※ 注意：請於試卷上依序作答，並應註明作答之大題及小題題號。

1) Please define the following terms (10%):
 (A) Frequency matching (2.5%)
 (B) Cross-sectional study (2.5%)
 (C) Effect modifier (2.5%)
 (D) Confounding (2.5%)

2) For the sources of systematic error, which of the following is NOT correct? (A) Selection of subjects, (B) Measurement of study variables, (C) Confounding, (D) None of the above. (3%)

3) Which of the following could be used to control for confounding in data analysis stage? (A) Stratification and regression models, (B) Randomization and stratification, (C) Restriction and regression models, (D) Matching and restriction. (3%)

4) Which of the following is NOT true? (A) Random error is the error remains after removal of systematic error, (B) Variability of random error could be easily described, (C) Random errors come from the random assignment of subjects in a randomized clinical trial, (D) In observational studies, most of random errors reflect hidden bias, which accounted for factors that have not been measured. (3%)

5) Which of the following is NOT true? (A) For 95% confidence interval (CI), if the data collection and analysis could be replicated many times, the CI should include within it the correct value of the measure 95% of the time, (B) 95% CI means 95% of the chance the correct value falls within the CI, (C) CI could range from 0 to 100%, (D) none of the above. (3%)

6) Which of the following is true? (A) Stratification creates subgroups in which the confounding factor does not vary at all or does not vary much, (B) When we stratify by nominal variable (e.g., gender), there is some residual variability due to misclassification, (C) When we stratify by continuous variable (e.g., age), age can vary within each category but within a range, (D) all of the above. (3%)

7) Which of the following could NOT be used to interpret the stratified data? (A) Pooling, (B) Regression models, (C) Standardization, (D) Stratum-specific estimates. (3%)

8) Which of the following is NOT true? (A) When a confounding is strong enough, the crude relative risk (RR) and pooled RR could be in the opposite direction, (B) Standardization and pooling could remove all of the confounding, (C) Residual

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confounding may result from factors that are controlled but are measured inaccurately from the beginning, (D) Within-stratum confounding due to few strata is one type of residual confounding. (3%)

9) Compare pooling and standardization, which of the following is NOT true? (A) Pooling use built-in weights, which are buried within the Mantel-Haenszel formula and based on the information in each stratum, (B) Weights for standardization can be based on the outside standard, (C) Weights for pooling cannot be easily specified, but standardization has explicit weights, (D) Pooling does not tolerate substantial variation in the effect across strata. (3%)

10) Which of the following is NOT true? (A) The existence of statistical interactions depends on which model we select (e.g., additive or multiplicative models), (B) A statistical interaction is similar to a biologic interaction, (C) A statistical interaction indicates the departure from the underlying form of a statistical model, (D) Statistical interaction depends on an arbitrary choice of measure or scale. (3%)

11) For simple regression $Y = a_0 + a_1 X$, which of the following is NOT true? (A) Regression line estimates average values for Y according to the values of X, (B) a_1 is the coefficient of X, (C) a_1 is number of units of change in Y for every unit change in X, (D) a_1 is the intercept. (3%)

12) The association between activities of daily living and the low back pain complaint was studied in a sample of middle aged and older adult residents in a suburban area of Taipei city. One of the activities of interest was "gardening." Current prevalent low back pain was defined based on the reporting of at least one episode of low back pain during the last month. The following table shows the distribution of individuals according to the complaint of low back pain and whether they frequently engaged in gardening activities according to age group. (30%)

	Frequent Gardening	Low Back Pain	
		Yes	No
Age <65 years	Yes	70	299
	No	20	198
Age>=65 years	Yes	55	15
	No	40	25

Please fill the answer in the following questions:

(A) (4%) This study is a _____ study design

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(B) (6%) What is the exposure factor? _____
What is the outcome variable?_____

(C) (6%) The crude odds ratio is _____ if we does not consider the age effect

(D) (6%) Please calculate the odds ratio for two age group: odds ratio ____ for <65 years old and ____ for >=65 years old

(E) (8%)

Is there relationship between age and gardening activity?_____(yes or no)

Is the relationship between age and low back pain?_____(yes or no)

Is the effect between gardening and low pack pain affected by age group?_____(yes or no). So you consider the age is a _____ factor

13) Please compare research aims, subjects, diagnostic tools, and procedures for solving research problems among basic medicine, clinical medicine and preventive medicine. (10%)

14) The prevalence of chronic obstructive pulmonary disease (COPD) is increasing in Taiwan. Please use the issue "smoking would induce COPD" to explore the possible strategies in different levels of prevention (三段五級預防), and also evaluate their cost and effectiveness. (20%)

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