-9

Nacirema Airlines is buying a fleet of new fuel-efficient planes. The HogJet and the LitheJet both meet their price and performance needs, and both planes meet EPA noise guidelines. However, the quieter plane is preferred. Each plane is flown through a typical takeoff and landing sequence 10 times, while remote sensors at ground level record the noise levels (in decibels). The table below summarizes the sound level tests using Excel's default level of significance ( $\alpha = 0.05$ ).

<i>t-Test: Two-Sample Assuming Equal Variances</i>			<i>t-Test: Two-Sample Assuming Unequal Variances</i>		
	<i>LitheJet</i>	<i>HogJet</i>		<i>LitheJet</i>	<i>HogJet</i>
Mean	80.33679276	82.46688629	Mean	80.33679276	82.46688629
Variance	0.717839339	4.738500111	Variance	0.717839339	4.738500111
Observations	10	10	Observations	10	10
Pooled Variance	2.728169725		Hypothesized Diff	0	
Hypothesized Diff	0		df	12	
df	18		t Stat	-2.883686093	
t Stat	-2.883686093		P(T<=t) one-tail	0.006868126	
P(T<=t) one-tail	0.004943752		t Critical one-tail	1.782286745	
t Critical one-tail	1.734063062		P(T<=t) two-tail	0.013736251	
P(T<=t) two-tail	0.009887504		t Critical two-tail	2.178812792	
t Critical two-tail	2.100923666				

7. In a left-tailed test comparing the means at  $\alpha = .05$ , we would
- A) clearly accept  $H_0$ .
  - B) clearly reject  $H_0$ .
  - C) have a close decision.

D) insufficient information to make a decision.

8. In our interpretation of the output at  $\alpha = .05$ , we should

- A) use the test assuming unequal variances since the variances are obviously different.
- B) use the test for equal variances.
- C) perform another test to determine if the variances are equal before proceeding.
- D) realize the decision isn't affected by our assumptions concerning the variance.

9. If we switched to  $\alpha = .005$  in a one-tailed test of means, assumptions about variances would

- A) affect the decision.
- B) not affect the decision.

10. \_\_\_\_\_ and \_\_\_\_\_ are used to describe qualitative data.

- A) Stem and leaf displays and scatter plots.
- B) Scatter plots and box plots
- C) Box plots and bar charts
- D) Bar charts and pie charts
- E) Pie charts and histograms

11. Oxnard Casualty wants to ensure that their e-mail server has 99.98 percent reliability. They will use several independent servers in parallel, each of which is 95 percent reliable. What is the smallest number of independent file servers that will accomplish the goal?

- A) 1
- B) 2
- C) 3
- D) 4

Use the following to answer 12-15

$H_0: \pi \geq .0098$	$p\text{-value} = 0.025$
$H_1: \pi < .0098$	

12. This hypothesis test is

- A) a left-tailed test.
- B) a right-tailed test.
- C) a two-tailed test.
- D) None of the above.

13. The benchmark value for this hypothesis test
- A) is equal to .0098.
  - B) is equal to the true population parameter.
  - C) is equal to the critical value of the test statistic.
  - D) More than one of the above.
14. Based on the reported p-value and  $\alpha = 0.05$  one should
- A) accept the null hypothesis as being true.
  - B) reject the null hypothesis.
  - C) fail to reject the null hypothesis.
  - D) gather more evidence due to inconclusive results.
15. Which of the following decisions could result in a Type II error for this test?
- A) Accept the null hypothesis as being true.
  - B) Reject the null hypothesis.
  - C) Fail to reject the null hypothesis.
  - D) Make no decision.

Use the following to answer 16-17

To compare the cost of three shipping methods, a firm ships material to each of four different destinations over a six-month period. The average cost per shipment is shown below.

Shipper	Toledo	Oshawa	Janesville	Dallas
SpeedyShip	355	435	422	518
GetItThere	342	441	402	488
WeRTops	361	430	435	528

16. Which test would be appropriate?
- A) independent samples t-test.
  - B) two-factor ANOVA with replication.
  - C) dependent (paired samples) t-test.
  - D) two-factor ANOVA no replication.
17. Total degrees of freedom would be
- A) 11
  - B) 3
  - C) 4
  - D) 12

Use the following to answer 18-20

	Cancer	Femlab
Cancer	1.00000	
Femlab	-.31342	1.00000

Regression Statistics	
Multiple R	0.313422848
R Square	0.098233882
Adjusted R Square	0.079447088
Standard Error	32.07003698
Observations	50

ANOVA				
	df	SS	MS	F
Regression	1	5377.835958	5377.836	5.228879
Residual	48	49367.38904	1028.487	
Total	49	54745.225		
	Coefficients	Standard Error	t Stat	
Intercept	343.619889	61.0823514	5.62552	
Femlab	-2.2833659	0.99855319	-2.28667	

Femlab	1996 labor force participation rate among females
Cancer	1995 death rate per 100,000 population due to cancer
Observations	states within the United States of America

18. Which of the following statement is not true?
- A) The standard error is too high for this model to be of any use.
  - B) An approximate 95% confidence interval for Femlab is -4.3 to -0.3
  - C) Strong multicollinearity exists between Femlab and Cancer.
  - D) The p-value for Femlab will be less than .05.
19. When testing the significance of the slope of the regression equation at  $\alpha = .05$  one can conclude
- A) the slope is significantly different from zero.
  - B) there is insufficient evidence to say the slope is different from zero.
  - C) a different alpha is needed to make a conclusion.
  - D) no conclusion can be made without first calculating the p-value.
20. Which of the following statements regarding the relationship between Femlab and Cancer is valid?
- A) A rise in female labor participation rate will cause the cancer rate to decrease within a state.
  - B) This model explains about 10 percent of the variance in state cancer rates
  - C) At the .05 level of significance, there simply isn't enough evidence to say the two variables are related.
  - D) If you sister starts working, the cancer rate in your state will decline.
21. If there are three or more populations with ordinal data, what is the appropriate test to determine whether the distributions are equal?
- A) Friedman test
  - B) t test
  - C) ANOVA
  - D) Kruskal-Wallis test
22. Which is not true of the one-sample runs test?
- A) It is also called the Wald-Wolfowitz test after its inventors
  - B) Its purpose is to detect non-randomness.
  - C) It cannot be applied to sequential observations.
  - D) It is similar to test for autocorrelation.
23. A package delivery company purchased five trucks from manufacturer A, four from B, and five from C. They then recorded and compared the maintenance cost of each truck. To apply the F test, how many degrees of freedom are in the denominator?
- A) 2
  - B) 3

- C) 11
- D) 14

24. A statistical test conducted to determine whether to reject or not reject a hypothesized probability distribution for a population is known as a

- A) contingency test
- B) goodness of fit test
- C) probability test
- D) None of these alternatives is correct.

25. Which of the following are true assumptions underlying linear regression: 1) for each value of X, there is a group of Y values which are normally distributed; 2) the means of these normal distributions of Y values all lie on the straight line of regression; and/or 3) the standard deviations of these normal distributions are equal?

- A) Only (1) and (2)
- B) Only (1) and (3)
- C) Only (2) and (3)
- D) All of them
- E) None of them