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

FINAL
Examination Paper

(COVER PAGE)

Session	:	JANUARY 2012			
Programme	:	DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME			
Course	:	**STA2104 & MAT1213: Quantitative Methods**			
Date of Examination	:	8 March 2012			
Time	:	2.00 p.m. – 4.00 p.m.	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 : **Teoh Ching Nee**

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: JANUARY 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 the number of visitors in a day to a local tourism centre for a particular period of time. :

Number of visitors in a day	Number of days
0 – 100	12
100 – 200	23
200 – 300	158
300 – 400	231
400 – 500	201
500 - 600	99

(i) Find the mean and standard deviation of the number of visitors in a day to the local tourism centre.

(6 marks)

(ii) Draw a histogram for the data given. Estimate the mode 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 number of visitors in a day to the local tourism centre.

(4 marks)

(b) The following data shows the number of students who were absent from school everyday for 12 schooling days :

4 3 5 6 2 3 4 5 7 5 3 4

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

(8 marks)

Question 2

(a) Ryan goes to school in the morning by taking either bus A or bus B. The probability he takes bus A is $\frac{1}{3}$. The probability he is late when taking bus A is $\frac{1}{5}$ and the probability he is late when taking bus B is $\frac{1}{6}$.

(i) Draw the probability tree diagram for the above events.

(3 marks)

(ii) Find the probability that Ryan will be late on next Monday.

(3 marks)

(iii) If Ryan was late to school this morning, what is the probability that he had taken bus B ?

(3 marks)

(iv) Are both events of 'taking bus A' and 'late to school' independent?

(2 marks)

(b) A discrete random variable X takes the value 0,1 and 2 only. The probability distribution of X is shown in the table below :

x	0	1	2
$P(X=x)$	$3p$	$2p$	p

(i) Find the value of p.

(2 marks)

(ii) Calculate the mean and variance of X.

(4 marks)

(c) The length of a new species of worm is normally distributed with mean 70 mm and variance 23 mm^2.

(i) One of these worms is chosen at random, find the probability that the length of the worm is more than 73 mm.

(3 marks)

(ii) Seven of these worms are chosen at random, find the probability that the mean length of these seven worms falls between 68 mm and 71 mm.

(5 marks)

Question 3

(a) A multiple choice test consists of 10 questions with 4 choices each. Each question has only one correct answer. If a student answers all questions by guessing randomly, find

(i) the expected number of questions that will be correct?

(2 marks)

(ii) the probability that he will get not more than two questions correct?

(4 marks)

(b) In a chocolate chips cookies making process, the chocolate chips are dispensed into cookies by machine. The chocolate chips dispensing machine on average dispenses 5 chips per cookie.

In a process control, cookies are sampled randomly.

(i) Find the probability that exactly 5 chocolate chips will be found in a cookie sampled.

(2 marks)

(ii) Find the probability that more than 2 chips in 2 cookies sampled.

(4 marks)

(iii) Find the expected number of chocolate chips required if 100,000 cookies are expected to be produced.

(2 marks)

(c) A supervisor wants to know the proportion of defective electronic components produced by a new machine. He inspects a random sample of 200 electronic components produced by the new machine and found that 40 electronics components are defective. Find the 95% symmetrical confidence interval for the population proportion of defective electronic components produced by the new machine.

(4 marks)

(d) The owner of a petrol service station wants to study the petrol purchasing habits by motorists at his station. A random sample of 50 motorists during a particular week was selected, and the results summarized as follow : $\bar{x} = 11.5l$, $s = 3.2l$.

At 5% significance level, is there evidence that the average purchase is different from $10l$.

(7 marks)

Question 4

(a) The quality control manager of an automotive parts factory would like to know if there is a difference in the proportion of defective parts produced on different days of the work week. Random samples of 100 parts produced on each day of the week were selected with the following results.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Number of defective parts	12	7	7	10	14

Test at 5% significant level whether there is evidence of difference in the proportion of defective parts produced on various days of the week.

(9 marks)

(b) The petrol consumption of a new model of car is being tested. In a trial, a sample of 50 cars chosen at random were driven under identical conditions and the distance, x kilometers, that were covered for precisely 1 litre of petrol were recorded. The results were summarized as follow :

$\sum x = 2{,}668, \sum x^2 = 148{,}258$

(i) Calculate the sample mean and standard deviation of the distance covered for 1 litre of petrol obtained from the trial.

(4 marks)

(ii) Find a 90% confidence interval for population mean of the distance covered for 1 litre of petrol.

(4 marks)

(iii) The chief engineer of this company claims that the petrol consumption of this new model of car is efficient, that it will on average travel more than 50 kilometers of distance for 1 litre of petrol consumed. Test at 5% significance level if the chief engineer's claim is true.

(8 marks)

Question 5

(a) A plantation company produces three types of oils, i.e. maize oil, palm oil and vegetable oil. The table below shows the prices and quantities sold of the oils in year 2005 and 2010 :

Type of oils	Year 2005		Year 2010	
	Price (RM/kg)	Quantity (1,000 kg)	Price (RM/kg)	Quantity (1,000 kg)
Maize	9.62	194	9.02	128
Palm	4.32	454	4.12	688
Vegetable	8.42	54	8.82	88

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

(4 marks)

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

(4 marks)

(b) A study is done in a farm to determine the amount of moisture per 100 grams of soil, y (grams), and the depth, x (cm), from the surface of the soil. The results are shown in the table below :

Depth (cm)	0	5	10	15	20	25	30	35
Amount of moisture (grams)	90	82	56	42	30	21	21	8

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

(4 marks)

(ii) Find the least square regression equation of the amount of moisture of soil on depth from surface of the soil.

(7 marks)

(iii) Estimate the content of moisture of soil when it is 40 cm in depth from surface of the soil. 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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