

FINAL
Examination Paper

(COVER PAGE)

Session	:	<u>APRIL 2019</u>
Programme	:	<u>Diploma in Business (DIB)</u> <u>Diploma in Information Technology (DITN)</u> <u>Diploma in Information and Communication Technology (DICTN)</u>
Course	:	<u>STA1101: Quantitative Methods</u>
Date of Examination	:	<u>1 August 2019, (Thursday)</u>
Time	:	<u>8:00am – 10:00am</u> Reading Time : <u>Nil</u>
Duration	:	<u>2 Hours</u>
Special Instructions	:	
		<u>Answer any FOUR (4) questions</u>
Materials permitted	:	<u>Non-Programmable Calculator</u>
Materials provided	:	<u>Formula Booklet 2 and Graph Paper</u>
Examiner(s)	:	<u>Hatin Fathihah, Abdullah Sholehin, Dinesh Kumar, Billy Siew Woo</u> <u>Bing, Choong Yin Ling, Tan Yun Lee, Nor Aliza and S.M. Elizabethrani</u>
Moderator	:	<u>Dr Ng Set Foong</u>

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

DIPLOMA IN BUSINESS PROGRAMME (DIB)
DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME
(DICTN)
DIPLOMA IN INFORMATION AND TECHNOLOGY PROGRAMME (DITN)
STA1101: QUANTITATIVE METHODS
FINAL EXAMINATION: APRIL 2019 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 on 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?

(9 marks)

- (b) There is a booth that has two spins. One spin has 10 equal slices with 6 red slices, 3 blue slices and the rest is yellow. The other spin has 5 equal slices with number 1 to 5 written on the slices, respectively. If a person spins the spins, what is the probability the person:

- (i) gets yellow on the first spin and number 1 on the second spin?

(2 marks)

- (ii) gets red on the first spin and odd number on the second spin or blue on the first spin and even number on the second spin?

(3 marks)

- (c) A study was conducted to investigate the effectiveness of lavender essential oil in reducing stress. Results for randomly selected subjects that are shown in the following 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 student is investigating the relationship between the price (in RM) of 100 grams of chocolate and the percentage of cocoa solids (%) in the chocolate. The following table gives the results:

Percentage of Cocoa (%)	10	20	30	35	40	45	50	60	70
Price (RM)	35	55	40	100	60	85	90	110	130

- (i) Plot a scatter diagram of price on percentage of cocoa on a graph paper. Comment on the relationship between the two variables. (4 marks)
- (ii) Compute the coefficient of correlation and interpret. (4 marks)
- (iii) Find the least square regression equation that can be used to estimate the price on the percentage of cocoa solids in the chocolate. (5 marks)
- (iv) Calculate the coefficient of determination of the model.
Comment on your answer. (2 marks)
- (v) Estimate the price, if 65% of cocoa solids are in the chocolate. (2 marks)

- (b) The price of three types of tablets sold and the respective quantities of tablets sold in the year 2017 and 2018 are shown in the table below:

Type of tablets	Year 2017		Year 2018	
	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 2017 as the base year. (4 marks)
- (ii) Calculate the Paasche quantity index, using year 2017 as the base year. (4 marks)

Question 3

- (a) The following data indicate the weights of all 30 cultured fish (rounded to nearest gm) at the end of 4 weeks in a pond.

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

- (i) Construct a table with related columns for the following calculations. (3 marks)
- (ii) Calculate the mean and standard deviation of the weight of the fish. (5 marks)
- (iii) Find the mode of the weight of the fish. (3 marks)

- (iv) Draw a cumulative frequency curve on a graph paper. (5 marks)

Estimate from the cumulative frequency curve,

- (v) median. (2 marks)
 (vi) value of x , if it is known that 40% of the fish weight more than x gm. (3 marks)

- (b) Identify each variable of the following as discrete or continuous.

- (i) the volume of milk produced by a cow. (1 mark)
 (ii) the number of daily admissions to a general hospital. (1 mark)
 (iii) the number of students who scored A in Statistics exam. (1 mark)
 (iv) the diameter of PVC pipe. (1 mark)

Question 4

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

	Smokers	Nonsmokers
Sample mean	90	88
Sample size	42	36

Test at 1% significance level, whether there is enough evidence to conclude that smokers have higher pulse rates than nonsmokers. Assume the population variances of the distribution of pulse rates for the smokers and nonsmokers are equal where $\sigma^2=25$.

(9 marks)

- (b) Packets of ground coffee have a nominal weight of 200 grams. A random sample of 15 packets had the following weights:

214 207 189 211 203
 183 219 214 203 197
 221 217 184 186 198

- (i) Find the best unbiased estimate for mean and standard deviation. (3 marks)
- (ii) Construct a 99% confidence interval for the population mean weight of ground coffee packets. (4 marks)
- (iii) The manufacturer claimed that the mean weight of a ground coffee packet is no less than 200 grams. Test at 10% significance level if this claim is true. (9 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:

	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 number of car sold per day for a particular month 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 the probability of at least 4 cars are sold in a day. (2 marks)

(iii) Calculate the expected value and standard deviation of number of car sold in a day.
(6 marks)

(c) Thirty percent of the students in UniX College are 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) The weight, in grams, of baked beans in a tin is normally distributed with a mean of 202 and a standard deviation of 7.5.

(i) Find the probability that a tin has weight less than 200 grams. (4 marks)

(ii) Find the probability that a tin has weight more than 208 grams. (4 marks)

(iii) Suppose that a sample of 25 tins is selected at random, what is the probability that the mean weight of the tins is between 200 grams and 205 grams? (5 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 are given as below:

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

Use a χ^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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