INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES'

FINAL
Examination Paper

(COVER PAGE)

Session	:	**April 2014**
Programme	:	Diploma In Business (DIB) Diploma In Business Administration (DBADI) Diploma In Information And Communication Technology (DICTN/DICTI)
Course	:	**STA1101: QUANTITATIVE METHODS** **STA2102/2103: BUSINESS STATISTICS**
Date of Examination	:	July 23, 2014
Time	:	8:00am – 10:00am Reading Time: Nil
Duration	:	2 Hours
Special Instructions	:	

Answer any **FOUR (4)** structured-type questions.

Materials permitted	:	Non-programmable Calculator
Materials provided	:	Formula Booklet 2 and Graph paper
Examiner (s)	:	**Ms. Cetha Achutan Nair,** S.M. Elizabethrani, Chan Ah Wah, Billy Siew Woo Bing, Saemila Devi, Hazrina Johari.
Moderator	:	Dr. Ch'ng Pei Eng

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

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN BUSINESS PROGRAMME (DIB)
DIPLOMA IN BUSINESS ADMINISTRATION PROGRAMME (DBADI)
DIPLOMA IN INFORMATION AND COMMUNICATION TECHNILOGY PROGRAMME (DICTN/DICTI)
STA1101/2102/2103 : QUANTITATIVE METHODS / BUSINESS STATISTICS
FINAL EXAMINATION : APRIL 2014 SESSION

Instructions : This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1 (25 marks)

(a) In a survey, 200 shoppers were asked how much they spend in a supermarket on a given visit. The results are shown in the table.

Amount	Frequency
1 – 20	10
21 – 40	32
41 – 60	48
61 – 80	54
81 – 100	36
101 - 120	20

(i) Construct a histogram for the above data. (4 marks)

(ii) Estimate mode from the graph in part (i). (2 marks)

(iii) Calculate the mean amount. (3 marks)

(iv) Calculate the median amount. (4 marks)

(v) Calculate the sample standard deviation. (4 marks)

(b) Define the following terms.

(i) Sample (2 marks)

(ii) Coefficient of correlation. (2 marks)

(c) If $P(A|B) = \frac{2}{5}$, $P(B) = \frac{1}{4}$ and $P(A) = \frac{1}{3}$, find

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

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

Question 2 (25 marks)

(a) A recent study on how a random sample of 670 workers commutes to work revealed the following information.

	Types of worker	
	City	Rural
Automobile	400	200
Public transportation	50	20

If a worker is selected at random, find the probability that the worker

(i) uses public transportation. (1 mark)

(ii) is a rural worker or uses public transportation. (2 marks)

(iii) is a city worker and uses automobile. (2 marks)

(iv) uses public transportation, given that he or she is a city worker. (3 marks)

(b) Given the following sample data for two variables x and y.

x	1	2	3	4	5
y	3	7	5	11	14

(i) Plot a scatter diagram for these data. (4 marks)

(ii) What does the scatter diagram in (i) indicate about the relationship between the two variables ? (2 marks)

(iii) Determine the equation of the least square regression line for the variables. (7 marks)

(iv) Use the estimated regression line to predict the value of y when x = 3.5. (2 marks)

(c) If X is a normal random variable with mean 80 and standard deviation 5, calculate the Z score if X=72. (2 marks)

Question 3 (25 marks)

(a) Given that 5% of Sabah truck drivers are young men who are below the age of 30. Suppose 10 truck drivers are selected randomly to be interviewed about the quality of work conditions.

(i) Find the probability that exactly two of the drivers are young drivers. (3 marks)

(ii) Find the probability that more than eight drivers are above the age of 30. (4 marks)

(iii) Find the average number of drivers who are below the age of 30. (2 marks)

(b) In a certain population of females, heights are normally distributed with a mean of 165 cm and a standard deviation of 8 cm. For a randomly selected female form this population, what is the probability that her height is

(i) less than 167cm? (3 marks)

(ii) between 160 cm and 172 cm? (4 marks)

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

x	1	2	3	4	5
P(x)	0.05	0.35	0.15	0.25	0.20

(i) What is the probability that a child will play more than three games? (2 marks)

(ii) Compute the mean of the number of games per visit. (3 marks)

(iii) Compute the variance of the number of games per visit. (4 marks)

Question 4 (25 marks)

(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 indexes for August 2005. (3 marks)

(ii) Determine the Paasche price index for August 2005. (4 marks)

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

	Industry		
Degree Major	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. (10 marks)

(c) The manager of a battery manufacturing factory needs to estimate the average life of a certain type of battery before being charged. The standard deviation is known to be 50 hours. A random sample of 80 batteries indicated an average life of 340 hours.

(i) Set up a 95% confidence interval estimate of the true average life of batteries. (4 marks)

(ii) Suppose that the process is improved so that the standard deviation is reduced to 30 hours. What would be your answer in (a)? What happens to the width of the confidence interval? (4marks)

Question 5 (25 marks)

(a) A report states that the average salary of private school teachers is more than \$4,000 per month. A sample of 40 private school teachers has a mean salary of \$4,260 and the standard deviation of the population is \$230. At the 0.05 level of significance, is there sufficient evidence to conclude that that the average salary has increased?

(6 marks)

(b) Mensa is an organization whose members possess IQ that is in the top 2% of the population. It is known that IQs are normally distributed with a mean of 100 and a standard deviation of 16. Find the minimum IQ needed to be a Mensa member.

(4 marks)

(c) The mass of tea in "APS" teabags has a normal distribution with mean 40g and standard deviation of 4g. If a random sample of 25 "APS" teabags is drawn at random, find the probability that the sample mean mass will be

(i) 41.4g or more, (3 marks)

(ii) between 38.7g and 40.7g. (4 marks)

(d) A company is involved in a market research survey. The analyst gathers a random sample of 800 orders which were delivered in a given month. Of these orders, 320 went to customers aged under 21.

(i) What is the point estimate of the population proportion? (2 marks)

(ii) Construct a 95% confidence interval for the percentage of all orders that are delivered to the customers aged under 21.

(4 marks)

(e) A box contains 20 spark plugs, of which 6 are substandard. If two plugs are selected from the box without replacement, what is the probability that both will be substandard?

(2 marks)

Question 6 (25 marks)

(a) Consider a tire manufacturer who wishes to estimate the difference between the mean lives of two types of tires, Type A and Type B, as a prelude to a major advertising campaign. A sample of 100 tires is taken from each production process. The sample mean lifetimes are 30100 and 25200 miles respectively for tires Type A and Type B. The sample variances are 1500000 and 2400000 miles squared respectively. Is there any difference between the mean lives of the two types of tires at the 1% level of significance?

(7 marks)

(b) Mrs. Ann wanted to determine whether playing soft music affects the Mathematic results of her 10 students. The data were as follows:

Student	With music	Without music
1	78	79
2	82	86
3	76	85
4	95	97
5	65	54
6	92	96
7	65	89
8	82	94
9	58	64
10	87	89

Conduct a paired sample t-test and conclude whether playing soft music affect the results of the students. Use $\propto = 0.05$.

(12 marks)

(c) Calculate the variance and standard deviation for samples where

n =10, $\sum x^2 = 84$, $\sum x = 20$ (3 marks)

(d) Classify the following data as either discrete or continuous.

(i) The number of freshmen entering college in a certain year is 621.

(ii) Number of doughnuts sold by King Bakery

(iii) Water temperature of a swimming pool.

(3 marks)

-The End-

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