※注意：請於試卷上「選擇題作答區」依序作答。

第一大題: 選擇題，請選出最適當的答案(每題三分)

1. Which property is NOT characteristics of the binomial experiment?
A. The experiment consists of two identical trials.
B. The trials are independent.
C. The probability of success on a single trial is equal to p.
D. The probability of a failure is equal to 1-p.
E. The probability of a failure is q.

2. Which of the parameters associated with a binomial experiment will produce a probabilities distribution with the smallest standard deviation, given that the sample size *n* is the same for each situation?
A. p=0.5
B. p=0.4
C. p=0.3
D. q=0.8
E. q=0.1

3. One characteristics 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 the degrees of freedom.
D. It has $\mu = 0$ and $\sigma = 1$.

4. In analysis of variance studies, it is assumed that
A. The values in each population are t-distributed.
B. The populations have a common variance σ^2.
C. The samples are random but not independent.
D. The population have different variances.

5. A sample statistics T is said to be an unbiased estimator of a parameter θ if :
A. Every time a sample is taken, the value of T will equal θ.
B. The mean of the sampling distribution of q is equal to T.
C. The mean of the sampling distribution of T is equal to θ.
D. The standard error of the sampling distribution of T is less than the standard error of the sampling distribution of θ.
E. None of the above is true.

6. Of the following, the one that is NOT a property of the F-distribution is
A. F-distribution are nonsymmetrical.
B. F-distribution have n-1 degree of freedom.
C. F can assume only positive values.
D. There are many F-distributions and each has a different shape.

見背面

7. A confidence interval for the equality of population variances was $.63<\frac{\sigma_1^2}{\sigma_2^2}<2.75$ therefore
A. One should conclude that the variances are not equal since 0 is not in the interval.
B. One should conclude that the variances are not equal because both values are greater than 0.
C. One should conclude that the variances are equal because 1 is in the interval
D. The research should now test the hypothesis that the variances are equal.

8. Which of the following is a correct statement concerning Central Limit Theorem (CLT)?
A. The CLT states that the sample mean, $\bar{x}$, is always equal to μ.
B. The CLT states that for large sample, sample mean $\bar{x}$ is always equal to μ.
C. The CLT states that for large samples, the sampling distribution of the population mean is approximately normal.
D. The CLT states that for large samples, the sampling distribution of the sample mean is approximately normal.
E. Both (B) and (C) are correct.

9. Which of the following statements is true?
A. Chance will cause a statistic to vary from sample to sample.
B. All parameters have sampling distributions.
C. A parameter is a function of sample outcomes.
D. Usually both the mean and variance are known for most populations.

10. At a given probability level α, as sample size n increases, the value of t_α such that $P[t>t_\alpha]=\alpha$
A. increases
B. decreases
C. is unchanged but is more accurate
D. is unchanged but is less accurate

11. Select the FALSE statement about R-square from the following in the context of multiple regression analysis.
A. R-square is defined as the ratio of SSR to Total SS.
B. R-square is the percent reduction in the variability of y when all of the x variables in the regression model are considered.
C. R-squared will never decrease with the inclusion of additional independent variables in the model.
D. R-squared is better when it is close to 0 than when it is close to 1.

12. When multicollinearity exists,
A. The overall F-value is not likely to be significant.
B. No predictions of the independent variable should be made.
C. The estimated regression coefficients tend to have a large standard errors and small t values.
D. R-square will tend to be smaller than if no multicollinearity exists.

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13. If two events A and B are independent and P(A) ≠0 and P(B) ≠0, then
A. P(A|B) = P(A∩B)
B. P(A|B) = P(A)P(B)
C. P(A∩B) ≠0
D. P(A|B) = 0
E. none of the above

14. X, Y, Z are independent random variable and E(X)=1, E(Y)=3, E(Z)=5 Var(X)=3, Var(Y)=1, Var(Z)=2, What is the mean and variance of 2X+3Y
A. mean=11, variance=21
B. mean=11, variance=9
C. mean=5.5, variance=9
D. mean=11, variance=4
E. none of the above

15. Suppose that A and B are independent events, with P(A)=0.2, P(B) =0.7. What is the probability that neither A nor B will occur?
A. 0.14
B. 0.24
C. 0.90
D. 0.86

第二大題: 是非題(每題三分) **請於試卷上「非選擇題作答區」標明題號並依序作答。**

16. A 90 percent confidence interval for a population mean implies that there is a 0.90 probability that the population mean will be contained in the confidence interval.

17. The analysis of variance test results in a two-tailed F-test.

18. The F-test for comparing two means is equivalent to a student's t-test.

19. The probability distribution for a statistic is called its sampling distribution.

20. When randomly sampling from a population with mean μ, the mean of the sampling distribution of $\bar{x}$ will always be equal to μ.

21. As α increases, the probability of a Type I error increases and the size of the rejection region increases.

22. In a contingency table, the observed number is always less than the expected number.

23. The chi-square test can be used to test whether a population possesses a Poisson distribution.

24. The normal approximation to the binomial distribution will usually be appropriate when n is large and p is very small.

25. If $X_1, \ldots X_n$ are n independent variables such that each expectation $E(X_i)$ exists, then $E(X_1 \cdot X_2 \cdot X_3 \cdots X_n)=E(X_1)E(X_2)\cdots E(X_n)$

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第三大題: 問答題 請於試卷上「非選擇題作答區」標明題號並依序作答。

第 1 題:

簡單線性模型表達如下:

$Y_i = \alpha + \beta X_i + \varepsilon_i \ \ i = 1, \cdots, n$，

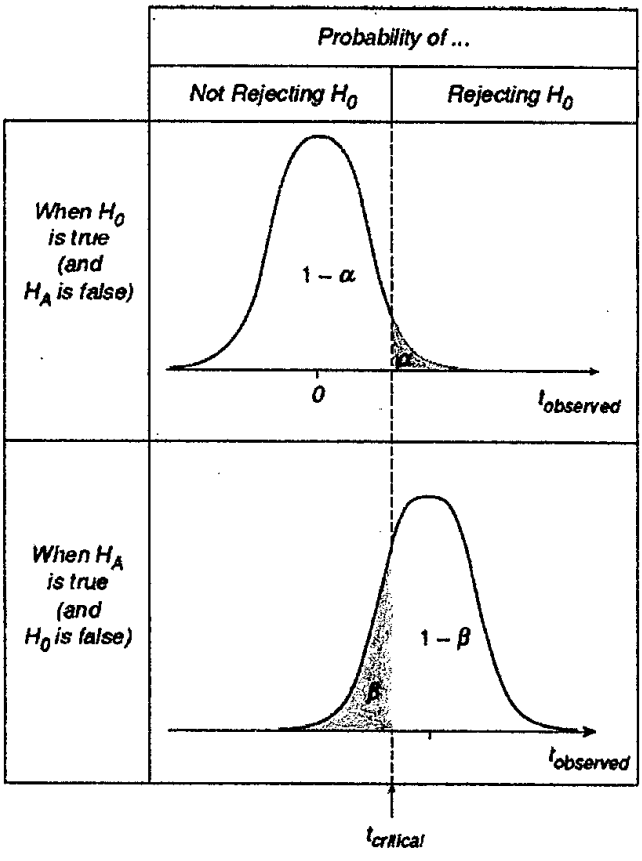
(1) 請寫出簡單迴歸模型的迴歸係數α 及 β的公式(五分)

(2) 為了估計及檢定時的方便，請問我們對簡單線性迴歸模型做了哪些假設?(十分)

第 2 題:

(1) 吾人欲檢定 $H_0: \mu_1 - \mu_2 = 0$，下圖說明他在決定如何進行檢定時所面對的考量，請說明$\alpha, \beta, (1-\alpha), (1-\beta)$在統計上的意義?(五分)

(2) 若將從$\alpha = 0.05$ 提升至 $\alpha = 0.10$，對於統計檢定會有甚麼影響?(五分)



試題隨卷繳回