INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**APRIL 2018**
Programme	:	Diploma in Business (DIB) Diploma in Information and Communication Technology (DICTN)
Course	:	**STA1101: Quantitative Methods**
Date of Examination	:	July 31, 2018 (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)	:	**Dinesh Kumar Govindasamy**, Foo Kai Pin, Bark Chee Beng, Dr Narderjit Singh, Billy Siew Woo Bing, Nor Aliza, S.M Elizabeth, and Fang Yen Yen
Moderator	:	Dr Ng Set Foong

This paper consists of 7 printed pages, including the cover page

DIPLOMA IN BUSINESS PROGRAMME (DIB)
DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME (DICTN)
STA1101: QUANTITATIVE METHODS
FINAL EXAMINATION: APRIL 2018 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 sample of shoppers at the BSC mall was asked the following questions. Identify the type of data (either qualitative or quantitative) each question would produce.

(i) Which state are you from? (1 mark)

(ii) How much did you spend? (1 mark)

(iii) What is your mode of transport? (Ex: Car, bike, bus) (1 mark)

(b) The gross hourly earnings of a group of workers randomly selected from the payroll list of a large industrial concern were organized into the following frequency distribution:

Hourly earnings	Number of workers
\$8 – \$10	11
\$10 – \$12	17
\$12 – \$14	32
\$14 – \$16	27
\$16 – \$18	13

(i) Construct a table with the related columns for the calculations in part (ii). (3 marks)

(ii) Calculate the following:

a. Mean. (2 marks)

b. Standard deviation. (3 marks)

c. Mode. (4 marks)

(iii) Draw a cumulative frequency polygon on a graph paper. (3 marks)

(iv) Estimate from the cumulative frequency polygon,

a. the median. (2 mark)

b. the number of workers who earns between \$13 and \$15 an hour. (3 marks)

c. the value of x, if it is known that 65% of the workers earns more than \$ x an hour. (2 marks)

Question 2

(a) After watching a number of children playing games at a video arcade, a teacher estimated the following probability distribution of X, the number of games played per visit.

X	1	2	3	4	5
P(X = x)	0.05	0.15	0.35	0.3	p

(i) Find the value of p. (2 mark)

(ii) Find the probability of children playing at least 2 games per visit. (2 marks)

(iii) Find the mean and standard deviation of number of games played per visit. (4 marks)

(b) The following table shows the relationship between the method of payment and the price category during a recent sale in a departmental store.

Amount spent	Cash	Debit/Credit card
Less than RM100	80	30
RM100 – RM 200	45	65
More than RM 200	10	40

(i) Find the probability that a purchase more than RM200 or by cash is made. (2 marks)

(ii) Find the probability that a purchase made by debit/credit card and the amount spent in between RM 100 – RM 200. (2 marks)

(iii) Find the probability that a purchase is made by cash given that the purchase is between RM100 and 200. (2 marks)

(c) Jason and Lisa are planning an outdoor reception following their wedding. They estimate that the probability of bad weather is 0.25, that of a disruptive incident is 0.15, and that a bad weather and a disruptive incident will occur is 0.08. Assuming these estimates are correct

(i) Find the probability that their reception will suffer bad weather or a disruptive incident. (2 marks)

(ii) Find the probability that their reception will suffer bad weather and it will not be a disruptive incident. (3 marks)

(d) Given that $P(A) = 0.3, P(B) = 0.4$ and $P(A|B) = 0.2$, find

(i) $P(A \cap B)$. (2 marks)

(ii) $P(A \cup B)$. (2 marks)

(iii) $P(A \cap \bar{B})$. (2 marks)

Question 3

(a) Based on records, the main printer in an office is operating properly 95% of the time. Suppose inspections are made at 12 randomly selected printers.

(i) What is the probability that the main printer is operating properly for more than 10 inspections? (3 marks)

(ii) What is the probability that the main printer is not operating properly in at least 1 inspection? (3 marks)

(b) The length of time of international telephone calls has mean of 19 minutes and standard deviation of 3 minutes. Suppose a sample of 25 telephone calls is used to reflect on the population of all international calls. What is the chance that the mean of the calls is between 18 and 20.5 minutes? (4 marks)

(c) The number of typographical errors in new editions of textbooks is Poisson distributed with a mean of 1.5 per 100 pages. What is the probability that there are at most 2 typographical errors in a randomly selected 200 pages of a new book? (4 marks)

(d) Ten employees were sent to a course on customer relation and they were evaluated. The following table gives the scores before and after they attend the course. Test at 5% significance level whether attending the course increases the mean score of the employees.

Before	8	5	4	9	6	9	5	7	6	5
After	10	8	5	11	6	7	9	10	7	8

(11 marks)

Question 4

(a) Lengthways of KEPAS Highway, the speed limit is 90 km/hr. A number of accidents were being reported lately along this highway. Fifteen cars were randomly clocked for speed by state police and their speeds were recorded.

110	**125**	**122**	**128**	**113**
90	**100**	**130**	**140**	**115**
120	**122**	**119**	**95**	**109**

(i) Find the best unbiased estimate for mean and standard deviation. (3 marks)

(ii) Construct a 95% confidence interval for the population mean speed of the cars traveling on this stretch of highway. (5 marks)

(iii) It has been claimed that the mean speed of a car that travels using KEPAS Highway is more than 120 km/hr. Test at 1% significance level if this claim is true. (6 marks)

(b) The length of components produced by a company are approximated by a normal distribution model with a mean of 4cm and a standard deviation of 0.05cm. If a component is chosen at random,

(i) what is the probability that the length of this component is less than 4.04cm? (3 marks)

(ii) what is the probability that the length of this component is between 3.98cm and 4.02cm? (4 marks)

(iii) find the value of k, if 5% of the components are more than k cm. (4 marks)

Question 5

(a) Below are the data of starting salaries for 2014 college graduates with Economics and Business major.

Economics major	Business major
$\bar{x} = RM\ 30{,}000$ per annum	$\bar{x} = RM\ 35{,}500$ per annum
$\sigma = RM\ 200$	$\sigma = RM\ 300$
$n = 100$	$n = 100$

Test at 10% significance level if the population means of the graduates are different.

(7 marks)

(b) A contingency table below shows the results of random samples of students in three colleges A, B and C on taking a certain examination.

College / Result	A	B	C
Pass	25	20	21
Fail	10	15	14

Use x^2 test to determine whether there is any evidence of association between the colleges and the passing rate in the examination by using 5% level of significance. (12 marks)

(c) The manager of a grocery store wants to determine whether the mean waiting time of all customers is more than 3 minutes. He has taken a random sample of 100 customers. He found that the average length of waiting time was 3.5 minutes with a standard deviation of 0.5 minutes. Test this hypothesis at $\alpha = 0.05$.

(6 marks)

Question 6

(a) The prices of prawns, local chicken and fish and the consumption of these items for a group of customers for 2009 and 2018 are as follows:

	2009		2018	
	Price per kg	Quantity	Price per kg	Quantity
Prawns	RM 9.50	25	RM 32.00	30
Local chicken	RM 9.00	24	RM 18.00	20
Mackerel fish	RM 10.50	20	RM 30.00	18

(i) Calculate a Laspeyres price index for 2018, using 2009 as the base year. (4 marks)

(ii) Calculate a Paasches quantity index for 2018, using 2009 as the base year. (4 marks)

(b) A company was set up 4 years ago when it purchased new machines. The following data shows the estimated current value of this equipment compared with the purchase price.

Machine	Purchase price,X (RM '000)	Current value,Y. (RM '000)
A	56	19
B	20	7
C	36	13
D	42	15
E	25	13
F	18	6
G	31	11
H	45	16

(i) Draw a scatter diagram on a graph paper, current price on purchase price. Comment on the relationship between these two variables. (3 marks)

(ii) Determine the least square regression equation that can be used to estimate the current price on the purchase price of machines. (5 marks)

(iii) Find the correlation of coefficient and comment on the strength of correlation that exists between the two variables. Comment on your answer. (4 marks)

(iv) Calculate the coefficient of determination of the model. Comment on your answer. (3 marks)

(v) Estimate the current price, if the purchase price is RM 40,000. (2 marks)

~ The End ~