# 國立臺北科技大學 100 學年度碩士班招生考試

## 系所組別：4410、4420 服務與科技管理研究所甲、乙組

## 第一節　統計學　試題



**注意事項：**

1. 本試題共十題，每題十分，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Make a boxplot for the following data set.
   24, 15, 34, 92, 68, 34, 78, 45, 53, 67, 83, 46
2. Find the weighted mean for a particular student's scores on three exams if the first one was worth 75 points and the student received a score of 70%, the second was worth 50 points and the student received a score of 80%, and the third was worth 30 points and the student received a score of 95%?
3. On an eight-question true-false quiz, a student guesses each answer. What is the probability that the student gets at least one of the answers correct?
4. Construct the probability distribution for the number of heads obtained when tossing four coins. Draw a graph of the distribution.
5. A research firm reported that 15% of those surveyed described their health as poor, 26% as good, 40% as very good, and 19% as excellent. A health professional in Chicago wanted to determine if people in Chicago had similar feelings toward their health. In a sample of 610 people in Chicago, 70 described their health as poor, 180 as good, 220 as very good, and 140 as excellent. Compute the test value.
6. A researcher has reason to believe that, for an experiment with 50 points, a 95% prediction interval would be of width 8. If the researcher wishes to run a more precise experiment that will result in a 95% prediction interval of width 4, then the researcher will require how many points?
7. Find the equation of the regression line.

| x | 60 | 48 | 53 | 40 | 48 | 50 |
|---|---|---|---|---|---|---|
| y | 269 | 213 | 251 | 171 | 211 | 215 |

8. A sample of 400 racing cars showed that 80 of them cost over $700,000. What is the 99% confidence interval for the true proportion of racing cars that cost over $700,000?
9. A quality control expert wants to estimate the proportion of defective components that are being manufactured by his company. A sample of 300 components showed that 20 were defective. How large a sample is needed to estimate the true proportion of defective components to within 2.5 percentage points with 99% confidence?
10. A manufacturer claims that its televisions have an average lifetime of at least five years (60 months) with a population standard deviation of seven months. Eighty-one televisions were selected at random, and the average lifetime was found to be 59 months. With $\alpha = 0.025$, is the manufacturer's claim supported?

| $\alpha$ | 0.1 | 0.05 | 0.025 | 0.01 | 0.005 |
|---|---|---|---|---|---|
| Z | 1.2816 | 1.6449 | 1.96 | 2.3263 | 2.5758 |