INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**AUGUST 2019**
Programme	:	Diploma in Business (DIB) Diploma in Information Technology (DITN) Diploma in Information and Communication Technology (DICTN)
Course	:	**STA1101: Quantitative Methods**
Date of Examination	:	December 10, 2019 (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,** Hatin Fatihah, Billy Siew Woo Bing, Goh Chok Huat, Dr Narinderjit, S.M. Elizabethrani, and Bak Chee Beng
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)
DIPLOMA IN INFORMATION AND TECHNOLOGY PROGRAMME (DITN)
STA1101: QUANTITATIVE METHODS
FINAL EXAMINATION: AUGUST 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) The following data shows the starting salary annually of selected 50 Bachelors of Business Administration graduates:

Annual Salary (RM '000)	Number of graduates
20 – 25	1
25 – 30	7
30 – 35	13
35 – 40	15
40 – 45	9
45 – 50	3
50 – 55	2

(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. Variance and standard deviation. (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 marks)

b. the 1st quartile (Q1) and 3rd quartile (Q3), and hence calculate interquartile range of the starting salary of the graduates. (4 marks)

c. the number of graduates with a starting salary of more than RM 45,000 per annum. (2 marks)

(v) Construct a 95% confidence interval for the true population mean of the selected graduate's starting salary. (5 marks)

(Total: 25 marks)

Question 2

(a) The table below shows the number of intercity shipment orders arriving daily at a transportation company.

X	0	1	2	3	4	5
P(X = x)	0.1	0.2	0.4	p	p	p

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

(ii) Find the probability of at least 2 shipment arrive in a given day. (2 marks)

(iii) Compute the mean and standard deviation of the number of intercity shipment orders arriving daily. (4 marks)

(b) The table below shows the results of random samples of students in three colleges P, Q and R on taking a certain examination.

College / **Result**	**P**	**Q**	**R**
Pass	125	120	120
Fail	110	115	110

(i) Find the probability if a student chosen at random is from college Q or student who pass the exam. (2 marks)

(ii) Find the probability if a student chosen at random is from college R and fails the exam. (2 marks)

(iii) Find the probability if a student chosen at random has passed the exam given that the student is from college P. (2 marks)

(c) A box contains 25 apples, of which 20 are red and 5 are green. Of the red apples, 3 contain maggots and of the green apples, 1 contains maggot. If two apples are chosen at random from the box without replacement, find

(i) the probability both apples contains maggots. (2 marks)

(ii) the probability that both apples are of different colors and contains maggots. (3 marks)

(d) Given that $P(\bar{A}) = \frac{3}{4}, P(A \cup B) = \frac{2}{3}$ and $P(B|A) = \frac{1}{3}$, find

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

(ii) $P(B)$. (2 marks)

(iii) $P(A|B)$. (2 marks)

(Total: 25 marks)

Question 3

(a) FedEx Delivery service, providing high quality service to customers is the top priority. The company guarantees a refund of all chargers if a package does not arrive at its destination by the specified time. It is known from past data that despite all efforts, 10% of the packages mailed through this company do not arrive at their destination within the specified time. Suppose a corporation mails 10 packages through FedEx Delivery Service.

(i) Find the probability that less than 2 packages will not arrive at their destination within the specified time. (3 marks)

(ii) Find the probability that at least 9 packages will arrive at their destination within the specified time. (3 marks)

(b) The length of time of an international telephone calls has mean of 12 minutes and standard deviation of 4 minutes. Suppose a sample of 100 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 11 and 13 minutes? (4 marks)

(c) Vehicles pass through a junction on a busy road at an average rate of 300 per hour. By using the Poisson distribution, find the probability that less than 3 cars pass through the junction in a given minute. (4 marks)

(d) An industrial engineer is evaluating a new technique to assemble a car engines. A sample of 8 employees is selected at random and the number of compressors they each produce in one month using the existing procedure is recorded. The same 8 workers are then trained to use the new technique, and the output for one month is then noted. The data are given as follows:

Employee	Output before new technique	Output after new technique
A	80	85
B	88	88
C	76	80
D	90	93
E	74	83
F	70	73
G	81	82
H	83	83

Test at the 5% level of significance that there is a significance increase on the output using the new technique. (11 marks)

(Total: 25 marks)

Question 4

(a) A baker keeps count of the number of doughnuts sold each day of a selected 18 consecutive days. The numbers are

35	**47**	**34**	**46**	**55**	**51**
82	**41**	**35**	**47**	**51**	**45**
56	**75**	**38**	**41**	**44**	**74**

(i) Find the best unbiased estimate for mean and standard deviation. (2 marks)

(ii) Construct a 95% confidence interval for the population mean, the number of doughnuts sold by the baker. (5 marks)

(iii) It has been claimed that the mean number of doughnuts sold each day is to be less than 50 doughnuts. Test at 5% significance level if this claim is true. (6 marks)

(b) The mass of a small loaf of bread is normally distributed with a mean of 500g and a standard deviation of 20g.

(i) Find the probability that a randomly chosen loaf has a mass of more than 510g. (4 marks)

(ii) Find the probability that a randomly chosen loaf has a mass in between 450g to 520g. (5 marks)

(iii) Find the value of P, if 5% of the loaf of bread are more than P gram. (3 marks)

Question 5

(a) A supermarket suspects that the average weight of a grade A melons from supplier X is less than grade A melons from supplier Y. Below are the summarized results taken from each of the suppliers.

Supplier A	Supplier B
$\bar{x}$ =4.5kg	$\bar{x}$ =5kg
σ =0.1kg	σ =0.2kg
$n = 82$	$n = 78$

Test at 5% significance level if the population mean weights of grade A melons from supplier X is less than supplier Y.

(7 marks)

(b) The table below shows the type of industry that students majoring in accounting and administration joined upon graduation.

Degree Major	Industry		
	Banking	**Finance**	**Insurance**
Accounting	30	15	15
Administration	30	30	20

Test at 1% level of significance whether there is an association between degree major and industry joined. (12 marks)

(c) A researcher reports that the average salary of private school teachers is more than RM 4,000. A sample of 40 private school teachers has a mean salary of RM 4,260 and the standard deviation of the population is RM 230. At $\alpha = 0.05$, test the claim that school teachers earn more than RM 4,000 a month.

(6 marks)

(Total: 25 marks)

Question 6

(a) Below are the prices of shampoo (500ml), cough tablets (package of 100), and antiperspirant (45g) for August 2001 and August 2005. Also included are the quantities purchased. Use August 2001 as the base year.

Item	August 2001		August 2005	
	Price(RM)	**Quantity**	**Price(RM)**	**Quantity**
Shampoo	3.29	4	3.59	5
Cough tablets	1.79	2	2.79	3
Antiperspirant	2.29	3	3.79	4

(i) Determine the simple price index. (3 marks)

(ii) Determine the Paasche's price index for 2005, using 2001 as the base year.

(4 marks)

(b) For 12 consecutive months a factory manager recorded the number of items produced by the factory and their total cost of their production. The following table summarizes the manager's data.

Month	Number of items In thousands.	Production cost ($ '000).
JAN	18	37
FEB	36	54
MAR	45	63
APR	22	42
MAY	69	84
JUN	72	91
JUL	13	33
AUG	33	49
SEPT	59	79
OCT	79	98
NOV	10	32
DEC	53	71

(i) Draw a scatter diagram on a graph paper, production cost on the number of items. Comment on the relationship between these two variables. (4 marks)

(ii) Determine the least squares regression equation that can be used to estimate the production cost on the number of items. (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 production cost, if 100 items were produced. (2 marks)

(Total: 25 marks)

~The End~