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FINAL
Examination Paper

(COVER PAGE)

Session	:	**AUGUST2018**
Programme	:	Diploma in Business (DIB) Diploma in Information Technology (DITN) Diploma in Information and Communication Technology (DICTN)
Course	:	**STA1101: Quantitative Methods**
Date of Examination	:	12 December 2018, (Wednesday)
Time	:	8:00am – 10:00am 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**, Dinesh Kumar Govindasamy, Bark Chee Beng, Dr Narderjit Singh, Billy Siew Woo Bing, S.M Elizabeth, Si Chong En and Choong Yin Ling
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 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) Identify each of the following as qualitative or quantitative.

(i) Taste of an apple. (1 mark)

(ii) Speed of a car. (1 mark)

(iii) Texture of clothes. (1 mark)

(b) The following table shows the speeds of 100 cars that pass a particular road during one Monday morning:

Speed (km/h)	No. of cars
55 - 59	4
60 – 64	28
65 – 69	36
70 – 74	20
75 – 79	7
80 - 84	5

(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. (3 marks)

(iii) On the graph paper, draw a cumulative frequency polygon for the distribution of the speeds of 100 cars. (3 marks)

(iv) Estimate from the cumulative frequency polygon,

a. the 1st Quartile (Q1) and 3rd Quartile (Q3), and hence calculate Quartile Deviation of the speeds of 100 cars, (5 marks)

b. the number of the cars speeding above 78km/h. (3 marks)

Question 2

(a) A random variable X has the following probability distribution :

x	1	2	3	4
P(X=x)	0.13	b	0.21	0.25

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

(ii) Find $P(X > 2)$. (2 marks)

(iii) Find the mean and variance of X. (4 marks)

(b) A group of primary, secondary and college students were asked which mode of transport they used to travel to school. Their responses are summarised in the following table.

	Car	Bicycle	Bus	Train
Primary	15	20	55	10
Secondary	5	35	40	20
College	50	25	10	15

(i) Find the probability that a randomly selected student travels to school either by bus or car. (2 marks)

(ii) Find the probability that a randomly selected student travels to school by train and is a college student. (2 marks)

(iii) Find the probability that a randomly selected student travels by bicycle given that the student is a primary school student. (2 marks)

(c) A fair die is tossed twice. Find the probability that

(i) both are 3, (1 mark)

(ii) one is 3 and another one is 6, (3 marks)

(iii) the sum of the tosses are 6, (4 marks)

(d) Given that $P(A) = 0.4, P(B) = 0.5$ and $P(A|B) = 0.3$, find

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

(ii) $P(A \cup B)$. (1 mark)

Question 3

(a) The probability that a visitor to a computer shop will buy a computer is 0.25. If 8 people have visited the shop at a certain time, find the probability that

(i) exactly 4 computers are sold. (2 marks)

(ii) more than 2 computers are sold. (4 marks)

(b) The number of complaints received by a customer service of an online business company follow a Poisson distribution with mean 3 complaints in any 2-hour interval.

(i) Find the probability that there will be more than 2 complaints in next 2 hours. (4 marks)

(ii) Find the probability that there will be exactly 4 complaint in 4 hours interval. (3 marks)

(iii) Find the expected number of complaints received within 24 hours of operation. (1 mark)

(c) The manufacturer of a gasoline additive claims that the use of this additive increases gasoline mileage. A random sample of six cars was selected, and these cars were driven for 1 week without the gasoline additive and then for 1 week with the gasoline additive. The following table gives the miles per gallon for these cars without and with the gasoline additive.

Without	24.6	28.3	18.9	23.7	15.4	29.5
With	26.3	31.7	18.2	25.3	18.3	30.9

Using a 5% significance level, can you conclude that the use of the gasoline additive increases the gasoline mileage? (11 marks)

Question 4

(a) Packets of ground coffee have a nominal weight of 200 g. 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. (4 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 more than 200g. Test at 5% significance level if this claim is true. (6 marks)

(b) The weight, in grams, of baked beans in a tin is normally distributed with mean 202 and standard deviation of 7.5.

(i) Find the probability that a tin has weight less than 200 grams. (3 marks)

(ii) Find the probability that a tin has weight more than 208 grams. (3 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)

Question 5

(a) A company claims that its medicine, Brand A, provides faster relief from pain than another company's medicine, Brand B. A researcher tested both brands of medicine on two groups of randomly selected patients. The results of the test are given in the following table. The mean and standard deviation of relief times are in minutes.

Brand A	Brand B
$\bar{x} = 44$	$\bar{x} = 49$
$\sigma = 11$	$\sigma = 9$
$n = 33$	$n = 32$

Test at a 1% significance level whether the mean relief time for Brand A is less than that for Brand B.

(7 marks)

(b) A study is being carried out to determine if there is any association on the preference of language medium used in schools with respect to three different geographical regions. A sample of 200 schools in the three geographical regions were asked which is the preferred language medium used in their schools. A summary of their replies is given in the following table, together with the region in which schools are located.

		Region		
		Northern	Central	Southern
Preferred Language Medium	A	38	27	69
	B	20	16	30

Use chi-square test to answer the question of the interest to the owner by using 5% level of significance. (11 marks)

(c) The masses of durians in a farm are known to be normally distributed. However, the population mean and variance of the masses of durians in the farm are unknown to the farm owner. A random sample of 70 durians collected on a particular day is found to have a mean mass of 220.0 g and standard deviation of 38.2 g. The owner of the farm claims that from his experience, the mean mass of the durians collected in this farm on average is more than 210 g. Test at 5% confidence level if the owner claim is true.

(7 marks)

Question 6

(a) 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)

(b) A student is investigating the relationship between the price, y (in RM) of 100 grams of chocolate and the percentage, x (%) of cocoa solids in the chocolate is given in the following table:

x (%) of cocoa	10	20	30	35	40	45	50	60	70
price, y (RM)	35	55	40	100	60	85	90	110	130

(i) Plot a scatter diagram, y on x, on a graph paper. Comment on the relationship between the two variables. (4 marks)

(ii) Compute the coefficient of correlation and interpret. (6 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. (4 marks)

(iv) Calculate the coefficient of determination of the model. Comment on your answer. (2 marks)

(v) Estimate the price, if the % of cocoa solids in the chocolate is 65. (1 mark)

~ The End ~

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