國立臺北科技大學九十九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. 本試題共五十題，每題兩分，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. Which is *not* an assumption of unreplicated two-factor ANOVA (randomized block)? (A)Normality of the population. (B)Interaction test required. (C)Additive treatment effects. (D)Homogeneous variances.
2. Which of the following statements is *not* true? (A)Scientific progress consists of continual refinement of theories by thorough hypothesis testing. (B)Statistics is the science of collecting, organizing, analyzing, interpreting, and presenting data. (C)Estimating parameters is an important aspect of descriptive statistics. (D)Statistical challenges include imperfect data, practical constraints, and ethical dilemmas.
3. Which of the following is way to distort statistical findings? (A)Inconsistent treatment of data. (B)Using graphs to give authority to poor data. (C)Omitting contrary data in your analysis. (D)All of the above can distort statistical findings.
4. Which is *least* likely to be regarded as a ratio variable? (A)A critic's rating of a restaurant on a 1 to 4 scale. (B)Automobile exhaust emission of nitrogen dioxide (milligrams per mile). (C)Number of customer complaints per day at a cable TV company office. (D)Cost of an e-Bay purchase.
5. In a single-factor ANOVA, the computed value of F will be zero when (A)there is no difference in the treatment means. (B)there is no difference in the block means. (C)the data are skewed left. (D)F will never be zero.
6. Which of the following is true? (A)The level of measurement for attribute data is ordinal. (B)The duration of a flight from Boston to Minneapolis is ratio data. (C)Oxnard University has two Nobel prize-winning faculty is an example of continuous data. (D)Jankord Industries has 6 regional warehouses is an example of ordinal scale data.

7. The critical value

(A)is calculated from the sample. (B)is usually 0.05 or 0.01. (C)divides the acceptance region from the rejection region. (D)is determined by the test statistic.

8. Professor Hardtack chose a sample of 7 students from his statistics class of 35 students by picking every student who was wearing red that day. Which kind of sample is this?

(A)Simple random sample. (B)Judgment sample. (C)Systematic sample. (D)Convenience sample.

9. Sampling errors can be reduced by

(A)increasing the sample size. (B)decreasing the sample size. (C)utilizing simple random sampling. (D)having a computer tabulate the results.

10. When using a dot plot to visualize a distribution which of the following is *least* apparent?

(A)Dispersion of data within the distribution. (B)The shape of the distribution. (C)Location of data within the distribution. (D)Central tendency of data within the distribution.

11. Which is *not* an assumption of one-factor ANOVA?

(A)Normality of the population. (B)Homogeneous variances. (C)Balanced sample sizes. (D)Independent sample observations.

12. Which display is most likely to reveal association?

(A)Dot plot. (B)Scatter plot. (C)Histogram. (D)Radar chart.

13. We expect that the ideal number of classes in a frequency distribution will

(A)reflect Sturges' Rule. (B)be based on aesthetic judgment. (C)provide "nice" class (bin) limits. (D)have all of the above characteristics.

14. Which of the following is true?

(A)Line charts are useful for visualizing attribute data. (B)Pyramid charts are generally preferred to bar charts. (C)Line charts are not used for cross sectional data. (D)Pie charts can generally be used instead of bar charts.

15. Histograms do *not* reveal the

(A)exact data range. (B)modal class(es). (C)degree of skewness. (D)relative frequencies.

16. Which is *not* a tip for effective bar charts?

(A)Time usually goes on the horizontal axis. (B) The non-zero origin rule may be waived for financial reports. (C)Label data values at the top of each bar unless graphing lots of data. (D)Bar height or length should be proportional to the quantity displayed.

17. Degrees of freedom for the treatments in a one-factor ANOVA with $n_1 = 5$, $n_2 = 6$, $n_3 = 7$ would be

(A)18 (B)17 (C)6 (D)2

18. Which is a reason for using a log scale for time series data?

(A)It is easier to compare rates of change in time series of dissimilar magnitude. (B)General business audiences find it easier to interpret a log scale. (C)On a log scale, equal distance represents equal dollar amounts. (D)Arithmetic scales are harder to interpret for most data.

注意：背面尚有試題

19. Which is *not* an advantage of the method of medians to find Q_1 and Q_3?
(A)Ease of interpolating quartile positions. (B)Ease of use in smaller data sets. (C)Intuitive definitions without complex formulas. (D)Applicability of formulas to larger samples.

20. In a two-factor unreplicated (randomized block) ANOVA if SSA (treatments) = 216, SSB (block) = 126, SSE (error) = 18, the F statistic for the treatments is
(A)12 (B)1.71 (C)7 (D)Can't tell as given.

21. Which is *not* true of p-values?
(A)When they are small, we want to reject H_o. (B)They measure the level of significance directly. (C)They show the chance of Type I error if we reject H_o. (D)They do not require α to be specified *a priori*.

22. Which is *not* a measure of dispersion?
(A)Mean absolute deviation (MAD). (B)Standard deviation. (C)Midhinge. (D)Interquartile range.

23. Which is a characteristic of the mean as a measure of central tendency?
(A)Deviations do not to sum to zero when there are extreme values. (B)Is less reliable than the mode when data are continuous. (C)Utilizes all the information in a sample. (D)Is usually equal to the median in samples of business data.

24. The position of the median is
(A)$n/2$ in any sample. (B)$n/2$ if n is even. (C)$n/2$ if n is odd. (D)$n/2+1$ if n is odd.

25. Which is *not* a characteristic of the standard deviation?
(A)It is always the square root of the variance. (B)It is not applicable when data are continuous. (C)It can be calculated even when the data contain negative or zero values. (D)Its physical interpretation is not as easy as the MAD.

26. Which is most nearly correct concerning a two-factor unreplicated (randomized block) ANOVA?
(A)No interaction effect can be estimated. (B)The interaction effect would have its own F statistic. (C)The interaction would be insignificant unless the main effects were significant. (D)More than one of these is true.

27. An outlier can be regarded as
(A)a data value beyond the outer fences. (B)a data value that is unusual. (C)a data value outside three standard deviations. (D)all of the above.

28. The level of significance
(A)is the probability of a "false alarm." (B)can be any value between 0 and 1. (C)is the likelihood of rejecting the null hypothesis when it is true. (D)has all of the above characteristics.

29. Which statement is true?
(A)With nominal data can still find the mode. (B)Outliers distort the mean but not the standard deviation. (C)Business and economic data are rarely skewed to the right. (D)If we sample a normal population the sample skewness coefficient will be exactly 0.

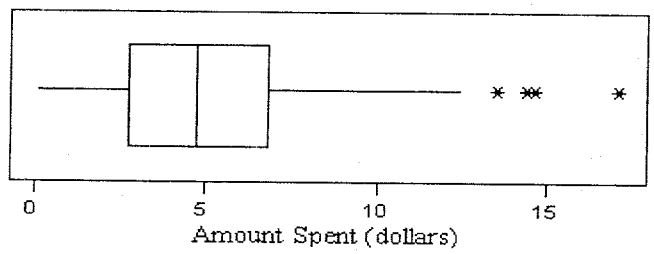
30. If we are using $\alpha = .01$ and a left-tailed test the decision is to

(A)clearly reject the hypothesis of equal proportions. (B)barely reject the hypothesis of equal proportions. (C)barely accept the hypothesis of equal proportions. (D)clearly accept the hypothesis of equal proportions.

31. As a measure of dispersion, compared to the range, an advantage of the standard deviation is

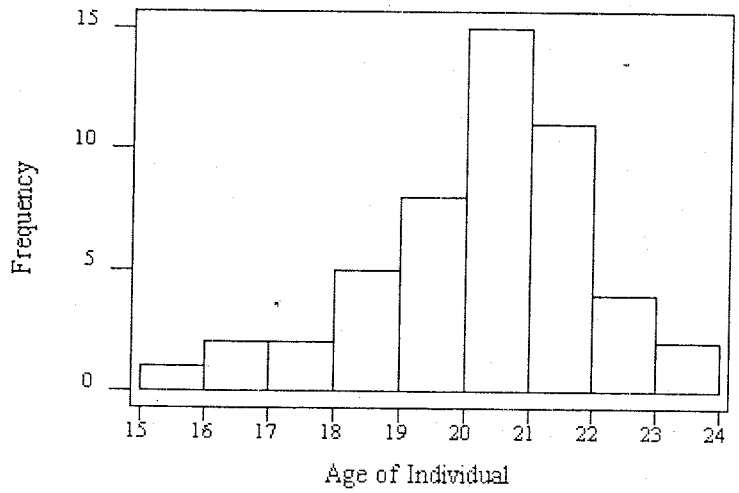
(A)considering only the data values in the middle of the data array. (B)considering all data values. (C)describing the distance between the highest and lowest values. (D)being calculated easily through the use of a formula.

32. A sample of 50 breakfast customers of MacDonald's showed the spending below. Which statement is *least* likely to be correct?



(A)The median is very close to the midhinge. (B)A typical customer spends a little less than $5. (C)The trimmed mean would be an unattractive measure of central tendency. (D)About 75 percent of the customers spend less than $7.

33. VenalCo Market Research surveyed 50 individuals who recently purchased a certain CD, revealing the age distribution shown below. Which statement is *least* defensible?



(A)The mean age probably exceeds the median age. (B)The mode would be a reasonable measure of central tendency. (C)The data are somewhat skewed to the left. (D)The CD is unlikely to appeal to retirees.

34. Events A and B are mutually exclusive when
(A)the joint probability of the two events is zero. (B)they are independent events.
(C)$P(A)P(B) = 0$ (D)$P(A)P(B) = P(A \mid B)$

35. Which of the following statement is *correct*?
(A)Increasing α will make it more likely that we will reject H_0 , if H_0 is false. (B)Doubling the sample size roughly cuts the width of a confidence interval in half. (C)A higher standard deviation would increase the power of a test for a mean. (D)The p-value shows the probability that the null hypothesis is false.

36. When using the Chebyshev's theorem, the minimum percentage of sample observations that will fall within 2 standard deviations of the mean will be _____ the percentage within 2 standard deviations if a normal distribution is assumed (Empirical Rule).
(A)smaller than (B)greater than (C)the same as (D)can not compare

37. For a given sample size, when we increase the probability of Type I error, the probability of a Type II error
(A)remains unchanged. (B)increases (C)decreases. (D)is impossible to determine without knowing the distribution.

38. The mean and standard deviation are shown in which display?
(A)Box-and-whisker plot with fences. (B)Dotplot. (C)Histogram. (D)None of these.

39. After testing a hypothesis regarding the mean of a normal distribution, we decided not to reject H_0. Thus, we are exposed to
(A)Type I and Type II error. (B)Since we do not reject H_0, no error is possible. (C)Type I error. (D)Type II error.

40. The probability of Type I error, α, and the probability of Type II error, β, are related as follows
(A)$\beta > \alpha$ (B)$\beta < \alpha$ (C)$\alpha + \beta = 1$ (D)None of the above.

41. Which of the following is *correct*?
(A)When your sample size increases, both your Type I and Type II errors will increase. (B)A Type II error can only occur when you accept H_0 as being true. (C)A Type I error can only occur if you reject H_0. (D)The level of significance refers to the probability of making a Type II error.

42. In hypothesis testing, Type II error is
(A)equal to 1 - probability of committing Type I error. (B)equal to 5 percent or more.
(C)the probability to accept H_0 when H_0 is true. (D)the probability to accept H_0 when H_1 is true.

43. Which of the following is *incorrect*?
(A)The level of significance refers to the probability of making a Type I error. (B)In assessing possible error, a low α and β will lead to the selection of a higher sample size. (C)The probability of rejecting a true null hypothesis increases as the sample size increases. (D)When Type I error increases, Type II error must decrease.

44. Regarding probability, which of the following is *correct*?

(A)When events A and B are mutually exclusive, $P(A \cap B) = P(A) + P(B)$. (B)When two events A and B are independent the intersection of the events can be found by multiplying the probabilities of the individual events. (C)The union of events A and B consists of all outcomes in the sample space that are contained in both event A and event B. (D)The probability of an event will always be a value greater than zero, but less than one.

45. The standard error of the mean decreases when

(A)the sample size decreases. (B)the standard deviation increases if n is constant. (C)the standard deviation decreases and n increases. (D)the population size decreases.

46. A sample is taken and a confidence interval is constructed for the mean of the distribution. At the center of the interval is the value of the

(A)sample average, $\bar{x}$. (B)population mean, μ. (C)a random variable -- neither $\bar{x}$ nor μ are necessarily at the center. (D)sample average, $\bar{x}$, provided the sample is large.

47. Which of the following statements is most nearly correct, other things being equal?

(A)If $n \geq 30$ a sample mean is within 5% of the true mean. (B)Critical values of z and t are about the same when the mean is large. (C)Quadrupling the sample size roughly halves the standard error of the mean. (D)All of the above statements are generally true.

48. The width of a confidence interval for μ is *not* affected by

(A)The sample size. (B)The confidence level. (C)The standard deviation. (D)The sample mean.

49. The Central Limit Theorem (CLT) implies

(A)that the population will be approximately normal if $n \geq 30$. (B)that repeated samples must be taken. (C)that the standard error of the mean gets larger as n increases. (D)None of the above.

50. Which of the following is not a valid null hypothesis?

(A) H_0: $\mu \geq 0$ (B) H_0: $\mu \neq 0$ (C) H_0: $\mu \leq 0$ (D)All are valid.