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

FINAL
Examination Paper

(COVER PAGE)

Session	:	August 2014
Programme	:	**DIPLOMA IN ENTREPRENEURSHIP (DENT)**
Course	:	**STA1103 INTRODUCTORY STATISTICS**
Date of Examination	:	9 DECEMBER 2014
Time	:	8.00am – 10.00am Reading Time : Nil
Duration	:	2 hours
Special Instructions	:	

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

Materials permitted :

Non-Programmable Calculator

Materials provided :

Formula Booklet 2, Graph Paper

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

Moderator : **Ch'ng Pei Eng**

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

INTI INTERNATIONAL COLLEGE PENANG

DIPLOMA IN INTREPRENEURSHIP (DENT)
STA1103 : INTRODUCTORY STATISTICS
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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 following table gives the distribution of weight of 30 ripe apples (measured to the nearest gm) randomly picked at a farm :

62	74	56	52	68	65	82	45	54	63	64	52	76	67	62
46	59	62	50	73	55	57	61	71	67	63	70	59	67	72

(i) Prepare a frequency distribution using 45 as the lower class boundary of first class, and the width of each class equal to 7. Use tally marking in your frequency counting construction.

(5 marks)

(ii) Construct a histogram for the distribution of weight of the apples.

(4 marks)

(iii) Using graph from (ii), estimate the mode of the weight of the apples.

(2 marks)

(iv) Using frequency distribution obtained in (i) above,

calculate the sample mean, and standard deviation of the weight of the apples,

(6 marks)

(v) calculate the median of the weight of the apples.

(2 marks)

(vi) Using results obtained from (iv) & (v) above, calculate the coefficient of skewness. Hence, comment on the distribution.

(3 marks)

(b) Indicate which of the following variables are quantitative and which are qualitative. Classify the quantitative variables as discrete or continuous.

(i) The table tennis scores of first game in a tournament.

(1 mark)

(ii) The speed of a fruit grinder used in a kitchen.

(1 mark)

(iii) The preferred T-shirt color of players during a final game.

(1 mark)

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% 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) 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) Calculate the mean and variance of X.

(3 marks)

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

(2 marks)

(c) On average the production machine interrupted 6 times a week (Monday to Friday). Assuming the number of interruptions follow a Poisson distribution. Find the probability that it is interrupted

(i) exactly five times in a given week,

(2 marks)

(ii) eight times in a fortnight (2 weeks),

(3 marks)

(iii) more than two times on Monday.

(4 marks)

Question 3

(a) The servicing time experienced by customers at a local bank is normally distributed with mean 2.6 minutes and a standard deviation of 0.8 minutes.

(i) What is the probability that a randomly chosen customer will experience more than 2.7 minutes servicing time?

(3 marks)

(ii) If 5 customers are randomly chosen, what is the probability that their mean servicing time experienced will be less than 2.5 minutes?

(4 marks)

(iii) If the bank is to reduce the mean servicing time experienced to 2.3 minutes, and assuming no change in its' variance. Assuming this is successful. Determine the percentage of customers that will experience servicing time below 2.0 minutes.

(4 marks)

(b) Large consignments of components are inspected for defectives by means of a sampling system. Ten components are examined and the lot is to be rejected if two or more are found to be defective. If a consignment contains exactly 6 percent defectives,

(i) what is the probability that the consignment will be rejected?

(5 marks)

(ii) what is the expected defectives out of 100 components examined?

(1 mark)

(c) Suppose the distribution of mathematics SAT scores of a local college students is known to be normal with variance $\sigma^2 = 200$. If the mean mathematics SAT scores for a random sample of 20 students is 103, can we conclude that the mean mathematics SAT scores of all the local college students is significantly greater than 100?
(Use 5% level of significance).

(8 marks)

Question 4

(a) A sample of 10 primary students' is taken, and asked for their daily spendings at school's canteen on a particular day. The amount spent (in RM) of the 10 students are as follow :

2.50 1.80 1.00 2.90 2.60 2.30 3.30 2.20 2.40 2.40

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

(5 marks)

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

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

(4 marks)

(iii) Assuming the population standard deviation is known to be RM0.80. Determine the minimum sample size if we wish to estimate the μ to be within RM0.10 with 99% confidence.

(4 marks)

(b) A factory produces cans of fruits syrup who masses are normally distributed with mean 140g, and standard deviation 8g. A can produced with mass less than 130g will be rejected due to underweight. The current reject rate is high and the factory plans to reduce the reject rate to 1% by adjusting the setting to produce at higher mean mass. Find this new mean.

(4 marks)

(c) 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 2008. Interpret your answer.

(4 marks)

Question 5

(a) 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.

(8 marks)

(b) The following table shows the length (in cm) of a specific type of earth worm randomly picked from a pool of same period birth worms. They are randomly picked at a constant interval period of growth (in days).

Growth Period (days)	5	10	15	20	25	30	35	40
Length (cm)	1.6	1.9	1.8	2.2	2.3	3.0	2.8	3.2

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

(4 marks)

(ii) Find the least square equation of the length of worm on growth period since birth.

(7 marks)

(iii) Estimate the length of the worm at 50 days after birth. 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)

Question 6

(a) 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)

(b) When a part of a machine is manufactured in a factory, the probability that it is rejected is π.

(i) A sample of 600 parts randomly selected and observed that 27 parts rejected. Using the result, find a symmetric 95% confidence interval for π.

(4 marks)

(ii) Estimate the smallest sample size if we wish to be 99% confidence that our sample proportion will be within 0.01 of the true proportion of rejected parts manufactured in the factory. Use the sample proportion obtained in (i) above in your estimation.

(4 marks)

(iii) It is believed that the population proportion of the rejected parts is less 0.05. Test at 1% significance level if this believe is true.

(8 marks)

-- THE END --