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University & Colleges**

FINAL  
Examination Paper

(COVER PAGE)

Session : APRIL 2017

Programme : Diploma in Business (DIB)  
Diploma in Information and Communication Technology (DICTN)

Course : STA1101: Quantitative Methods

Date of Examination : 01 August, 2017 (Tuesday)

Time : 2:00pm – 4:00pm Reading Time : Nil

Duration : 2 Hours

**Special Instructions** :

Answer any **FOUR (4)** questions.

Materials permitted : Non-Programmable Calculator

Materials provided : Formula Booklet 2 and Graph Paper

Examiner(s) : Hatin Fatihah, S.M Elizabethrani, Dinesh Kumar, Foo Kai Pin ,  
Bark Chee Beng, Fang Yen Yen, Billy Siew and Dr. Vignes

Moderator : Dr Ng Set Foong

*This paper consists of 8 printed pages, including the cover page*

DIPLOMA IN BUSINESS PROGRAMME (DIB)  
STA1101 : QUANTITATIVE METHODS  
FINAL EXAMINATION: APRIL 2017 SESSION

**Instruction:** This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

**Question 1**

- (a) A new weight-watching company, WWC, advertises that those who join will lose, on average, 10 pounds the first two weeks. A random sample of 50 people who joined the new weight reduction program revealed the mean loss to be 9 pounds with a standard deviation of 2.8 pounds. At 0.05 level of significance, can we conclude that those joining WWC will lose less than 10 pounds on average?

(8 marks)

- (b) In a restaurant, 30% of the customers choose steak for the main course. If a customer chooses steak, the probability that he will choose ice cream to follow is 0.6. If he does not choose steak, the probability that he will choose ice cream is 0.2.

- (i) Use tree diagram to illustrate the above possible outcomes with respective probabilities.

(3 marks)

- (ii) If a customer is chosen and this customer is following with ice cream, find the probability that the customer just finished steak as main course.

(3 marks)

- (c) A study was conducted to investigate the effectiveness of lavender essential oil in reducing stress. Results for randomly selected subjects are shown in the table are scale of stress before using the essential oil and after using essential oil.

Subject	A	B	C	D	E	F	G	H
Before	6.6	6.5	9	10.3	11.3	8.1	6.3	11.6
After	6.8	2.4	7.4	8.5	8.1	6.1	3.4	2.0

Are the stress scale measurements, on average, lower after using lavender essential oil? Test at  $\alpha=0.05$ .

(11 marks)

### Question 2

- (a) A car manufacturer wanted to investigate how the price of one of its car model depreciates with age. The research department of the company took a sample of eight cars of this model and collected the following information on the ages (in years) and prices (in thousands of dollars) of these cars.

Age (years)	8	3	6	9	2	5	6	3
Price (\$'000)	1.8	9.4	5	2.1	10.8	4.2	3.6	9.9

- (i) On a graph, draw a scatter diagram of prices on ages of cars. Comment on the relationship between ages and prices of cars.  
 (5 marks)
- (ii) Find the equation of the linear regression line that can be used to estimate the price of a given car's age.  
 (5 marks)
- (iii) Calculate the correlation coefficient between the above two variables. Comment on your result.  
 (4 marks)
- (iv) Estimate the price of an 18-year-old car of this car model. Comment on this finding.  
 (3 marks)

- (b) The prices of three types of tablets sold and the respective quantities of tablets sold in the year 2014 and 2015 are shown in the table below:

Type of tablets	Year 2014		Year 2015	
	Price per unit (RM)	Quantity (units)	Price per unit (RM)	Quantity (units)
Type A	250	180	280	250
Type B	1200	80	1540	120
Type C	840	100	750	150

- (i) Calculate Laspeyres price index, using year 2014 as the base year. Comment.  
(4 marks)
- (ii) Calculate Paasche quantity index, using year 2014 as the base year. Interpret.  
(4 marks)

### Question 3

- (a) The following data indicates the weights of selected 30 cultured fishes (rounded to nearest, gm) at the end of 4 weeks in a pond.

Weight (gm)	Number of fishes
15 - 18	3
19 - 22	5
23 - 26	15
27 - 30	5
31 - 34	2

Construct a table with the related columns for the following calculations.

(3 marks)

Calculate

- (i) mean and standard deviation, (5 marks)

- (ii) mode for the weight of those 30 fishes. (3 marks)

Draw a cumulative frequency curve on a graph paper. (4 marks)

Estimate from the cumulative frequency curve,

- (iii.) median, (2 marks)

- (iv.) value of  $x$ , if it is known that 40% of the fishes weight more than  $x$  gm. (3 marks)

- (b) There is a game called “Blue in a Basket”. Two red balls and 5 blue balls are placed into a bag and the rule is the player needs to transfer the balls from the bag into a basket one at a time using mouth while being blindfolded. The player will be needed to stop when there is a blue ball in the basket. The winner will be considered if the least ball in the basket. Let  $X$  is number of red balls in the basket. Construct a probability distribution.

(5 marks)

#### Question 4

- (a) A medical researcher wishes to see whether the pulse rates of smokers are higher than the pulse rates of nonsmokers. Sample of 42 smokers and 36 nonsmokers are selected. The results are shown below.

	Smokers	Nonsmokers
Sample mean	90	88
Sample size	42	36

Test at 5% significance level, whether there is enough evidence to conclude that smokers have higher pulse rates than nonsmokers. Assume the population variance of the distribution of pulse rates are equal for the smokers and nonsmokers, where  $\sigma^2=25$ .

(8 marks)

- (b) The XXY Telephone Company claims in its annual report that “the typical customer spends \$60 per month on local service on average”. A sample of 12 subscribers revealed the following amounts spent last month.

\$64 \$66 \$64 \$66 \$59 \$62 \$67 \$61 \$64 \$58 \$54 \$66

- (i) What is the point estimates of population mean and population standard deviation? (5 marks)
- (ii) Construct a 90% confidence interval for population mean. (4 marks)
- (iii) Using 5% significance level, can we reject the company claim? (8 marks)

**Question 5**

(a) A market research company has studied the quality of after-sales service provided by 100 electrical retailers in a region. The findings are summarized below:

	B	B
A	Good service	Poor service
High street chain	36	28
Independent retailer	26	10

If a retailer is selected at random, determine the probability that the retailer

- (i) gives poor service, (1 mark)
- (ii) is independent and gives good service, (1 mark)
- (iii) is a high street chain or gives good service, (2 marks)
- (iv) gives poor service given that the selected retailer is part of a high street chain. (3 marks)

(b) The probability distribution of a discrete random variable X is shown in the following table.

X	1	2	3	4	5
P(X=x)	5a	4a	0.1	0.1	a

- (i) Determine the value of a. (2 marks)
- (ii) Find P(X>3). (2 marks)

- (iii) Calculate the expectation and standard deviation of  $X$ . (6 marks)
- (c) Thirty percents of the students in UniX College is in favor of a ban on drinking in the dormitories. Suppose 30 students are to be randomly selected from the college.
- (i) Find the probability that exactly 8 favor the ban. (2 marks)
- (ii) Find the probability that fewer than three favor the ban. (3 marks)
- (iii) The expected number and standard deviation of students favor the ban. (3 marks)

#### Question 6

- (a) In a certain population of females, height is normally distributed with a mean of 160 cm and a variance of  $6^2$  cm<sup>2</sup>.
- (i) If a woman is selected, find the probability that she is shorter than 150 cm. (5 marks)
- (ii) If a woman is selected, find the probability her height is 155 cm to 170 cm. (6 marks)
- (iii) It is believed that a woman who is higher than 150 cm only can pass the first audition for modelling. If 300 women are selected, how many of them are expected to fail the first audition for modelling? (2 marks)

- (b) A survey was undertaken to investigate whether or not there had been a change in business confidence due to the economy slow down experienced by many industries over the past 6 months. Three hundred companies were randomly selected and were asked whether confidence in future prosperity of their companies had increased, decreased or remained the same. The results re given below:

Business Confidence	Type of Company		
	Manufacturing	Retailing	Financial Services
Increased	20	40	20
Decreased	90	40	30
Remained	10	20	30

Use a  $\chi^2$  test at 5% significance level to test whether there is any dependency between business confidence and type of company.

(12 marks)

~ THE END ~

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