

國立中央大學97學年度碩士班考試入學試題卷

所別：產業經濟研究所碩士班 產業經濟組 科目：統計學 共 3 頁 第 1 頁

*請在試卷答案卷(卡)內作答

I. Multiple Choice Questions (total 50% with 5% for each question)

Note: For standard normal distribution,

$$P(Z \leq 1.284) = 0.9; P(Z \leq 1.645) = 0.95; P(Z \leq 1.96) = 0.975; P(Z \leq 2.326) = 0.99$$

$$t_{0.1} = 1.282, t_{0.05} = 1.645; t_{0.025} = 1.960; t_{0.005} = 2.576$$

1. From a group of six people, two individuals are to be selected at random. How many possible selections are there?
 - a. 12
 - b. 36
 - c. 15
 - d. 8
2. An experiment consists of selecting a student association president and vice president. All undergraduate students (freshmen through seniors) are eligible for these positions. How many sample points (possible outcomes as to the classifications) exist?
 - a. The number of all undergraduate students in the university
 - b. 16
 - c. 8
 - d. 32
3. Forty percent of all registered voters in a national election are female. A random sample of 5 voters is selected. The probability that the sample contains 2 female voters is
 - a. 0.0778
 - b. 0.7780
 - c. 0.5000
 - d. 0.3456
4. A normal probability distribution
 - a. is a continuous probability distribution
 - b. is a discrete probability distribution
 - c. can be either continuous or discrete
 - d. must have a standard deviation of 1
5. The starting salaries of individuals with a master degree are normally distributed with a mean of \$30,000 and a standard deviation of \$5,000. What is the probability that a randomly selected individual with a master degree will get a starting salary of at least \$20,000?
 - a. 0.4772
 - b. 0.9772
 - c. 0.0228
 - d. 0.9544
6. Random samples of size 49 are taken from a population that has 200 elements, a mean of 180, and a variance of 196. The distribution of the population is unknown. The mean and the standard error of the mean are
 - a. 180 and 24.39
 - b. 180 and 28
 - c. 180 and 2
 - d. 180 and 1.74

參考用

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注意：背面有試題

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7. From a population that is not normally distributed and whose standard deviation is not known, a sample of 20 items is selected to develop an interval estimate for μ .
- The normal distribution can be used.
 - The t distribution with 19 degrees of freedom must be used.
 - The t distribution with 20 degrees of freedom must be used.
 - The sample size must be increased.
8. Salary information for a random sample of male and female employees of a large company is shown below.

	Male	Female
Sample Size	64	36
Sample Mean Salary (in \$1,000)	44	41
Sample Variance	128	72

- The 95% confidence interval for the difference between the means of the two populations is
- 0 to 6.92
 - 2 to 2
 - 1.96 to 1.96
 - 0.92 to 6.92
9. 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
- 6 numerator and 20 denominator degrees of freedom
 - 5 numerator and 20 denominator degrees of freedom
 - 5 numerator and 114 denominator degrees of freedom
 - 6 numerator and 114 denominator degrees of freedom
10. Whenever the population has a normal probability distribution, the sampling distribution of \bar{x} is a normal probability distribution for
- only large sample sizes
 - only small sample sizes
 - any sample size
 - only samples of size thirty or greater

II. Problems (50%)

1. Consider the data in the following frequency distribution. Assume the data represent a population.

Class	Frequency
2 - 6	2
7 - 11	3
12 - 16	4
17 - 21	1

For the above data, compute the following.

- The mean. (8%)
- The standard deviation. (8%)

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2. A producer of lightbulbs wants to estimate the proportion of defective lightbulbs within ± 0.1 with a 95% degree of confidence. What is the minimum sample size required if previous experience indicates that the proportion of defective lightbulbs produced is 0.2. (8%)

3. Is your chance of getting a cold influenced by the number of social contacts you have? A study shows that the more social relationships you have, the less susceptible you are to colds. A group of 276 health men and women were grouped according to their number of relationships (such as parent, friend, colleague, neighbor). They were then exposed to a virus that causes colds. Each cell in the following table shows the total number of cases falls into 6 contacts/cold categories and the corresponding probabilities in the parentheses.

	Number of Relationships					
	3 or fewer		4-5		6 or more	
Cold	49	(0.1775)	43	(0.1558)	34	(0.1232)
Not Cold	31	(0.1123)	57	(0.2065)	62	(0.2246)
Total	80	(0.2898)	100	(0.3623)	96	(0.3478)

- a. If one person is selected at random from the 276 peoples in the study, what is the probability that the person got a cold? (8%)
- b. If two people are randomly selected, what is the probability that one has 4-5 relationships and the other has 6 or more relationships? (10%)
- c. If a single person is randomly selected and has a cold, what is the probability that he or she has 3 or fewer relationships? (8%)

參考用