※ 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。

題一: 為了解某個介入方案是否有效，研究人員對受試者做介入前的評估，接著將他們隨機分派至介入組(19 人)或控制組(14 人)，經過介入時段後，兩組受試者都接受介入後之評估，後側的評估方式與前測的方式相同。表一呈現前測的、後測的及前後測改變的平均分數與標準平方差。分數越高，介入效果越好。(35 分)

表一

	前測		後側		後測與前測的差別	
	平均分數	標準平方差	平均分數	標準平方差	平均分數	標準平方差
介入組(19 人)	6.21	2.20	8.11	2.08	1.90	2.75
控制組(14 人)	5.86	1.61	6.00	1.57	0.14	1.83

(1) 請推論介入組與控制組受試者後測評估分數(母體)的平均數是否有差別?

　(a) 請用獨立樣本雙尾 T 檢定, 在型一錯誤的機率不得超過 5%的前提下，推論兩組樣本後測平均分數的差異是否達統計上的意義? (5 分)

　註: Student T 分佈 97.5 百分位，　在自由度是 31 的情況下是 2.04.

　(b) 請建構兩組母體後測平均數之間差別的 95%信賴區間。(5 分)

(2) 請比較介入組與控制組受試者前後測改變分數(母體)的平均數是否有差別?

　(c) 請用獨立樣本雙尾 T 檢定, 在型一錯誤的機率不得超過 5%的前提下，推論兩組樣本前後測改變平均分數的差異是否達統計上的意義? (5 分)

　(d) 請建構兩組母體前後測改變平均數之間差別的 95%信賴區間。(5 分)

(3) 請比較(a)和(c)的 T 檢定的值, 你會採用何種方法?為什麼? (15 分)

題二: R (列數)by C(行數) 列聯表的分析，檢定兩個類別變相之間相關性時(虛無假設:無相關 vs. 替代假說:有相關), 常用皮爾森卡方檢定。請解釋為何在虛無假說成立之下，卡方檢定的自由度是 (R-1)×(C-1), R≥2 和 C≥2。 (15 分)

題三: 選擇題。 (25 分)

1. Which of the following best describes the retrospective design where subjects are sampled by disease status and is often used when the investigator is interested in rare diseases.

    A. intervention trial
    B. case control study
    C. retrospective cohort
    D. ecologic study
    E. none of the above

2. Which of the following best describes the study design that can be either retrospective or prospective and is often used when the investigators are interested in rare exposures.

    A. intervention trials
    B. cohort studies
    C. prevalence studies
    D. case control study
    E. none of the above

3. The strength of an association is one of the criteria for evaluating the cause and effect relationship between an exposure and outcome. Which of the following is a test for association? (Choose one best answer).

    A. Chi-square
    B. T-test
    C. Pearson's correlation
    D. One-way ANOVA
    E. all of the above

4. In a diet and bowel disease case control study, 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 sucrose appear more harmful than it really was?　(Choose one best answer)

    A. Controls underreported sucrose intake but cases did not.
    B. Cases underreported sucrose 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

5. 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:

    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. All of the above

題四: 申論題。 (25 分)

1. A researcher is going to conduct a study to examine if health literacy is predictive of health condition in ten years among retired older adults, and if the relationship differs by physical condition. Please propose a project for answering the goal of the research.

  I. Specific aims & Design & Participants (5 分)

  II. Measures　(15 分)

    A. Specify what independent, dependent, moderating and confounding variables you are going to measure.

    B. Specify how you are going to get these measures.

  III. Analytical methods: please specify how you might evaluate the results. (5 分)