

※ 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。

一、選擇題 (48 分，每題 4 分)

1. 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.
2. Consider the following question: Do women make more visits to their primary care physician in a year than men? Which variable is the grouping variable?
 - A. Gender
 - B. Number of visits to the physician
 - C. Both
 - D. Neither
3. Consider the following question: Do people who exercise three times a week or more have lower systolic blood pressure than people who exercise less than three times a week? Which variable should be normally distributed?
 - A. Frequency of exercise
 - B. Systolic blood pressure
 - C. Both
 - D. Either one
4. Consider the following questions: Do people without health insurance spend more money a year on over-the-counter drugs than people who have some form of health insurance? How many levels (or possible values) does the variable "health insurance" have?
 - A. One
 - B. Two
 - C. Three
 - D. Can't tell
5. Consider the following questions: Is there a relationship between insurance status and the number of days absent from work? To use an independent t test, how many possible values should the variable "health insurance" have?
 - A. One
 - B. Two
 - C. Three
 - D. Can't tell from the information given
6. A logistic regression model was run looking at the association between gender (male=0, female=1) and diabetes (yes=1, no=0). The odds ratio was 3.4, and the 95% confidence interval around the odds ratio was 2.9 to 4.6. This means that
 - A. the association between gender and diabetes is statistically significant at the $\alpha = .05$ level.
 - B. the association between gender and diabetes is not statistically significant at the $\alpha = .05$ level.
 - C. women have a lower odds of diabetes but we cannot tell if that difference is statistically significant.

- D. the p -value is greater than .05.
7. Linear regression allows you to test the significance of the following:
- A. The overall model
 - B. Each regression coefficient
 - C. The risk ratio comparing those with a characteristic to those without
 - D. a and b only
8. Which of the following statement is incorrect.
- A. Cronbach's alpha is a coefficient for reliability
 - B. High internal validity means the study finding may be correct
 - C. Reliability means the scope the study finding can be applied/referred to
 - D. Low reliability means the items in a scale have low correlation
 - E. Reliability can be high even the validity is low
9. Which of the following analysis cannot control for covariates?
- A. T-Test
 - B. Logistic regression
 - C. Multiple regression
 - D. Two-way ANOVA
 - E. ANCOVA
10. Which of the following statistic can provide tests for association between two variables? (Choose one best answer).
- A. Chi-square
 - B. T-test
 - C. Pearson's correlation
 - D. One-way ANOVA
 - E. all of the above
11. In a case control study, examining caffeine consumption as a risk factor for pancreatic cancer, dietary exposures were assessed using a questionnaire with retrospective questions aimed at a period of time 5 years in the past. Which of the following situations of misclassification would make caffeine appear more harmful than it really was? (Choose one best answer)
- A. Cases underreported caffeine intake but controls did not.
 - B. Controls underreported caffeine intake but cases did not.
 - C. Both cases and controls underreported sucrose intake.
 - D. Both cases and controls over-report sucrose intake.
 - E. None of the above
12. A retrospective study predicting the disability score with multiple regression, and found the coefficient of gender is 2.98 (95%CI=0.88-4.11). It claims that women were more likely to have disability than men.
- A. Correct, and means that being women had an average of 2.98 more disability score than men.
 - B. Incorrect, mainly because there is no comparison group
 - C. Correct, because prevalence rates are used where incidence rates are needed
 - D. Incorrect, mainly because of failure to achieve a high level of statistical significance
 - E. All of the above.

二、簡答題

1. Choose a research question from your interest. Write three hypotheses that this study is testing. Write both the null and alternative hypotheses for each one. (12 分)
2. Based on the results of the three models provided in the table below, please answer questions: (40 分，每題 4 分)
 - (1) What kind of multivariate analysis used in the analysis?
 - (2) Why the author using three models?
 - (3) What is the outcome variable? In other words, what is the analysis predicting for?
 - (4) What does model 1 mean? In other words, what you can explain from model 1?
 - (5) The coefficient of Diabetes in Model 3 is 1.70 (p=0.029). What does that mean?
 - (6) Based on model 3, what are protecting factors for the outcome variable?
 - (7) According to the three models, how do you explain the effect of age?
 - (8) According to the three models, how do you explain the effect of depression?
 - (9) Can this analysis claim any causation?
 - (10) Can this analysis claim any association?

Table 2
Multivariate analyses for cognitive impairment, OR(95%CI)

	Model 1		Model 2		Model 3	
	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p
Older age	3.05 (2.14-4.35)	<0.001	3.18 (2.22-4.58)	<0.001	2.60 (1.79-3.78)	<0.001
Sex (Male)	0.28 (0.20-0.39)	<0.001	0.32 (0.22-0.46)	<0.001	0.34 (0.25-0.48)	<0.001
Marital status (Single)	1.05 (0.76-1.44)	0.77				
Education (years)						
Elementary school (0-6)	Reference group		Reference group		Reference group	
High school (7-12)	0.46 (0.25-0.86)	0.01	0.39 (0.21-0.70)	0.002	0.47 (0.26-0.85)	0.012
College (>12)	0.35 (0.10-1.19)	0.09	0.28 (0.09-0.87)	0.029	0.30 (0.10-0.95)	0.040
Ethnicity						
Fukienese	Reference group					
Hakka	0.82 (0.55-1.22)	0.33				
Mainlander	0.61 (0.34-1.06)	0.07				
Smoking			1.01 (0.66-1.54)	0.955		
Alcohol drinking			0.74 (0.44-1.24)	0.262		
Depression			1.40 (1.02-1.94)	0.039	1.18 (0.81-1.71)	0.391
Hypertension			0.98 (0.68-1.41)	0.945		
Diabetes			1.82 (1.15-2.88)	0.010	1.70 (1.06-2.74)	0.029
Cardiovascular disease			1.22 (0.82-1.80)	0.312		
Stroke			2.71 (1.25-5.86)	0.011	2.36 (1.06-5.26)	0.036
ADL disability					1.96 (0.85-4.54)	0.116
IADL disability					2.06 (1.38-3.09)	0.029
Functional limitation					1.42 (0.95-2.13)	0.082
Self perceived health						
Good					0.94 (0.57-1.58)	0.836
Fair					1.12 (0.78-1.60)	0.534
Poor					reference group	
Joining organized group activity					0.98 (0.71-1.35)	0.090