

國立嘉義大學九十五學年度

應用經濟學系碩士班招生考試試題

科目：統計學

計算題：請勿使用電子計算機，每題配分標在問題後面，共 100%。

1. The mean and standard deviation of wages of 1,000 factory workers are \$25,600 and \$2,200, respectively. (a) At least how many of these workers receive wages of between \$21,200 and \$30,000? (5%) (b) How many of these workers, at most, receive wages that are not between \$17,900 and \$33,300? (5%)

2. Each morning, coffee is prepared for the entire office staff by one of three employees, depending on who arriving at work. Karen arrives first 20% of the time; Gita and Michael are each the first to arrive on half of the remaining mornings. The probability that the coffee is bitter when it is prepared by Karen is 0.1, while the corresponding probabilities when it is prepared by Gita and Michael are 0.2 and 0.3, respectively. If you arrive one morning and find the coffee bitter, (a) what is the probability that it was prepared by Karen? (10%) (b) What is the probability that the coffee will not be bitter on a given morning? (5%)

3. A sample size of $n=100$ has been drawn from a population whose variance is 2,250 in order to test the following: $H_0 : \mu = 1,000$ vs. $H_A : \mu \neq 1,000$. It is decided to reject H_0 if $\bar{x} > 1008$ or if $\bar{x} < 992$. (a) Find the probability of a Type I error. (5%) (b) Find the probability of a Type II error if $\mu = 1,005$. (10%)

4. A manufacturer of a bottle-filling machine claims that the standard deviation of the fills from his machine is less than 2 cc. In a random sample of 10 fills, the sample standard deviation was 1.19cc. Is this sufficient evidence at the 5% level of significance to support the manufacture's claim? (Assume a normal population.) (10%)

5. A fast-food franchiser is considering building a restaurant at a certain location. According to a financial analysis, a site is acceptable only if the number of pedestrians passing the location average more than 100 per hour. A random sample of 50 hours produced $\bar{x} = 110$ and $s = 12$ pedestrians per hour. (a) Do these data provide sufficient evidence to establish that the site is acceptable? (Use $\alpha = 0.05$) (5%) (b) What are the consequences of Type I and Type II errors? (5%)

6. An insurance company is thinking about offering discounts on its life insurance policies to nonsmokers. As part of its analysis, it randomly selects 200 men who are 50 years old and asks them if they smoke at least one pack of cigarettes per day and if they have ever suffered from heart disease. The results indicate that 20 out of 80 smokers and 15 out of 120 nonsmokers suffer from heart disease. Can we conclude at the 5% level of significance that smokers have a higher incidence of heart disease than nonsmokers? (10%)

7. The following sums of squares were computed from a randomized block design of the analysis of variance with 5 treatments and 12 blocks: $SS(\text{Total})=79.3$, $SST=11.6$, $SSB=9.0$. Determine whether there is enough evidence at the 10% significance level to allow us to conclude that the treatment means differ. (15%)

8. Test the hypothesis that the following sample of data is drawn from a normal population. The sample mean and the standard deviation are 164 and 10. (Use $\alpha = 0.10$.) (15%)

Frequency Distribution of Battery Lifetimes

Lifetime in hours	Number of batteries
140 up to 150	15
150 up to 160	54
160 up to 170	78
170 up to 180	42
180 up to 190	11
Total	200

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