國立高雄大學九十七學年度研究所碩士班招生考試試題

系所：

科目：統計學　　經濟管理研究所碩士班甲組　　是否使用計算機：是

考試時間：100 分鐘　　經濟管理研究所碩士班乙組

本科原始成績：100 分

I. MULTIPLE CHOICE QUESTIONS (50%)

所有答案請寫在答案卷，答案請五題寫在一行如下列所示：

All answers must be written on the answer sheet; write answers to five questions in each row, for example:

1. A　2. B　3. C　4. D　5. A

6. B　7. C　8. D　9. A　10. B

1. The measure of location which is the most likely to be influenced by extreme values in the data set is the
   a. range
   b. median
   c. mode
   d. mean

2. If two events are independent, then
   a. they must be mutually exclusive
   b. the sum of their probabilities must be equal to one
   c. their intersection must be zero
   d. None of these alternatives is correct.

3. Two events, A and B, are mutually exclusive and each have a nonzero probability. If event A is known to occur, the probability of the occurrence of event B is
   a. one
   b. any positive value
   c. zero
   d. any value between 0 to 1

4. A numerical description of the outcome of an experiment is called a
   a. descriptive statistic
   b. probability function
   c. variance
   d. random variable

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5. 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

6. Which of the following is <u>not</u> a property of a binomial experiment?
   a. the experiment consists of a sequence of n identical trials
   b. each outcome can be referred to as a success or a failure
   c. the probabilities of the two outcomes can change from one trial to the next
   d. the trials are independent

7. The level of significance is the
   a. maximum allowable probability of Type II error
   b. maximum allowable probability of Type I error
   c. same as the confidence coefficient
   d. same as the p-value

8. 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.

9. For a continuous random variable x, the probability density function f(x) represents
   a. the probability at a given value of x
   b. the area under the curve at x
   c. the area under the curve to the right of x
   d. the height of the function at x

10. Convenience sampling is an example of
    a. probabilistic sampling
    b. stratified sampling
    c. nonprobabilistic sampling
    d. cluster sampling

11. In hypothesis testing, the hypothesis tentatively assumed to be true is
    a. the alternative hypothesis
    b. the null hypothesis
    c. either the null or the alternative
    d. None of these alternatives is correct.

12. In point estimation
    a. data from the population is used to estimate the population parameter
    b. data from the sample is used to estimate the population parameter
    c. data from the sample is used to estimate the sample statistic
    d. the mean of the population equals the mean of the sample

13. A variable that takes on the values of 0 or 1 and is used to incorporate the effect of qualitative variables in a regression model is called
    a. an interaction
    b. a constant variable
    c. a dummy variable
    d. None of these alternatives is correct.

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. If a hypothesis is rejected at the 5% level of significance, it
    a. will always be rejected at the 1% level
    b. will always be accepted at the 1% level
    c. will never be tested at the 1% level
    d. may be rejected or not rejected at the 1% level

16. 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.

17. The ANOVA procedure is a statistical approach for determining whether or not
    a. the means of two samples are equal
    b. the means of two or more samples are equal
    c. the means of more than two samples are equal
    d. the means of two or more populations are equal

18. The range of the Durbin-Watson statistic is between
    a. –1 to 1
    b. 0 to 1
    c. –infinity to + infinity
    d. 0 to 4

19. A random sample of 121 bottles of cologne showed an average content of 4 ounces. It is known that the standard deviation of the contents (i.e., of the population) is 0.22 ounces. In this problem the 0.22 is
    a. a parameter
    b. a statistic
    c. the standard error of the mean
    d. the average content of colognes in the long run

20. Whenever using the t distribution in estimation, we must assume that
    a. the sample size is at least 30
    b. the sampling distribution is approximately normal
    c. the population is approximately normal
    d. the finite population correction factor is necessary

II. PROBLEMS (20%)

1. In a random sample of UTC students 50% indicated they are business majors, 40% engineering majors, and 10% other majors. Of the business majors, 60% were females; whereas, 30% of engineering majors were females. Finally, 80% of the other majors were male. Given that a person is male, what is the probability that he is an engineering major?

2. The life expectancy of Timely brand watches is normally distributed with a mean of four years and a standard deviation of eight months. Ninety-five percent of the watches will have a life expectancy of at least how many months?

3. Economists have stated that the marginal propensity to consume is at least 90? out of every dollar. Identify the null and alternative hypotheses

4. An ANOVA procedure is applied to data obtained from 6 samples where each sample contains 20 observations. The degrees of freedom for the critical value of F are ____ numerator and ____ denominator degrees of freedom

III. Let $X_1, X_2, \cdots, X_n$ be independent Bernoullli random variables with the probability of success θ, $f(x;\ \theta) = \theta^x (1-\theta)^{1-x}$, $x = 0, 1$. (30%)

1. Find the maximum likelihood estimator $\hat{\theta}$ of θ.
2. Find an estimator $\tilde{\theta}$ for θ by the method of moment.
3. Find the sufficient statistic of θ.
4. Show that $\bar{X} = \sum_{i=1}^{n} X_i / n$ is a MVUE of θ.
5. Is $\tilde{\theta}$ consistent for θ? Explain.