INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**August 2014**
Programme	:	Diploma In Business (DIB) Diploma In Finance (DIF) Diploma In Business Administration (DBADI)
Course	:	**STA1101: QUANTITATIVE METHODS** **STA2102: BUSINESS STATISTICS**
Date of Examination	:	December 10, 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

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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 FINANCE (DIF)
DIPLOMA IN BUSINESS ADMINISTRATION PROGRAMME (DBADI)
STA1101/2102: QUANTITATIVE METHODS / BUSINESS STATISTICS
FINAL EXAMINATION: AUGUST 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

(a) The amounts of money spent by all 50 customers at a supermarket for a particular day are summarized in the following table.

Amount Spent ($)	Number of Customers
1 – 50	3
51 – 100	6
101 – 150	7
151 – 200	12
201 – 250	14
251 – 300	8

Construct a table with the related columns for the following calculations. (3 marks)

Calculate

i) mean, (2 marks)

ii) standard deviation, and (3 marks)

iii) mode of the above distribution (3 marks)

Draw a cumulative frequency curve on a graph paper. (4 marks)

Estimate from the cumulative frequency curve,

iv) the median (2 marks)

v) the value x, if it is known that 20% of the customers who spent more than \$ x. (3 marks)

(b) The events A and B are such that $P(A)=0.4$, $P(A|B)=0.25$ and $P(B|A)=0.2$. Find

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

ii) $P(A \cup B)$ (3 marks)

Question 2

(a) A certain part of equipment is produced in a factory using three machines, A , B and C. The machines A, B and C produce 30%, 45%, 25% respectively of total parts required. It is known that 5%, 2%, 6% of the parts produced by the machines A, B and C respectively are defective.

(i) Draw a tree diagram to represent all possible outcomes. (3 marks)

(ii) If a finished part is randomly picked, find the probability that it is a defective part from machine B. (2 marks)

(iii) If a defective part is found in the production floor, find the probability that it is produced by machine C. (4 marks)

(b) A number of students from Sabah College were grouped according to their reading ability and education. The table shows the results.

	Reading ability		
Education	Low	Average	High
Diploma holder	6	18	43
Did not hold a diploma	27	16	7

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

(i) the student has an average reading ability or holding a diploma. (3 marks)

(ii) the student has a high reading ability, given that the student did not hold a diploma. (3 marks)

(c) Precision Parts is a job shop that specializes in producing electric motor shafts. The average shaft size for the E300 electric motor is 0.55 inch, with a standard deviation of 0.10 inch. It is normally distributed.

(i) What is the probability that a shaft size will be under 0.45 inch? (3 marks)

(ii) What is the probability that a shaft size will be between 0.53 and 0.59 inch? (3 marks)

(iii) Suppose 10% of the shaft is less than k inch. Find k. (4 marks)

Question 3

(a) The distribution of the number of cakes, X, bought by a customer at a particular cake shop, is given in the following table:

x	1	2	3	4	5	6
$P(X=x)$	p	$2p$	$4p$	$2p$	$2p$	p

where p is a constant.

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

(ii) Find $P(x>4)$ (2 marks)

(ii) Calculate the mean and variance of X. (5 marks)

(iii) If $Y=3X+3$, find $E(Y)$ and $Var(Y)$. (4 marks)

(b) The number of accidents per day on a particular stretch of motorway follows a Poisson distribution with a mean of one.

(i) What is the probability that the number of accidents per day is at most 2? (3 marks)

(ii) What is the probability that the number of accidents in a week is less than 3? (3 marks)

(c) The amount of money collected by a random sample of 300 people involved in a sponsored walk was recorded as follows:

Amount collected to nearest RM	**Number of people**
0 to less than 5	26
5 to less than 10	93
10 to less than 15	83
15 to less than 20	58
20 to less than 25	40

On a graph paper, draw a frequency histogram of the distribution and estimate the mode. (6 marks)

Question 4

(a) A sample of 10 primary school student is selected to ask about their daily spending at the school canteen on a particular day. The amount spent (in RM) by the 10 students is as follows :

2.50 1.80 1.00 2.90 2.60 2.30 3.30 2.20 2.40 2.40

Assuming the amount spent by students on that particular day is normally distributed.

(i) Calculate the sample mean and standard deviation of the amount spent. (5 marks)

(ii) Calculate a 90% symmetrical confidence interval for the mean amount spent by all students at the canteen, μ. (4 marks)

(b) On the basis of past experience, 85% of the registered mail of a private mailing service company was collected by the owner. A random sample of 8 registered mails is selected.

(i) What is the probability that exactly 5 registered mails was collected by the owner? (3 marks)

(ii) What is the probability that less than 7 registered mail was collected? (4 marks)

(c) The manager of a football team is interested to find out if the weather has an effect on his team's results. The team plays 50 matches, with the following results.

		Weather	
		Good	Bad
Result	Win	13	8
	Draw	9	7
	Lose	8	5

By using χ^2 test, test at 5% significance level whether the weather has an effect on the football team performance.

(9 marks)

Question 5

(a) The manager of a bank in Kota Kinabalu wants to determine the proportion of its depositors who have more than one account at the bank. A random sample of 100 depositors is selected and 30 state that they have more than one account at the bank. Construct a 95% confidence interval estimate of the population proportion of the bank's depositors who have more than one account at the bank. (6 marks)

(b) A statistics instructor thought that a new method of instruction (B) would result in a best understanding of statistics. The instructor tested his 10 students under the current method (A). A statistics test was then given after one month of instruction (B). The results are as follows:

A	58	63	66	69	70	70	70	76	77	86
B	60	64	67	69	71	72	74	76	75	85

Test at 1% level of significance whether the new method of instruction effective. (10 marks)

(c) The same IQ test was given to a group of 120 female students and to a group of 100 male students of a college. The maximum score was 120. The female students obtained a mean score of 96.8 and the male students obtained a mean score of 102.5. Assuming that the IQ scores are normally distributed with a common population variance of 718, test at the 5% significance level whether the female students did not score as well as the male students in the IQ test.

(9 marks)

Question 6

(a) The prices and consumption of corn, oat and barley for year 2005 and year 2010 in a city are given below :

Type of food	Year 2005		Year 2010	
	Price/kg (RM)	Quantity (kg)	Price/kg (RM)	Quantity (kg)
Corn	5.00	500	8.00	400
Oat	3.00	300	5.00	500
Barley	6.00	400	9.00	950

(i) Using 2005 as the base, calculate the Paasche's price index for 2010. Interpret your answer.

(4 marks)

(ii) Using 2005 as the base, calculate the Laspeyres' quantity index for 2010. Interpret your answer.

(4 marks)

(b) The paired data below consist of the temperature (°C) on randomly chosen days and the amount a certain kind of plant grew (in millimeters)

Growth	62	76	50	51	71	46	51
Temperature	36	30	38	37	33	40	38

(i) Draw a scatter diagram of 'plant growth' on 'temperature'.

(2 marks)

(ii) Determine the least square regression equation that can be used to estimate the amount of certain kind of plant grew on temperature. (5 marks)

(iii) Draw the least square regression line obtained in part (ii) on the scatter diagram in part (i). (2 marks)

(iv) What is the strength of correlation that exists between the two variables? Comment on your answer. (4 marks)

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

(vi) Estimate the amount of plant grew (in millimeters) given that the temperature is 25 °C. Comment on the reliability of your prediction. (2 marks)

~The End~

sta1101f/aug14/BS

Normal Distribution

The z value of a value of X is calculated as : $Z = \frac{x - \mu}{\sigma}$

Sampling Distributions of Mean

The z value of a value of $\overline{X}$ is calculated as : $Z = \frac{\overline{X} - \mu}{\sigma_{\overline{X}}}$

Hypothesis Testing

When population variance is known, $z = \frac{\overline{x} - \mu}{\sigma / \sqrt{n}}$

Regression

The regression line equation: $y' = a + bx$

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2} \qquad a = \frac{\sum y}{n} - b\frac{\sum x}{n}$$

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left\{n\sum x^2 - \left(\sum x\right)^2\right\}\left\{n\sum y^2 - \left(\sum y\right)^2\right\}}}$$