所別：產業經濟研究所碩士班 乙組 科目：統計學

注意：請依序橫式作答，未作答題目，請寫題號後空白，未依規定者將予扣分

1. (10%) A company has come under pressure to eliminate discriminatory hiring practices (all its employees are overseas born women). Company officials have agreed with unions that during the next 5 years, 40% of their new employees will be men and 30% will be Taiwanese born. 35% of new employees, though, will be overseas born women. What percentage of Taiwanese born men are they committed to hire?

2. (20%) A quality control inspection system requires that from each batch of items a sample of 10 is selected and tested. If 2 or more of the sample are defective the whole batch is rejected. If the probability of an item being defective is 0.05

   (a) What is the probability of 2 defectives in the sample?
   (b) What is the probability of the batch being rejected?

   (Note: $0.95^5 = 0.7737$ 、 $0.95^6 = 0.7350$ 、 $0.95^7 = 0.6983$ 、 $0.95^8 = 0.6634$ 、 $0.95^9 = 0.6302$ 、 $0.95^{10} = 0.5987$)

3. (20%) The following table below shows the probabilities of males (M) and females (F) being employed (E) or unemployed (U) at a poor area in Taiwan.

	M	F
E	0.52	0.41
U	0.05	0.02

   (a) Find P(E|M), the conditional probability of employment given that the person is male
   (b) Find P(M|E), the conditional probability of being male given that the person is employed.

4. (10%) An oil exploration company has a lease for which it must decide to either:

   (a) sell now,
   (b) hold for a year and then sell, or
   (c) drill now.

   The cost of drilling is $200,000.
   Drilling will lead to one of the following outcomes:

Well type	Probability	Payoff
Dry	0.5	$0
Wet	0.4	$400,000
Gusher	0.1	$1,500,000

   If it sells now, the company can get $125,000. If it holds for a year and oil prices rise (probability =0.6) it can sell for $300,000 or if oil prices fall (probability = 0.4) it can get $100,000. What should it do?

注意：背面有試題

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5. (10%) In a particular university 60% of students are men and 40% are women. In a random sample of 50 students what is the probability that more than half are women?

   (Note: $\sqrt{3} = 1.732$; P (z<1.40) = 0.9192 , P(z<1.44) = 0.9251, P(z<1.51)=0.9345, P(z<1.55)=0.9394)

6. (30%) Use the following values to derive the regression model: $Y_i = a + bX_i + e_i$

Observations	X	Y
1	2	4
2	3	7
3	1	3
4	5	9
5	9	17

   (a) The coefficients of a and b.
   (b) The explained sum of squares(ESS) and the residual sum of squares(RSS).
   (c) The proportion of the Y variation explained by the linear regression.
   (d) The variance of a and b.
   (e) Test the significance of the estimated parameters, a and b. Use the $t_{0.025} = 3.182$.