INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

RESIT
Examination Paper

(COVER PAGE)

Session	:	**January 2014**
Programme	:	Diploma In Business (DIB) Diploma In Business Administration (DBADI) Diploma In Information And Communication Technology (DICTN)
Course	:	**STA1101: QUANTITATIVE METHODS** **STA2102: BUSINESS STATISTICS**
Date of Examination	:	March 10, 2014
Time	:	11:00am – 1:00pm 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. S.M. Elizabethrani,** Mr. Bark Chee Beng, Billy Siew Woo Bing, Tan Seng Kuan, Kumatha Tinakaran, Dinesh Kumar.
Moderator	:	Dr. Ch'ng Pei Eng

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

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME (DICTI)
STA2103/1101 : QUANTITATIVE METHOD
FINAL EXAMINATION : JANUARY 2014 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) Table below shows the frequency distribution on weekly rent of sixty 3-room apartments situated in the vicinity of Kota Kinabalu. The rents are corrected to the nearest Ringgit (RM).

Weekly Rent (in RM)	Number of Apartments
93 – 102	7
103 – 112	12
113 – 122	17
123 – 137	14
133 – 142	6
143 – 152	4

(i) Construct a histogram to represent the data and estimate the mode.

(7 marks)

(ii) Calculate the value of mean.

(3 marks)

(iii) Calculate the value of sample variance score.

(4 marks)

(b) A company is studying the number of monthly absences among its 125 employees. The following probability distribution shows the likelihood that people were absent 0, 1, 2, 3, 4, or 5 days last month.

Number of days absent, X	Probability, P(x)
0	0.6
1	0.2
2	0.12
3	0.04
4	0.04
5	0

(i) Find $P(2 \leq X \leq 5)$ and $P(X < 4)$.

(3 marks)

(ii) What is the mean number of days absent? (3 marks)

(iii) What is the variance of the number of days absent? (5 marks)

Question 2

(a) The following table shows the distribution of 80 participants according to gender and body weight category.

	Light(L)	Heavy(H)	Total
Male(M)	10	40	50
Female(F)	25	5	30
Total	35	45	80

If a participant chosen at random, determine

(i) the probability that the participant is a female, (1 mark)

(ii) the probability that the participant is a female or heavy weight, (2 marks)

(iii) the probability that participant is a heavy weight given that a female is selected. (3 marks)

(iv) whether male and heavy weight are independent events? (4 marks)

(b) Based on past records, it is found that 30% of the populations in a community are having brown hair. If 12 people are selected at random from this community, find

(i) the probability that at most 10 of them are having brown hair (3 marks)

(ii) the probability that exactly 5 of them are having brown hair. (2 marks)

(iii) the mean and standard deviation. (4 marks)

(c) Suppose that we want to test if the climate has changed since industrialization. The mean temperature throughout history is $50^{\circ}F$ with the standard deviation of $2^{\circ}F$.During the last 40years, the mean temperature has been $51^{\circ}F$. Is there sufficient evidence, at 0.05 significance level? (6 marks)

Question 3

(a) A computer maintenance company keeps record of the length of time it takes to repair faulty computers. The time that elapses between a customer reporting a computer out of action due to a fault and the faulty being repaired is known as the " repair time ".

The computer records show that repair times may be assumed to be normally distributed with mean 40 hours and standard deviation 5 hours, and that the repair time on any particular occasion that a fault is reported may be assumed to be independent of all other repair times.

(i) Find the probability that on a particular occasion the repair time will be less than 24 hours.

(3 marks)

(ii) Find the probability that on a particular occasion the repair time is between 50 and 55 hours .

(4 marks)

(iii) Find the probability that on a particular occasion the repair time exceeds 55 hours.

(3 marks)

(b) One hundred managers from various levels of management were randomly selected and interviewed regarding their concern about the environmental issues. The results were as followed:

Level of management	No concern	Some concern	Great concern
Top management	13	12	10
Middle management	17	16	17
Supervisor	5	4	6

Use the 0.01 significance level to determine whether there is a relationship between management level and environmental concern.

(10 marks)

(c) A researcher wants to estimate the mean weight of an adult male in Texas County. A random sample of 500 men from a population of 10,000 men was taken. He finds that the mean weight of the sample is 180 pounds, and the standard deviation of the sample is 30 pounds.

(i) Find the best point estimate of the population mean weight.

(1 mark)

(ii) Find the 95% confidence interval of the mean weight.

(4 marks)

Question 4

(a) The prices of fish, potatoes and milk and the consumption of these item for a group of customer, for 2005 and 2006 are as follows:

	2005		2006	
	price	quantity	Price	quantity
Fish (per kilo)	\$6.50	25	\$6.80	30
Potatoes (per kilo)	\$2.00	240	\$2.20	200
Milk (per litre)	\$4.50	200	\$4.80	180

(i) Calculate a base-weighted price index for 2006, using 2005 as the base year.
(4 marks)

(ii) Calculate a current-weighted price index for 2006, using 2005 as the base year.
(4 marks)

(b) The owner of Mercury-BM wants to study the relationship between the age of a car and its selling price. Listed below is a random sample of 10 used cars sold at the dealership during the last year.

Age (years)	Selling price (RM'000)
9	8.1
7	8.6
11	6.1
12	5.5
13	5.0
10	6.0

Let age be the independent variable and selling price be the dependent variable.

(i) Draw a scatter diagram of selling price against age.
(4 marks)

(ii) Comment briefly on the relationship between the two variables based on the diagram you obtained in part (i).
(2 marks)

(iii) Compute the coefficient of determination and interpret this value.
(4 marks)

(iv) Determine the regression equation.
(5 marks)

(v) For a used car of 8 years in age, estimate the selling price. (2 marks)

Question 5

(a) As a part of a study of corporate employees, the director of Human Resources for BMZ, Inc. wants to compare the distance travelled to work by employees at their office in Town A with the distance for those in Town B. A sample of 40 employees in Town A showed they travel a mean of 380 miles per month with a standard deviation of 30 miles per month. A sample of 50 Town B employees showed they travel a mean of 390 miles per month, with a standard deviation of 26 miles per month. At the 0.05 significance level, is there a difference in the mean number of miles travelled per month between Town A and Town B employees?

(7 marks)

(b) 590 people applied to the Bachelor's in Elementary Education program at Florida State College. Of those applicants, 57 were men. Find the 90% confidence interval of the true proportion of men who applied to the program.

(5 marks)

(c) A research was done to check whether the new library is fully utilized by students staying around the area. The following table shows the number of hours spent by students who visited the library:

Number of hours	Number of students
1	4
2	7
3	12
4	6
5	5
6	1

(i) Find the mean, median and mode.

(5 marks)

(ii) Calculate the standard deviation and coefficient of variation.

(5 marks)

(d) The discrete random variable X has probability distribution given by

$$P(X = x) = \begin{cases} \dfrac{3x+1}{22} & \text{for } x = 0,1,2,3 \\ 0 & \text{otherwise} \end{cases}$$

Find E(X).

(3 marks)

-THE END-

Hypothesis Testing

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

When population variance is unknown and $n \geq 30$, $z = \dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

When population variance is unknown and $n < 30$, $t = \dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

For Proportion $z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{pq}{n}}}$

Testing the Difference between Two Means, and Two Proportions

Comparing two means (large independent samples):

$$z = \frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$$

Comparing two means (small independent samples, variances equal):

$$t = \frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}\sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$$

Comparing two means for small dependent samples

$$t = \frac{\overline{D} - \mu_D}{s_D/\sqrt{n}} \quad \text{where} \quad \overline{D} = \frac{\Sigma D}{n} \quad \text{and} \quad s_D = \sqrt{\frac{\Sigma D^2 - \dfrac{(\Sigma D)^2}{n}}{n-1}}$$

Correlation and Regression

Correlation Coefficient :

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n(\Sigma x^2) - (\Sigma x)^2][n(\Sigma y^2) - (\Sigma y)^2]}}$$

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

Where $a = \dfrac{(\Sigma y)(\Sigma x^2) - (\Sigma x)(\Sigma xy)}{n(\Sigma x^2) - (\Sigma x)^2}$ $\quad b = \dfrac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$

Chi-Square and Analysis of Variance

Chi-square test for goodness of fit:

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Chi-square test for independence and homogeneity of proportions:

$$\chi^2 = \Sigma \frac{(O - E)^2}{E}$$