系所組別：環境醫學研究所丙組

考試科目：生物統計　　　　　　　　　　　　　　　　　　考試日期：0223，節次：2

※ 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。

第一題　名詞解釋 (12%)

1. α level
2. logit
3. odds ratio

第二題　簡答題 (9%)

4. 一般情況下 chi-square test 相對應的無母數統計檢定為何 test?
5. 一般情況下 ANOVA 相對應的無母數統計檢定為何 test?
6. 一般情況下 two-sample t test 相對應的無母數統計檢定為何 test?

7. 某次健檢用機器量完血壓(收縮壓; mmHg)後,再請護理師量一次,得以下數據(29%)：

個案	機器	護理師
1	102	102
2	111	108
3	119	122
4	121	122
5	122	118
6	123	124
7	107	118
8	113	112
9	112	112
10	128	126
11	135	136
12	108	128

以 120 mmHg 為標準

a. 請問以護理師量測值為準，12 名人員收縮壓過高之盛行率為多少？ (5%)

b. 以機器檢測收縮壓過高之情況，請問敏感度(sensitivity)、特異性(specificity)、正預測值(predictive value positive)、 負預測值(predictive value negative)各為多少？(12%)

c. 要檢驗機器與護理師檢測收縮壓過高之盛行率的差異有無統計意義，用何種統計檢定方式最適當？如果擴充人數至 500 人，在盛行率、敏感度、特異性不變的情況，用何種統計檢定方式最適當？(6%)

d. 要檢驗機器與護理師檢測收縮壓之平均值的差異有無統計意義，用何種統計檢定方式最適當？如果擴充人數至 500 人，用何種統計檢定方式最適當？(6%)

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8. (15%) Suppose the daily amount of electricity X required for a plating process has mean 100 and stand deviation 30 kilowatt hours. If the cost of electricity is 50 dollars each kilowatt hour, find the (1) mean, (2) variance, and (3) standard deviation of the daily cost of electricity.

9. (20%) If the probabilities are 0.25, 0.35, and 0.09 that, while under warranty, a new car will require repairs on the engine, brake, or both, (1) what is the probability that a car will require one or the other or both kinds of repairs under the warranty? (2) What is the probability that a car with a required repair on the engine will also need repair on the brake?

10. (15%) A lead absorption group and a control group of children were identified by the amount of lead in blood samples. The performance IQ test was performed on 34 children in the lead absorption group and 63 comparably aged children in the control group. Variances of the IQ test are assumed equal between the 2 groups. Please use an appropriate statistical test to assess the statistical significance of the IQ test results, which are given in the Table below. (Hint: $\{(1/34) + (1/63)\}^{0.5} = 0.213$; SD is standard deviation; SD^2 is the square of standard deviation.)

	Mean	SD	SD^2	n
Lead absorption	95	12.20	148.91	34
Control	105	17.69	313.00	63