FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2021**
Programme	:	Diploma in Information Technology (DITN)
Course	:	**STA1106: Quantitative Methods**
Date of Examination	:	July 28, 2021 (Wednesday)
Time	:	4.00pm – 6.30pm Reading Time : Nil
Duration	:	2 Hours 30 Minutes

Note: 30 minutes is added into the duration of the examination to factor in any connectivity matters and for you to scan and upload your scripts.

Special Instructions :

Answer **ALL** questions.

Materials permitted :

Non-Programmable Calculator

Materials provided :

Nil

Examiner(s)	:	**S.M. Elizabethrani Allappan**, Bark Chee Beng and Dr Narinder
Chief Moderator	:	Dinesh Kumar

*This paper consists of **5** printed pages, including the cover page*

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
STA1106 : QUANTITATIVE METHODS
FINAL ALTERNATIVE ASSESSMENT: APRIL 2021 SESSION

Instructions: This paper consists of **FOUR (4)** questions. Answer **ALL** questions.

Question 1

(a) The number of newly-published books that are sold in a week by 10 bookstores in a town is as follow:

30	25	5	30	33
28	29	26	2	27

(i) Find the sample mean, standard deviation and range of the data given.

(6 marks)

(ii) Find the first, second and third quartile. Comment on the shape of the distribution base on these quartiles obtained.

(7 marks)

(iii) Which would be a more appropriate measure of central tendency for these data, the mean or median? Explain.

(2 marks)

(b) The table below shows 100 cars according to the repairing cost (in RM) for damages due to road accident recorded by one of local car workshops in a particular month.

Repair Cost (RM)	Number of cars
100 - 1100	6
1100 - 2100	16
2100 - 3100	38
3100 - 4100	32
4100 - 5100	8

(i) Build a respective cumulative frequency table and draw a cumulative frequency polygon on graph paper, and estimate the percentage of cars with repaired cost above RM3500.

(7 marks)

(ii) If a car is involved in an accident, and sent to the workshop, compute the probability that the repairing will cost more than RM3500.

(3 marks)

(Total: 25 marks)

Question 2

(a) Adrian goes to school in the morning by taking either bus or train. The probability he takes bus is 0.7. The probability he is late when taking bus is 0.2 and the probability he is late when taking train is 0.3.

(i) Find the probability he will be taking train and late to school?

(3 marks)

(ii) Find the probability he will be late to school?

(4 marks)

(iii) If he were late to school, find the probability he actually took the bus (rounded to 2 decimal places?

(3 marks)

(iv) Assess if the events taking train and late to school are independent of each other?

(2 marks)

(b) The table below shows the probability distribution of a discrete random variable X.

x	0	1	2	3	4
$P(X=x)$	0.1	0.3	0.2	a	0.28

(i) Find the value of a.

(2 marks)

(ii) Calculate the mean and standard deviation of X.

(5 marks)

(c) A factory is producing large number of mechanical pencils. The probability that a mechanical pencil is faulty is 0.05.

(i) If 30 mechanical pencils are randomly selected from the production, find the probability exactly one pencil are faulty?

(2 marks)

(ii) If 20 mechanical pencils are randomly selected from the production, find the probability less than two pencils are faulty?

(3 marks)

(iii) If 20 mechanical pencils are randomly selected from the production, find the expected number of faulty pencil?

(1 mark)

(Total: 25 marks)

Question 3

(a) The total number of goals scored in a local football match follows a Poisson distribution with mean 3 goals in a match. Assuming a football match runs for exactly 90 minutes,

(i) find the probability that no score in a match,

(2 marks)

(ii) find the probability that exactly 3 scores in 30 minutes,

(3 marks)

(b) The diameter of a type of screw produced by a large manufacturing factory is distributed normally with mean μ mm and variance 0.04 mm^2.

(i) If a sample of size 10 is taken, and the sample mean found to be 1.02mm, find 95% confidence interval for μ.

(4 marks)

(ii) Given 10% of the screws have diameter larger than 1.29mm. Find the value of μ.

(4 marks)

(iii) A screw is randomly taken from the production, find the probability that the diameter of the screw is smaller than 0.99mm?

(4 marks)

(iv) If a sample size of 10 is taken again, find the probability that the mean of the sample is large than 1.06mm?

(4 marks)

(c) The following table shows the prices and quantities traded of the products of a plantation company for year 2015 and year 2020.

Product	Year 2015		Year 2020	
	Price (RM per kg)	Quantity (x 1000 kg)	Price (RM per kg)	Quantity (x 1000 kg)
Latex	20.30	3985	27.33	3298
Palm Oil	22.15	1820	27.68	1279
Cocoa	12.62	260	15.36	288

Using 2015 as the base year, calculate the Paasche's quantity index for 2020. Interpret your answer.

(4 marks)

(Total: 25 marks)

Question 4

(a) The director of a clothing manufacturing factory needs to determine whether a new machine is producing a particular type of cloth according to the manufacturer's specifications, which indicate that the cloth should have a mean breaking strength of 70 pounds. A sample of 49 pieces of cloth reveals a sample mean breaking strength of 69.1 pounds with standard deviation of 3.5 pounds. At 0.05 significant level, determine if there is sufficient evidence that the machine is not meeting the manufacturer's specification for average breaking strength.

(8 marks)

(b) According to a particular new game with 3 possible outcomes, the expected ratio of respective outcomes O1,O2,O3 is set at 3:2:5 which is unknown to participants. In a randomly played 100 games, the correspondent numbers of respective outcomes O1,O2,O3 were 24,14 and 62. At 1% significant level, determine whether there is any difference between the observed and expected frequencies.

(8 marks)

(c) An investor would like to use the volume of a stock to predict the stock closing price by using a simple linear regression model. He has collected 8 days information on the stock traded volumes and closing prices, as listed in below table :

Day	1	2	3	4	5	6	7	8
Traded volume (Number of shares)	10,800	12,300	11,800	16,800	18,700	12,500	8,900	6,900
Closing price (RM)	1.28	1.42	1.33	1.65	1.68	1.38	1.08	0.90

(i) Find the equation of the linear regression line of closing price on traded volume.

(7 marks)

(ii) Using the equation of the linear regression line, estimate the closing price if traded volume were to surge to 30,000 shares in a particular day. Comment on the estimate obtained.

(2 marks)

(Total: 25 marks)

~ The End ~