一、簡答題(40%；每題各 4 分)

1.何謂推論統計？

2.何謂柴比雪夫定理(chebyshev's theorem)？

3."期待值"與"平均數"有何不同？

4.試述卜瓦松機率分配(Poisson)的特性，及其應用性。

5.何謂隨機抽樣(random sampling)？

6.何謂中央極限定理？

7.何謂不偏性(unbiasedness)？

8.假設檢定中常見的 P 值之意義為何？有何作用？

9.試舉一統計學在品質管制中應用之例子。

10.何謂適合度檢定？

二、選擇題(60%；每題各 5 分)

1. Suppose that P(A)= .1, P(B)= .3, and P(A and B)= .05. Then P(A U B)is
   a. .25 b. .10 c. .35 d. .40

2. Suppose that A and B are independent events with P(A)= .2 and P(B)= .7. What is the probability that neither A nor B will occur ?
   a. .14 b. .24 c. .90 d. None of the above.

3. As the sample size n increases, the width of the confidence interval for the population mean tends to :

a. increase b. decrease c. stay the same

4. If a researcher is using a 95% level of confidence in calculating a confidence interval,

a. 95% of the time the computed interval will include the sample mean.

b. 5% of the time such intervals will not include the population value.

c. in the long run, 95 % of all sample means will fall within the interval.

d. 95% of the time the interval will not include the population value.

5. When finding a confidence interval for a population mean based on a sample of size 9, which assumption is made ?

a. Both populations have the same standard deviation.

b. The sampling distribution of z is normal.

c. The populations is approximately normal.

d. There is nó special assumption made.

6. One characteristic of any t-distribution is

a. it is skewed to the right.

b. as n increases, the t-distribution has less and less resemblance to a normal curve.

c. it has a single parameter, which is degrees of freedom.

d. it has $\mu = 0$ and $\sigma = 1$

7. The quality control office tests bottles of shampoo to see if the filling machines are putting the proper amount in each bottle. They do not want to shut down production unless there is strong evidence indicating that the machines are not functioning properly. After testing a sample of bottles, the quality control manager decides to leave the filling machines operating. Actually, however, the filling machines are not operating properly. This is an example of :

a. A Type I error. b. A Type II error. c. A correct decision.

8. Which of the following statements is correct regarding the null and alternative hypothesis ?

a. The alternative hypothesis is the one that we want to reject.

b. The null hypothesis should be identified as the one without an equality relationship.

c. One should dichotomize the possible outcomes of a process on the basis of the decision that must be made, then identify the null and alternative hypotheses accordingly.

d. All of the above.

9. In hypothesis testing, $\alpha$ can be set as low as desired

a. by increasing the sample size.

b. without having any effect on $\beta$.

c. only in very special situations, because most of the time researchers are limited in choice by the nature of the problem.

d. but at the expense of increasing the risk of a Type II error as $\alpha$ is decreased.

10. If a confidence interval for a difference between population means is -8.32 to 38.88, it can be said that

a. an error has been made; the limits must both be positive or negative.

b. there is, indeed, a difference between the population means.

c. it should not be concluded that there is a difference between the two population means.

d. the confidence coefficient was set at the wrong level.

11. Two samples, each with a sample size of 10, have means of 22 and 27, respectively. The degrees of freedom to be used in testing the significance of the difference between the two sample means are

a. 9 b. 18 c. 19 d. 20 e. 49

12. The chi-square goodness-of -fit test

a. is a lower-tail test.

b. is an upper-tail test.

c. is a two-tail test.

d. All of the above are correct.