所別：財務金融學系碩士班 甲組 科目：統計
乙組
丙組

Part I: Multiple-Choice Questions (80%:16*5%)

QUESTIONS 1 THROUGH 2 ARE BASED ON THE FOLLOWING INFORMATION:

In a recent survey about capital gains tax, 60 % of the respondents said that they support capital gains tax. Females comprised 40% of the sample, and of the females, 40% supported capital gains tax.

1. What is the probability that a randomly selected person is a female and capital gains tax supporter?
A) 0.10 B) 0.16 C) 0.57 D) 0.83

2. Suppose we select a female respondent, what is the probability that she is not a capital gains tax supporter?
A) 0.2 B) 0.3 C) 0.6 D) 0.8

3. There are 15 professors in the School of Education. 12 of them have received good evaluations from students, while 3 received poor evaluations. You will take three courses in the School of Education next semester. What is the probability that all of your professors next semester have received good evaluations?
A) 0.516 B) 0.484 C) 0.258 D)0.242

4. A random variable X is normally distributed with mean of 50 and variance of 49, and a random variable Y is normally distributed with mean of 100 and variance of 100. Given the random variables X and Y have a correlation coefficient equal to -0.80, what is the variance of the random variable W = 4X - 3Y?
A) 2488 B) 3002 C) 3028 D) 4342

5. In a recent survey of high school students, it was found that the average amount of money spent on entertainment each week was normally distributed with a mean of \$50 and a standard deviation of \$20. Assume that these values are representative of all high school students. The probability is 67% that the average spending of a sample of 25 randomly-selected students will spend at least how much? [Hint: Prob(z<0.44)=0.67]
A) 40.66 B) 48.24 C) 60.77 D) 70.99

6. The filling machine at a bottling plant is operating correctly when the variance of the fill amount is equal to 0.3 ounces. Assume that the fill amounts follow a normal distribution. The probability is 0.10 that for a sample of 31 bottles, the sample variance is less than what number? [Hint: Prob(χ^2_{30}>40.256)=0.1; Prob(χ^2_{30}>20.599)=0.9; Prob(χ^2_{31}>41.422)=0.1; Prob(χ^2_{31}>21.434)=0.9]
A) 0.081 B) 0.103 C) 0.206 D) 0.311

7. In a recent survey of 900 adults, 10% indicated that they had fallen asleep in front of the television in the past month. What is the level of confidence associated with the interval of 8% to 12%? [Hint: Prob(z<1)=0.8643; Prob(z<2)=0.9772; Prob(z<3)=0.9987]
A) 0.9 B) 0.93 C) 0.95 D) 0.98

8. You are interested in determining the amount of time (in minutes) you spend each day on the Internet. For nine days, the average and the standard deviation are 47 and 30, respectively. Assume that the amount of time you spend on the Internet each day is normally distributed. what is the 90% confidence interval for the population average amount of time? [Hint: Prob(t_8>1.86)=0.05; Prob(t_9>1.833)=0.05; Prob(t_8>2.306)=0.025; Prob(t_9>2.262)=0.025]
A) 47 ± 18.6 B) 47 ± 18.33 C) 47 ± 23.06 D) 47 ± 22.62

9. If multicollinearity exists among the independent variables included in a multiple regression model, then:
A) regression coefficients will be difficult to interpret
B) standard errors of the regression coefficients for the correlated independent variables will increase
C) multiple coefficient of determination will assume a value close to zero
D) both (A) and (B) are correct statements

10. Suppose you are interested in estimating the regression: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$. Using a sample of 40 observations, we get $y = 13.2 + 18.4x_1 + 0.033x_2 + 1732.4x_3$, $R^2 = 0.88$, $s_{b_0} = 6.3$, $s_{b_1} = 15.2$, $s_{b_2} = .0025$, and $s_{b_3} = 1443.2$. These results suggest that this model may suffer from:
A) Serial Correlation B) Specification bias C) Multicollinearity D) Heteroscedasticity

注意：背面有試題

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QUESTIONS 11 THROUGH 14 ARE BASED ON THE FOLLOWING INFORMATION:

The manager of a used-car dealership is very interested in the resale price of used cars. The manager feels that the age of the car is important in determining the resale value. He collects data on the age and resale value of 15 cars and runs a regression analysis with the value of the car (in thousands of dollars) as the dependent variable and the age of the car (in years) as the independent variable. Unfortunately, he spilled his coffee on the printout and lost some of the results, identified by "*A*" through "*F*". The partial results left are displayed below.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.442
R Square	*"A"*
Adjusted R Square	0.133
Standard Error	*"B"*
Observations	15.000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	44.397	44.397	3.154	*"C"*
Residual	13	*"D"*	12.960		
Total	14	227.389			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	*"E"*	3.835	5.988	0.000
Age	*"F"*	0.640	-1.776	*"G"*

11. What is the value of **A*?
A) 0.195 B) 0.805 C) 0.442 D) 0.67

12. What is the value of **B*?
A) 2.58 B) 6.67 C) 3.60 D) 3.95

13. What is the value of **D*?
A) 172.25 B) 152.42 C) 140.03 D) 168.48

14. What is the value of **E*?
A) 9.35 B) 3.06 C) 9.82 D) 22.96

QUESTIONS 15 THROUGH 16 ARE BASED ON THE FOLLOWING INFORMATION:

Consider the following model: $Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \gamma Y_{t-1}$. Suppose we increase X_1 by one unit in time period t, with all other independent variables in the model held fixed.

15. What is the total expected increase in the dependent variable over time period t and all future time periods?
A) $\beta_1/(1-\gamma Y_{t-1})$ B) $1/(1-\gamma)$ C) $\beta_1/(1-\gamma)$ D) $(1-\gamma\beta_1)/(1-\gamma)'$

16. What is the expected increase in the dependent variable in time period (*t*+1)?
A) $\beta_1\gamma$ B) $\beta_1\gamma^3$ C) $\beta_1\gamma^2$ D) $\beta_1+\beta_0$

Part II: Applied Questions (20%: 2*10%)

1. Random samples of 20000 people in the Kaohsiung and in Taipei indicated that 85% of the people in the Kaohsiung and 95% of the people in Taipei were positive about the future economy. Does this provide strong evidence at the 5% significance level that the people in Kaohsiung are more pessimistic about the economy? [Hint: Prob(z<1.96)=0.975; Prob(z<1.645)=0.95]

2. You are comparing the precision of two brands of stamping machines. From a random sample of 12 units of output from the Brand A machine, you find that it produces with a standard deviation of 15. For the Brand B machine, in a sample of 20 units of output, you find a standard deviation of 10. Is this sufficient evidence at the 5% significance level to conclude that Brand B machines produce with lower variance? Assume that the output of both machines follows a normal distribution. [Hint: Prob($F_{11,19}$>2.38)=0.05; Prob($F_{12,20}$>2.28)=0.05]