

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (15 pts) Define the concept of “covariates.” Identify how the ANCOVA accounts for covariates, as well as *how* and *why* we adjust for covariates in research.
2. (5 pts) Develop one hypotheses that could be tested with the independent *t* test or the Mann-Whitney U-test.
3. (20 pts) Imagine that you are going to conduct a study. Write the purpose of the study, research questions, main hypotheses, and research methods.
4. (5 pts) An investigator examined cases of fetal death in 27,000 pregnancies and classified mothers according to whether they had experienced sexual intercourse within 1 month before delivery. It was found that 11% of the mothers of fetuses that died and 2.5% of the mothers of fetuses that survived had had sexual intercourse during the period. It was concluded that intercourse during the month preceding delivery caused the fetal deaths. This conclusion: (5 pts)
 - a. May be incorrect because mothers who had intercourse during the month before childbirth may differ in other important characteristics from those who did not
 - b. May be incorrect because there is no comparison group
 - c. May be incorrect because prevalence rates are used where incidence rates are needed
 - d. May be incorrect because of failure to achieve a high level of statistical significance
 - e. Both b and c
5. (5 pts) All of the following are important criteria when making causal inferences except: ()
 - a. Consistency with existing knowledge
 - b. Dose-response relationship
 - c. Consistency of association in several studies
 - d. Strength of association
 - e. Predictive value
6. (5 pts) In 1990, a case-control study was conducted to investigate the positive association between artificial sweetener use and bladder cancer. Controls were selected from a hospital sample of patients diagnosed with obesity-related conditions. Obesity-related conditions have been positively associated with artificial sweetener use. How would the use of these patients as controls affect the estimate of the association between artificial sweetener use and bladder cancer?
 - a. The estimate of association would accurately reflect the true association regardless of the association between artificial sweetener use and obesity-related conditions
 - b. The estimate of association would tend to underestimate the true association
 - c. More information is needed on the strength of association between artificial sweetener use and obesity-related conditions before any judgment can be made
 - d. The estimate of association would tend to overestimate the true association
 - e. More information is needed on the strength of association between artificial sweetener use and bladder cancer before any judgment can be made

(背面仍有題目請繼續作答)

系所組別：老年學研究所甲、乙、丙組

考試科目：研究方法與統計

考試日期：0223，節次：3

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7. (5 pts) If a statistical test is significant, it means that:

- a. it has important clinical applications.
- b. the study had acceptable power.
- c. the null hypothesis was rejected.
- d. all of the above are true.

8. (5 pts) Power is defined by

- a. the α -level.
- b. the sample size.
- c. the effect size (γ).
- d. all of the above.

9-15 (5 pts for each) For each of the following scenarios (1 to 10), choose the most appropriate test (a to l).

- a. Independent t test
- b. Mann-Whitney U -test
- c. Paired t test
- d. Wilcoxon matched-pairs test
- e. Logistic regression
- f. McNemar test
- g. Linear regression
- h. Chi-square test
- i. One-way analysis of variance (ANOVA)

9. A total of 100 employees were followed for 10 years. Half of the employees were classified as having high-stress jobs, while the other half had low-stress jobs. Which group had a higher probability of having a heart attack over the 10 years of follow-up after adjusting for socioeconomic differences (income, education, and race)?
10. What is the relationship between the number of fruit and vegetables consumed in a week and total cholesterol level after adjusting for age? There are 300 people in the study, and cholesterol level is normally distributed.
11. What is the relationship between score of an exam and staying up all night to study (yes/no)? Exam score is normally distributed.
12. You want to know if the mean weight of graduate students differs by year of graduate school. Weight is not normally distributed.
13. Determine whether or not two raters agree on the diagnosis of a disease using newly developed criteria.
14. Determine the relationship between the year in school (freshman, sophomore, junior, and senior) and having a car on campus.
15. In a study of 84 elderly men, a researcher wants to know if systolic blood pressure, which is normally distributed, is related to men's marital status, which is single, married, divorced, or widowed.