國立中山大學101學年度碩士暨碩士專班招生考試試題

科目：商用統計學丁〔企管系甲班碩士班丁組選考〕

本份試題共有50題選擇題，每題2分，計100分。

單選題

(1) A cumulative relative frequency distribution shows
a. the proportion of data items with values less than or equal to the upper limit of each class
b. the proportion of data items with values less than or equal to the lower limit of each class
c. the percentage of data items with values less than or equal to the upper limit of each class
d. the percentage of data items with values less than or equal to the lower limit of each class

(2) If two groups of numbers have the same mean, then
a. their standard deviations must also be equal
b. their medians must also be equal
c. their modes must also be equal
d. None of these alternatives is correct.

(3) When computing the mean of a set of values x_i, the value of x_i
a. can never be zero
b. can never be negative
c. must always be positive
d. can be any value

(4) The hourly wages of a sample of 130 system analysts are given as below:

mean = 60	range = 20
mode = 73	variance = 324
median = 74	

The coefficient of variation equals
a. 0.30%
b. 30%
c. 5.4%
d. 54%

(5) A researcher has collected the following sample data

5	12	6	8	5
6	7	5	12	4

The 75th percentile is
a. 5
b. 6
c. 7
d. 8

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(6) In an experiment, events A and B are mutually exclusive. If P(A) = 0.6, then the probability of B
a. cannot be larger than 0.4
b. can be any value greater than 0.6
c. can be any value between 0 to 1
d. cannot be determined with the information given

(7) In the textile industry, a manufacturer is interested in the number of blemishes or flaws occurring in each 100 feet of material. The probability distribution that has the greatest chance of applying to this situation is the
a. normal distribution
b. binomial distribution
c. Poisson distribution
d. uniform distribution

(8) The key difference between the binomial and hypergeometric distribution is that with the hypergeometric distribution
a. the probability of success must be less than 0.5
b. the probability of success changes from trial to trial
c. the trials are independent of each other
d. the random variable is continuous

(9) X is a random variable with the probability function:
$f(X) = X/6$ for $X = 1, 2$ or 3
The expected value of X is
a. 0.333
b. 0.500
c. 2.000
d. 2.333

(10) Z is a standard normal random variable. By not using Z-table, the value of $P(-1.96 \leq Z \leq 1.96)$ can be judged to be closest to
a. 0.8942
b. 0.0558
c. 0.475
d. 0.4192

(11) X is a normally distributed random variable with a mean of 12 and a standard deviation of 3. By not using Z-table, the probability that X equals 19.62 is
a. 0.000
b. 0.0055
c. 0.4945
d. 0.9945

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(12) X is a normally distributed random variable with a mean of 15 and a standard deviation of 3. Not using Z-table, the probability that X greater than or equal to 21 is approximately

a. 0.044
b. 0.055
c. 0.022
d. 0.033

(13) The probability distribution of all possible values of the sample proportion $\bar{p}$ is the

a. probability density function of $\bar{p}$
b. sampling distribution of $\bar{x}$
c. same as $\bar{p}$, since it considers all possible values of the sample proportion
d. sampling distribution of $\bar{p}$

(14) A population consists of 500 elements. We want to draw a simple random sample of 50 elements from this population. On the first selection, the probability of an element being selected is

a. 0.100
b. 0.010
c. 0.001
d. 0.002

(15) A population has a mean of 75 and a standard deviation of 8. A random sample of 800 is selected. The expected value of $\bar{x}$ is

a. 8
b. 75
c. 800
d. None of these alternatives is correct.

(16) The purpose of statistical inference is to provide information about the

a. sample based upon information contained in the population
b. population based upon information contained in the sample
c. population based upon information contained in the population
d. mean of the sample based upon the mean of the population

(17) A sample of 25 observations is taken from an infinite population. The sampling distribution of $\bar{p}$ is

a. not normal since $n < 30$
b. approximately normal because $\bar{p}$ is always normally distributed
c. approximately normal if $np \geq 5$ and $n(1-p) \geq 5$
d. approximately normal if $np > 30$ and $n(1-p) > 30$

(18) As a rule of thumb, the sampling distribution of the sample proportions can be approximated by a normal probability distribution whenever

a. $np \geq 5$

b. $n(1 - p) \geq 5$ and $n \geq 30$
c. $n \geq 30$ and $(1 - p) = 0.5$
d. None of these alternatives is correct.

(19) In order to determine an interval for the mean of a population with unknown standard deviation a sample of 61 items is selected. The mean of the sample is determined to be 23. The number of degrees of freedom for reading the t value is
a. 22
b. 23
c. 60
d. 61

(20) In order to use the normal distribution for interval estimation of μ when σ is known and the sample is very small, the population
a. must be very large
b. must have a normal distribution
c. can have any distribution
d. must have a mean of at least 1

(21) A 95% confidence interval for a population mean μ is determined to be 100 to 120. If the confidence coefficient is reduced to 0.90, the interval for μ
a. becomes narrower
b. becomes wider
c. does not change
d. becomes 0.1

(22) The sample size needed to provide a margin of error of 2 or less with a .95 probability when the population standard deviation equals 11 is
a. 10
b. 11
c. 116
d. 117

(23) A machine that produces a major part for an airplane engine is monitored closely. In the past, 10% of the parts produced would be defective. With a .95 probability, the sample size that needs to be taken if the desired margin of error is .04 or less is
a. 110
b. 111
c. 216
d. 217

(24) In hypothesis testing,
a. the smaller the P(Type I error), the smaller the P(Type II error) will be
b. the smaller the P(Type I error), the larger the P(Type II error) will be
c. P(Type II error) will not be effected by P(Type I error)
d. the sum of P(Type I error) and P(Type II error) must equal 1

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(25) For a two-tail test, the p-value is the probability of obtaining a value for the test statistic as
a. likely as that provided by the sample
b. unlikely as that provided by the sample
c. likely as that provided by the population
d. unlikely as that provided by the population

(26) The power curve provides the probability of
a. correctly accepting the null hypothesis
b. incorrectly accepting the null hypothesis
c. correctly rejecting the alternative hypothesis
d. correctly rejecting the null hypothesis

(27) In a two-tailed hypothesis test, the test statistic is determined to be t = -2.692. The sample size has been 45. The p-value for this test can be judged closest to
a. -0.005
b. +0.005
c. -0.01
d. +0.01

(28) The average monthly rent for one-bedroom apartments in Chattanooga has been \$700. Because of the downturn in the real estate market, it is believed that there has been a decrease in the average rental. The correct hypotheses to be tested are
a. H_0: $\mu \geqq 700$ vs. H_a: $\mu < 700$
b. H_0: $\mu = 700$ vs. H_a: $\mu \neq 700$
c. H_0: $\mu > 700$ vs. H_a: $\mu \leqq 700$
d. H_0: $\mu < 700$ vs. H_a: $\mu \geqq 700$

(29) $n = 49$ $\bar{x} = 54.8$ $s = 28$ H_0: $\mu \leqq 50$
H_a: $\mu > 50$

The test statistic is
a. 0.1714
b. 0.3849
c. -1.2
d. 1.2

(30) If we are interested in testing whether the proportion of items in population 1 is larger than the proportion of items in population 2, the
a. null hypothesis should state $p_1 - p_2 < 0$
b. null hypothesis should state $p_1 - p_2 > 0$
c. alternative hypothesis should state $p_1 - p_2 > 0$
d. alternative hypothesis should state $p_1 - p_2 < 0$

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(31) The standard error of $\bar{x}_1 - \bar{x}_2$ is the

a. variance of $\bar{x}_1 - \bar{x}_2$

b. variance of the sampling distribution of $\bar{x}_1 - \bar{x}_2$

c. standard deviation of the sampling distribution of $\bar{x}_1 - \bar{x}_2$

d. difference between the two means

(32) The following information was obtained from matched samples.

Individual	**Method 1**	**Method 2**
1	7	5
2	5	9
3	6	8
4	7	7
5	5	6

The point estimate for the difference between the means of the two populations (Method 1 - Method 2) is

a. -1

b. 0

c. -4

d. 2

(33) Referring to problem (32), the null hypothesis tested is H_0: $\mu_d = 0$. The test statistic for the difference between the two population means is

a. 2

b. 0

c. -1

d. -2

(34) Referring to problems (32) and (33), if the null hypothesis is tested at the 5% level, the null hypothesis

a. should be rejected

b. should not be rejected

c. should be revised

d. None of these alternatives is correct.

(35) Which of the following has an F distribution?

a. $(n - 1)S^2/\sigma^2$

b. $(n_1-1)S_1^2/(n_2-1)S_2^2$

c. $(n - 1)\sigma^2/S^2$

d. S_1^2/S_2^2

(36) The sampling distribution used when making inferences about a single population's variance is

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a. an F distribution
b. a t distribution
c. a Chi-Square distribution
d. a normal distribution

(37) A sample of 61 observations yielded a sample standard deviation of 6. If we want to test H_o: $\sigma^2 = 40$, the test statistic is
a. 54
b. 9.15
c. 54.90
d. 9

(38) The number of degrees of freedom for the appropriate Chi-Square distribution in a test of independence is
a. n-1
b. k-1
c. number of rows minus 1 times number of columns minus 1
d. a Chi-Square distribution is not used

(39) The table below gives beverage preferences for random samples of teens and adults.

	Teens	**Adults**	**Total**
Coffee	50	200	250
Tea	100	150	250
Soft Drink	200	200	400
Other	50	50	100
	400	600	1,000

We are asked to test for independence between age (i.e., adult and teen) and drink preferences. The expected number of adults who prefer coffee is

a. 0.25
b. 0.33
c. 150
d. 200

(40) Referring to problem (39), the test statistic for this test of independence is
a. 0
b. 8.4
c. 62.5
d. 82.5

(41) The variable of interest in an ANOVA procedure is called
a. a partition
b. a treatment
c. either a partition or a treatment
d. a factor

(42) In an analysis of variance problem involving 3 treatments and 10 observations per treatment, SSE = 399.6. The MSE for this situation is
a. 133.2
b. 13.32
c. 14.8
d. 30.0

(43) When an analysis of variance is performed on samples drawn from k populations, the mean square between treatments MSTR is
a. $SSTR/n_T$
b. $SSTR/(n_T - 1)$
c. SSTR/k
d. SSTR/(k - 1)

(44) In ANOVA, which of the following is not affected by whether or not the population means are equal?
a. $\bar{\bar{x}}$
b. between-samples estimate of σ^2
c. within-samples estimate of σ^2
d. None of these alternatives is correct.

(45) A randomized block design ANOVA table is demonstrated as below.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Treat.	2,073.6	5		
Between Blocks	6,000	6	1,000	
Error		30	288	
Total		41		

The null hypothesis for this ANOVA problem is
a. $\mu_1=\mu_2=\mu_3=\mu_4$
b. $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5$
c. $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$
d. $\mu_1=\mu_2=\ldots\ldots=\mu_{20}$

(46) Referring to problem (45), the sum of squares due to error equals
a. 14.4
b. 2,073.6
c. 5,760
d. 8,640

(47) Referring to problem (45), the test statistic to test the null hypothesis equals
a. 0.415
b. 1.834
c. 4.173
d. 28.88

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(48) You are given the following information about y and x.

y **Dependent Variable**	**x** **Independent Variable**
5	1
4	2
3	3
2	4
1	5

The least squares estimate of b_1 (slope) equals
a. 1
b. -1
c. 6
d. 5

(49) Referring to problem (48), the least squares estimate of b_0 (intercept) equals
a. 1
b. -1
c. 6
d. 5

(50) In simple linear regression analysis, which of the following is **not** true?
a. The F test and the t test yield the same conclusion.
b. The F test and the t test may or may not yield the same conclusion.
c. The relationship between X and Y is represented by means of a straight line.
d. The value of $F = t^2$.