所別：工業管理研究所碩士班 甲組 科目：統計學
乙組

1. Consider the following set of sample data.

16	23	17	24	9	11	13	15	15	23	18	16	17

   a. Determine the coefficient of variation for the set. (7%)
   b. Use Tchebysheff's Theorem to determine the range of values that include at least 75% of the data. (8%)

2. Company A makes the same type of bicycle from three production facilities. If one distributor has found a bicycle that has not been properly assembled. The manager of company A wants to know which facility is most likely to be responsible for this mistake. Provide the manager this information based on the following data. (10%)

Facility	Contribution to total	Proportion of defective
1	0.40	0.05
2	0.35	0.10
3	0.25	0.07

3. A management behavior analyst has been studying the relationship between male/female supervisory structures in the workplace and the level of employees' job satisfaction. The results of a recent survey are shown here in the table. Is there sufficient evidence to infer that the level of job satisfaction depends on the boss/employee gender relationship? (α=0.05) (10%) (hint: $\chi_{0.05,6} = 12.5916$)

	Boss/Employee			
Level of Satisfaction	Female/ Male	Female/ Female	Male / Male	Male / Female
Satisfied	21	25	54	71
Neutral	39	49	50	38
Dissatisfied	31	48	10	11

4. The following data were generated from a 2 × 2 factorial experiment with 3 replicates.

	Factor B	
Factor A	1	2
1	6	12
	9	10
	7	11
2	9	15
	10	14
	5	10

   a. Test at the 5% significance level to determine whether factors A and B interact. (10%)
   b. Test at the 5% significance level to determine whether differences exist between the levels factor A. (10%) (hint: $F_{0.05,1,8} = 5.32$)

注意：背面有試題

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5. Please define marginal probability and union probability (6 %). Refer to the table in question 2 again:

Facility	Contribution to total	Proportion of defective
1	0.40	0.05
2	0.35	0.10
3	0.25	0.07

Give one example each for the two probabilities defined above (4 %).

6. Referring to question 3, how many elements are in the sample space of the table (5 %)?

7. Please define stratified random sampling (10 %).

8. A specialist in hospital administration stated that the number of FTEs (full-time employees) in a hospital can be estimated by counting the number of beds in the hospital (a common measure of hospital size). A business analyst decided to develop a regression model in an attempt to predict the number of FTEs of a hospital by the number of beds. She surveyed 12 hospitals and obtained the following data. The data are presented in sequence, according to the number of beds.

Number of beds	FTEs	Number of beds	FTEs
23	69	50	138
29	95	54	178
29	102	64	156
35	118	66	184
42	126	76	176
46	125	78	225

Please develop the least squares equation of the regression line (10 %). Explain the managerial implication of the regression line developed above (10 %). (Note: the use of calculator is not absolutely necessary).