INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**AUGUST 2017**
Programme	:	Diploma in Business (DIB) Diploma in Information and Communication Technology (DICTN)
Course	:	**STA1101: Quantitative Methods**
Date of Examination	:	12 December, 2017 (Tuesday)
Time	:	2:00 pm – 4:00 pm 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)	:	**Foo Kai Pin**, S.M Elizabethrani, Dinesh Kumar, Hatin, Bark Chee Beng, Angeline Tan, Fang Yen Yen and Billy Siew
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: AUGUST 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) Sam started up a company that has developed a drug that is supposed to increase IQ. Sam knows that the standard deviation of IQ in the general population is 15. Sam tested his drug on 36 patients and obtained a mean IQ of 102.96. Using $\alpha=0.01$, is this mean IQ significantly different from the population mean of 100?

(8 marks)

(b) Peter and Shafie applied for a job. The probability that Peter is accepted is 0.75 and the probability that Shafie is accepted is $\frac{1}{3}$. Find the probability that

(i) both of them are accepted. (2 marks)
(ii) only Shafie is accepted. (2 marks)
(iii) only one of them is accepted. (3 marks)

(c) A random sample of ten students was tested before and after being coached in a subject. Their marks are shown as below:

Student	1	2	3	4	5	6	7	8	9	10
Before	53	59	61	48	39	56	75	45	81	60
After	60	57	67	52	61	71	70	46	93	75

At 1% significance level, can you conclude that the coaching is effective in improving the marks scored for the subject?

(10 marks)

Question 2

(a) An investor would like to use the volume of a stock to predict the stock closing price by using a simple linear regression model. He has collected 8 days information on the stock traded volumes and closing prices, as listed in the table below:

Day	1	2	3	4	5	6	7	8
Traded volume (Number of shares)	10,800	12,300	11,800	16,800	18,700	12,500	8,900	6,900
Closing price (RM)	1.28	1.42	1.33	1.65	1.68	1.38	1.08	0.90

(i) Draw a scatter diagram on a graph paper of closing price on traded volume. Comment on the linear relationship. (4 marks)

(ii) Find the equation of the linear regression line of closing price on traded volume. [Note: Leave your coefficients to four significant figures]. (7 marks)

(iii) Using the equation of the linear regression line, estimate the closing price if traded volume were to drop to 1,000 shares in a particular day. Comment on the estimate obtained. (2 marks)

(iv) Calculate the coefficient of correlation for the above data. Comment on your result. (4 marks)

(b) The following data relate to a set of commodities used in a particular process.

Commodity	Unit of purchase	2000		2001	
		Price ($)	Quantity (units)	Price ($)	Quantity (units)
A	2 gallon drum	36	100	40	95
B	1 tonne	80	12	90	10
C	10 pounds	45	16	41	18

(i) Calculate a Laspeyres price index that shows the change in prices between year 2000 and 2001. (Use 2000 as the base year) (4 marks)

(ii) Calculate a Paasche price index that shows the change in prices between year 2000 and 2001. (Use 2000 as the base year) (4 marks)

Question 3

(a) The following table indicates the weights of 30 female students in year 10 that has been grouped into 6 class intervals, each with range 5 kilograms.

Weight (kg)	Number of students
40–44	1
45–49	5
50–54	9
55–59	8
60–64	5
65–69	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 30 female students. (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 30% of the female students whose weight less than x kg. (3 marks)

(b) Let A and B be events such that $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $(A \cup B) = \frac{5}{12}$.

(i) Find $P(A \mid B)$. (2 marks)

(ii) Find $P(A \cap B')$, where B' denotes the complement of B. (2 marks)

(iii) Show that A and B are not independent. (1 mark)

Question 4

(a) The mean lasting time of 2 competing floor waxes are to be compared. Ten floors are randomly assigned to test wax 1. Another 10 floors are randomly assigned to test wax 2. . The following table shows the result.

Wax	Sample Mean Number of Months Floor Wax Last	Population Standard Deviation
1	3	0.33
2	2.9	0.36

Does the data indicate that wax 1 is more effective than wax 2? Test at 5% level of significance. (8 marks)

(b) An outbreak of Salmonella-related illness was attributed to ice cream produced at a certain factory. Scientists measured the level of Salmonella in 9 randomly sampled batches of ice cream. The levels (in MPN/g) were:

0.593 0.142 0.329 0.691 0.231 0.793 0.519 0.392 0.418

(i) What are the point estimates of population mean and population standard deviation? (5 marks)

(ii) Construct a 90% confidence interval for population mean. (4 marks)

(iii) At 5% significance level, is there evidence that the mean level of Salmonella in the ice cream is greater than 0.3 MPN/g? (8 marks)

Question 5

(a) The table shows the number of students who pass or fail a mathematics test.

	Pass	Fail
Boys	12	d
Girls	18	9

(i) Find the probability that a student picked at random from those who pass the test is a boy. (1 mark)

(ii) If two students are picked at random from the girls, find the probability that both of them pass. (2 marks)

(iii) If the probability of picking at random a student who passes the test is 0.6, find the value of d. (3 marks)

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

X	2	3	4	5	6
$P(X=x)$	a	0.3	0.3	$2a$	a

(i) Determine the value of a. (2 marks)

(ii) Find $P(X>3)$. (3 marks)

(iii) Calculate the expected value and standard deviation of X. (6 marks)

(c) In a certain country, the probability that a child born is a female is 0.53. A family is chosen at random from families with 4 children. Find the probability that the family has

(i) exactly two female children. (2 marks)

(ii) at least one female child. (3 marks)

(iii) four female children . (3 marks)

Question 6

(a) The masses of eggs from a farm are normally distributed with a mean of 60g and a standard deviation of 5g.

(i) If an egg is randomly selected, find the probability that the mass of the egg is less than 55g. (3 marks)

(ii) If an egg is randomly selected, find the probability that the mass of the egg is from 55g to 70g. (6 marks)

(iii) It is believed that eggs with a mass more than 70g are sold as grade A. If the farm produces 2500 eggs, how many eggs are grade A? (4 marks)

(b) The production manager of a food products plant claims that absenteeism among workers is more common on some weekdays than on others. The following sample data were recorded last week.

Day	Number Absent
Monday	21
Tuesday	20
Wednesday	16
Thursday	19
Friday	24

Test the hypothesis at the 0.05 significance level that absences occur uniformly over the 5 days.

(12 marks)

~ THE END ~

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