

大同大學 九十二 學年度轉學考試試題

考試科目：統計學

所別：事業經營學系

全1頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 可以使用計算器。

1. What is “multicollinearity” in multiple linear regression models? Which independent variables appear to contribute to high multicollinearity? Why? Use the following correlation matrix. (20 points)

	Y	X1	X2	X3	X4	X5
Y	1.00	0.80	0.95	0.32	0.41	0.50
X1	0.80	1.00	0.98	0.03	0.25	0.41
X2	0.95	0.98	1.00	0.12	0.22	0.03
X3	0.32	0.03	0.12	1.00	0.10	0.27
X4	0.41	0.25	0.22	0.10	1.00	0.97
X5	0.50	0.41	0.03	0.27	0.97	1.00

2. Consider a study design to examine the role of television viewing in the lives of a selected group of people over 65 years of ages. The purpose of the study was to provide guideline for developing television programming that would adequately meet the special needs of this audience. A sample of $n = 25$ senior citizens was selected and from each senior citizen the following data were obtained.

Dependent variable:

- (a) the average number hours per day an interviewee watching television;

Independent variables:

- (b) the marital status of the interviewee (whether the interviewee is living with his or her spouse),
 (c) the age of the interviewee,
 (d) the number of years of education of the interviewee.

Write a multiple linear regression model to represent this relationship and define each variable. (20 points)

3. Green company is considering a new bonus plan. Under the current bonus plan, the amount of bonus is not linked to production but only lined to profits. According to the proposed bonus plan, the amount of bonus will be linked to the quantity produced but will be subject to the amount of profit. The controller of Green is interested in examining whether employee opinion of the bonus plan is independent of job classification. Please use both the chi-square and t statistics to test the independence. ($\alpha = 0.05$) (20 points)

Employee	Favorable	Unfavorable
White collar	67	28
Blue color	43	19

4. A factorial experiment involving two factors, A and B, each at two levels, was replicated five times.

Factor A

Factor B	1	2
1	13, 15, 14, 16, 16	14, 17, 17, 20, 16
2	14, 16, 15, 18, 16	17, 16, 22, 20, 19

Please establish a complete ANOVA table for the above data. (20 points)

5. What sample size is required to detect a change of $\delta = \pm 0.05$ (a two-tailed test) in a binominal proportion p for $\alpha = 0.05$ and $\beta = 0.1$ when maximum variation of pq is used in the calculation? (20 points)