

國立中央大學100學年度碩士班考試入學試題卷

所別：企業管理學系碩士班 一般乙組(一般生) 科目：統計學 共 / 頁 第 / 頁
 企業管理學系碩士班 一般丙組(一般生)

本科考試禁用計算器

*請在試卷答案卷(卡)內作答

請使用藍色或黑色筆作答

1. The sample means, variances and covariance for random variable X_1 and X_2 are given as $\bar{X}_1 = 1$, $\bar{X}_2 = 2$, $S_1^2 = 0.1$, $S_2^2 = 0.2$, $S_{12} = 0.3$ respectively.

Let $Y_1 = 2X_1 - X_2$ and $Y_2 = X_1 + X_2$ Compute the covariance of Y_1 and Y_2 . (20%)

2. A market research firm is interested in the possible success of new flavors of ice cream. A study was conducted with three different flavors—peach, almond, and coconut. Three participants were given a sample of each ice cream, in random order, and asked to rate the flavors on a 100-point scale. The results are given in the table below.

PARTICIPANT	FLAVOR		
	Peach	Almond	Coconut
1	75	83	73
2	80	98	78
3	83	89	74

Is there sufficient evidence of a difference in the mean ratings for the three flavors? ($\alpha = 0.05$) (20%)

3. A pediatrician wishes to recruit five couple, each of whom is expecting their first child to participate in a new natural childbirth regimen. Let $p = P(\text{randomly selected couple agrees to participate})$, If $p = 0.2$, what is the probability that 15 couples must be asked before five are found who agree to participate? (15%)

4. In human there is a blood group, which is composed of individuals having one of the three blood types M, MN and N. Type is determined by two alleles and there is no dominance, so the three possible genotypes give rise to three phenotypes. A population consisting of individuals in the blood group is in equilibrium if $P(M) = \theta^2$, $P(MN) = 2\theta(1-\theta)$, $P(N) = (1-\theta)^2$ for some θ . Suppose that a sample from such a population yielded the following results:

Type	M	MN	N	
Observed	125	225	150	n=500

- (a) Find the *maximum likelihood estimator* for θ . (15%)
 (b) Test the null hypothesis $P(M) = P(MN) = P(N)$ at $\alpha = 0.05$ (15%)

5. (a) Compare the meaning of 'level' between *significant level* and *factor level*. (5%)
 (b) Explain the *spurious regression* phenomenon. (10%)

Note: $\chi_{0.05,1}^2 = 3.843$ $\chi_{0.05,2}^2 = 5.991$ $F_{2,4,0.05} = 6.94$

參考用