編號：G 385　系所：企業管理學系丙組　　科目：統計學

本試題是否可以使用計算機：☑可使用，□不可使用　（請命題老師勾選）

Part I: MULTIPLE CHOICE QUESTIONS. (50%)

1. The ratio scale of measurement has the properties of
   a. only the ordinal scale　　b. only the nominal scale
   c. the rank scale　　d. the interval scale

2. Statistical studies in which researchers control variables of interest are
   a. experimental studies　　b. control observational studies
   c. non-experimental studies　　d. observational studies

3. A statistics professor asked students in a class their ages. On the basis of this information, the professor states that the average age of all the students in the university is 24 years. This is an example of
   a. a census　　b. descriptive statistics
   c. an experiment　　d. statistical inference

4. The interquartile range is used as a measure of variability to overcome what difficulty of the range?
   a. the sum of the range variances is zero
   b. the range is difficult to compute
   c. the range is influenced too much by extreme values
   d. the range is negative

5. A method of assigning probabilities based on historical data is called the
   a. classical method　　b. subjective method
   c. relative frequency method　　d. historical method

6. 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

7. The random variable x is known to be uniformly distributed between 70 and 90. The probability of x having a value between 85 to 95 is
   a. 0.75　　b. 0.5　　c. 0.25　　d. 1

（背面仍有題目，請繼續作答）

8. The standard deviation of a sample of 100 elements taken from a very large population is determined to be 60. The variance of the population
   a. can not be larger than 60
   b. can not be larger than 3600
   c. must be at least 100
   d. can be any value

9. A simple random sample of 100 observations was taken from a large population. The sample mean and the standard deviation were determined to be 80 and 12 respectively. The standard error of the mean is
   a. 1.20　b. 0.12　c. 8.00　d. 0.80

10. A population has a standard deviation of 16. If a sample of size 64 is selected from this population, what is the probability that the sample mean will be within ±2 of the population mean?
   a. 0.6826　b. 0.3413　c. 0.9544
   d. Since the mean is not given, there is no answer to this question.

11. Stratified random sampling is a method of selecting a sample in which
   a. the sample is first divided into strata, and then random samples are taken from each stratum
   b. various strata are selected from the sample
   c. the population is first divided into strata, and then random samples are drawn from each stratum
   d. None of these alternatives is correct.

12. Whenever the population has a normal probability distribution, the sampling distribution of $\bar{x}$ is a normal probability distribution for
   a. only large sample sizes
   b. only small sample sizes
   c. only samples of size thirty or greater
   d. any sample size

13. The sampling error is the
   a. same as the standard error of the mean
   b. difference between the value of the sample mean and the value of the population mean
   c. error caused by selecting a bad sample
   d. standard deviation multiplied by the sample size

14. A property of a point estimator that occurs whenever larger sample sizes tend to provide point estimates closer to the population parameter is known as
    a. efficiency　　b. unbiased sampling
    c. consistency　　d. relative estimation

15. Given two unbiased point estimators of the same population parameter, the point estimator with the smaller variance is said to have
    a. smaller relative efficiency　　b. greater relative efficiency
    c. smaller consistency　　d. larger consistency

16. Whenever the estimation process summarizes **all** of the information a sample has about a population parameter, the point estimator has the property of
    a. relative consistency　　b. full consistency
    c. sufficiency　　d. insufficiency

17. A probability statement about the sampling error is known as the
    a. confidence　　b. precision
    c. interval　　d. error

18. After computing a confidence interval, the user believes the results are meaningless because the width of the interval is too large. Which one of the following is the best recommendation?
    a. Increase the level of confidence for the interval.
    b. Discard the current data and try a different sample.
    c. Increase the sample size.
    d. Reduce the population variance.

19. A random sample of 100 people was taken. Eighty of the people in the sample favored Candidate A. The 95% confidence interval for the true proportion of people who favors Candidate A is
    a. 0.722 to 0.878　　b. 0.762 to 0.838
    c. 78.04 to 81.96　　d. 62.469 to 97.531

（背面仍有題目，請繼續作答）

20. 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

21. If a hypothesis test leads to the rejection of the null hypothesis
    a. a Type II error must have been committed
    b. a Type II error may have been committed
    c. a Type I error must have been committed
    d. a Type I error may have been committed

22. Your investment executive claims that the average yearly rate of return on the stocks she recommends is at least 10%. You plan on taking a sample to test her claim. The correct set of hypotheses is
    a. H_0: $\mu < 10\%$ H_a: $\mu \geq 10\%$
    b. H_0: $\mu \leq 10\%$ H_a: $\mu > 10\%$
    c. H_0: $\mu > 10\%$ H_a: $\mu \leq 10\%$
    d. H_0: $\mu \geq 10\%$ H_a: $\mu < 10\%$

23. Changing from using the normal distribution to using the t distribution in a hypothesis test,
    a. will result in the rejection region being smaller
    b. will result in the rejection region being larger
    c. would have no effect on the rejection region
    d. None of these alternatives is correct.

24. 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.

25. A nonparametric version of the Parametric analysis of variance test is the
    a. Kruskal-Wallis Test　　b. Mann-Whitney-Wilcoxon Test
    c. sign test　　d. Wilcoxon Signed-rank test

Part II: FILL IN All THE BLANKS. (35%)

1. A statistics teacher wants to see if there is any difference in the abilities of students enrolled in statistics today and those enrolled five years ago. A sample of final examination scores from students enrolled today and from students enrolled five years ago was taken. You are given the following results.

	Today	**Five Years Ago**
Mean	82	88
Variance	112.5	54
Sample Size	45	36

The test statistic for the difference between the two population means is __(a).

2. The following information was obtained from matched samples.

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

The test statistic for the difference between the two population means is __(b)

3. An insurance company selected samples of clients under 18 years of age and over 18 and recorded the number of accidents they had in the previous year. The results are shown below.

Under Age of 18	**Over Age of 18**
$n_1 = 400$	$n_2 = 900$
Number of accidents = 76	Number of accidents = 90

The test statistic to determine if the accident proportions differ between the two groups is __(c).

（背面仍有題目，請繼續作答）

4. We are interested in determining whether or not the variances of the sales at two music stores (A and B) are equal. A sample of 25 days of sales at store A has a sample standard deviation of 30 while a sample of 16 days of sales from store B has a sample standard deviation of 20. The test statistic is (d.).

5. In a completely randomized design involving three treatments, the following information is provided:

	Treatment 1	Treatment 2	Treatment 3
Sample Size	5	10	5
Sample Mean	4	8	9

The overall mean for all the treatments is (e).

6. Two employers (A and B) ranked five candidates for a new position. Their rankings of the candidates are shown below.

Candidate	Rank by A	Rank by B
Tammy	2	1
Mary	1	3
John	3	4
Lynda	5	5
Steve	4	2

Compute the Spearman rank-correlation . (f) .

7. The following is the frequency distribution for the speeds of a sample of automobiles traveling on an interstate highway.

Speed Miles per Hour	Frequency
50 - 54	2
55 - 59	4
60 - 64	5
65 - 69	10
70 - 74	9
75 - 79	5
	35

The mean is (g) .

Part III: FILL IN THE GIVEN TABLES. (15%)

1. In a completely randomized experimental design, 18 experimental units were used for the first treatment, 10 experimental units for the second treatment, and 15 experimental units for the third treatment. Fill in **all** the blanks marked with "?" in the ANOVA table for this experiment shown below.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Treatments	?	?	?	3.0
Error (Within Treatments)	?	?	6	
Total	?	?		

2. Part of an Excel output relating X (independent Variable) and Y (dependent variable) is shown below. Fill in all the blanks marked with "?".

Summary Output

Regression Statistics	
Multiple R	0.1347
R Square	?
Adjusted R Square	?
Standard Error	3.3838
Observations	?

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	?	2.7500	?	?	0.632246859
Residual	?	?	11.45		
Total	14	?			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	8.6	2.2197	?	0.0019
x	0.25	0.5101	?	0.6322