INTI
INTERNATIONAL COLLEGE PENANG (507232-U)
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session : AUGUST 2012

Programme : DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME

Course : **STA2104 : Quantitative Methods**

Date of Examination : 14 December 2012

Time : 2.00 pm – 4.00 pm Reading Time : Nil

Duration : 2 hours

Special Instructions :

This paper consists of **FIVE (5)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Materials permitted :

Non-Programmable Scientific Calculator

Materials provided :

Formula Booklet 2, Graph Paper

Examiner(s) : **Bark Chee Beng**

Moderator : **Teng Mei Tuan**

This paper consists of 6 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE PENANG

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME
STA2104 : QUANTITATIVE METHODS
FINAL EXAMINATION: AUGUST 2012 SESSION

Instructions: This paper consists of **FIVE (5)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) The following table shows speed (km/h) of 100 cars that pass a new road during a particular time period:

Speed (km/h)	Number of cars
55 – 59	4
60 – 64	29
65 – 69	33
70 – 74	20
75 – 79	9
80 – 84	5

(i) Find the sample mean and standard deviation of the speed (km/h) of 100 cars that pass the new road during a particular time period.

(5 marks)

(ii) Draw a cumulative frequency polygon for the data given. Estimate the median from the graph.

(5 marks)

(iii) Calculate the coefficient of skewness using results from (i) and (ii) above. Comment on your result.

(2 marks)

(iv) Calculate the quartile deviation for the speed (km/h) of 100 cars that pass the new road during a particular time period.

(5 marks)

(b) The following data shows number of patients treated weekly in a clinic :

65 57 64 60 54 59 61 64 70 57 65 57 66 55 68

Find the mean, standard deviation, median, mode and range of the data given.

(8 marks)

Question 2

(a) The probability of that it will rain in a particular morning is $\frac{1}{7}$. If it rains, the probability Joshua takes bus to work is $\frac{5}{6}$, and if does not rain, the probability that Joshua takes bus to work is $\frac{1}{4}$.

(i) Draw a tree diagram to illustrate all the possible outcomes.

(3 marks)

(ii) Find the probability that in a particular morning, it will rain and Joshua does not take bus to work.

(2 marks)

(iii) Find the probability that in a particular morning, Joshua will take bus to work.

(3 marks)

(iv) It is known that in a particular morning, Joshua took a bus to work. What is the probability that it was raining that particular morning.

(3 marks)

(b) The probability distribution of discrete random variable X is shown in the table below :

x	-1	0	3	5
$P(X=x)$	0.13	0.25	p	0.30

(i) Find the value of p.

(2 marks)

(ii) Calculate the mean and variance of X.

(4 marks)

(c) The scores of students in an examination of a school are found to be approximately normally distributed with a mean of 68 marks and a standard deviation of 12 marks. If a student is randomly selected from that school, what is the probability that the student scores

(i) above than 80 marks,

(3 marks)

(ii) between 60 marks and 70 marks.

(5 marks)

Question 3

(a) The probability that a visitor to a computer shop will buy a computer is 0.38. If 8 people have visited the shop at a particular period, find the probability that

(i) exactly 5 units of computers are sold,

(2 marks)

(ii) less than 6 units of computers are sold.

(4 marks)

(b) In a restaurant, the number of customers ordering ice-cream for dessert occurs at random and follows a Poisson distribution with average 4 orders in 3 hours. Find the probability that

(i) there is exactly 5 orders in 8 hours of business operation,

(3 marks)

(ii) more than 2 orders in an hour of business operation.

(5 marks)

(c) A manufacturer claimed that the minimum amount of vitamin C in a bottle of drink produced is 250 mg. A sample of 25 such drink is randomly selected from the markets and measured for the amount of vitamin C in per bottle. The mean and standard deviation of the amount of vitamin C per bottle (in mg) are summarized as follows :

$\bar{x} = 248.9$, $s = 2.8$

(i) Is there evidence, at 1% significance level, that the manufacturer claim is not true?

(7 marks)

(ii) Find 99% confidence interval for the population mean amount of vitamin C in a bottle of drink produced.

(4 marks)

Question 4

(a) The proportion of four groups of citizen in a town is being studied for specific development planning purpose. The study involved the four early life stages groups of citizens. The four groups are Children (3 to 9 years old), Adolescents (10 to 19 years old), Yong Adults (20 to 29 years old) and Adults (30 to 39 years old). The proportion of this four groups initially assumed to follow a proportion of 2 : 4 : 3 : 1. A sample of 500 citizens of these groups is randomly selected and the number in each group is obtained as follow :

Group	Children	Adolescents	Young Adults	Adults
Number of citizens	87	228	158	27

Test at 5% significant level whether there is evidence that at least one group's proportion is different from the initial assumption.

(10 marks)

(b) An investigation was carried out to compare the performance of two areas (urban area and village area) of students in their examination. A random sample is drawn from each area and given a same test. The students drawn are of same age, study in same level but from two different areas.

The results are summarized in the table below:

	Sample size	Mean (marks)	Standard Deviation (marks)
Urban area	38	79.3	11.3
Village area	36	81.2	15.8

Treating the samples as large samples from normal distributions with the equal variance.

(i) Calculate the pooled variance of the samples.

(3 marks)

(ii) Test at 5% significance level whether the results provide evidence that the examination performance of students in two areas (urban area and village area) are different.

(8 marks)

(c) In a public opinion poll, 500 randomly chosen voters were asked whether they would vote for Party A at the next election and 186 replied 'Yes'. Find 95% confidence interval for the population proportion who would answer 'Yes' to the same question.

(4 marks)

Question 5

(a) Data on prices and quantities of food for year 2006 and 2011 are given in the following table. The quantities are based on the estimated usage for a family with two adults and three children.

Items	Year 206		Year 2011	
	Price (RM)	Quantity	Price (RM/kg)	Quantity
Milk (litre)	1.70	49	2.58	68
Egg (dozen)	1.53	52	2.92	56
Sugar (kg)	0.62	131	1.42	94
Butter (kg)	11.70	28	14.11	29

(i) Using year 2006 as the base, calculate the Laspeyres' price index for 2011. Interpret your answer.

(4 marks)

(ii) Using year 2006 as the base, calculate the Paasche's quantity index for 2011. Interpret your answer.

(4 marks)

(b) A factory produces a type of product. The sales volume for the product depends on the price per unit. The data shown in the following table.

Price per unit (RM)	10	11	12	13	14	15	16	17
Sales volume ('000 boxes)	61	43	38	26	21	17	13	9

(i) Plot a scatter diagram for this data. Comment on the linear relationship.

(4 marks)

(ii) Find the least square regression equation of the sales volume on price per unit.

(7 marks)

(iii) Estimate the sales volume if the factory intends to lower the unit price to RM5 per unit. Comment on the reliability of the estimate.

(2 marks)

(iv) Find the Pearson's correlation coefficient for the above data. Comment on your result.

(4 marks)

-- THE END --

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