UNIVERSITI TEKNOLOGI MARA
ASSESSMENT 2

COURSE	**:**	**INTRODUCTION TO STATISTICS**
COURSE CODE	**:**	**QMT181/STA104**
DATE	**:**	**1ST JULY 2022**
TIME	**:**	**9.00 – 11.00 AM (120 MINUTES)**

Please read these instructions:

1) This assessment paper consists of **THREE (3)** questions.
2) Answer **ALL** questions.
3) The assessment must be taken completely **alone**. Showing it or discussion with anyone is forbidden.
4) Please write your answer on your own papers using **pen**.
5) Student must ensure that their test papers are **readable**. Ensure that your answers are **written clearly** with your name, group and student ID are provided.
6) Student must prepare their answer in **pdf format** and submit via **Google Classroom** or any other platform used by the lecturer. **(FULLNAME_GROUP.pdf)**
7) Keep close track of your allocated time. Due to internet connectivity, students are given no more than 20 minutes (11.00 - 11.20am) to submit their works electronically.
8) **Late submission (after 11.20 am) will not be accepted.**

ALL THE BEST

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This test paper consists of 5 pages

QUESTION 1

A manager desires to know whether the typing speed of a secretary (in words per minute) is related to the time (in hours) that it takes the secretary to learn to use a new word processing program. The data are recorded as follows:

Speed (words per minute)	Time (in hours)
48	7
74	4
52	8
79	3.5
83	2
56	6
85	2.3
63	5
88	2.1
74	4.5
90	1.9
92	1.5

a) State the independent and dependent variables.

(2 marks)

b) Draw a scatter diagram of the recorded data.

(3 marks)

c) Calculate the Pearson Product Moment Correlation coefficient and explain the result obtained.

(5 marks)

d) Calculate the regression equation line and draw it on your scatter diagram.

(6 marks)

e) Explain the meaning of the slope coefficient value obtained in (d).

(1 mark)

f) Predict the time it will take the average secretary who has a typing speed of 70 words per minute to learn the word processing program.

(3 marks)

QUESTION 2

The table below shows the price (RM/Kg) and quantity (shipping container) of three types of imported onion by NIMA Trading for local market from 2019 to 2021.

Types of Onion	Price (RM/Kg)		Quantity (Number of shipping containers)	
	2019	2021	2019	2021
Shallots	3.00	4.10	550	590
Red onion	5.00	6.50	700	850
Yellow onion	7.00	7.20	600	860

Using 2019 as the base year

a) Using appropriate calculations, determine the type of imported onion that is the highest increase in shipping container for the year 2021.

(4 marks)

b) Calculate the Paasche price index for the year 2021.

(3 marks)

c) Calculate the simple aggregate relative price index for the 2021.

(3 marks)

QUESTION 3

a) The quarterly seasonal indices of operating expenses of Flexy Enterprise from 2015 to 2019 are shown below:

Quarter	First	Second	Third	Fourth
Seasonal Index	99.5	102.6	**T**	**F**

If the operating expenses in every third quarter increased by 3.5%, find the value of T and F.

(2 marks)

b) Table 1 shows the number of road accidents reported at a police station every four months from the year 2012 to 2015.

Table 1: Road accidents reported at a police station, 2012 - 2015

Year	Term		
	Jan - Apr	May - Aug	Sept - Dec
2012	45	38	64
2013	52	47	70
2014	59	53	76
2015	61	58	85

Table 2: Actual data and trend values

Year	Term	Number of road accidents	3-Moving Average
2012	Jan – Apr	45	
	May – Aug	38	49.0000
	Sept - Dec	64	51.3333
2013	Jan – Apr	52	54.3333
	May – Aug	47	56.3333
	Sept - Dec	70	58.6667
2014	Jan – Apr	59	60.6667
	May – Aug	53	62.6667
	Sept - Dec	76	63.3333
2015	Jan – Apr	61	65.0000
	May – Aug	58	68.0000
	Sept - Dec	85	

i) Calculate the seasonal indices for the three terms.

(5 marks)

ii) Forecast the number of road accidents for the last term of the year 2016.

(3 marks)

END OF QUESTION PAPER

FORMULA LIST

Correlation and Regression

1. Pearson's Product Moment Correlation Coefficient

$$r = \frac{n\sum XY - \left(\sum X\right)\left(\sum Y\right)}{\sqrt{\left[n\sum X^2 - \left(\sum X\right)^2\right]\left[n\sum Y^2 - \left(\sum Y\right)^2\right]}} \quad \text{or} \quad \frac{\sum XY - \frac{\left(\sum X\right)\left(\sum Y\right)}{n}}{\sqrt{\left[\sum X^2 - \frac{\left(\sum X\right)^2}{n}\right]\left[\sum Y^2 - \frac{\left(\sum Y\right)^2}{n}\right]}}$$

2. The least-squares regression line of Y against X, $Y = a + Bx$

i.

$$b = \frac{n\sum XY - \left(\sum X\right)\left(\sum Y\right)}{n\sum X^2 - \left(\sum X\right)^2} \quad \text{or} \quad \frac{\sum XY - \frac{\left(\sum X\right)\left(\sum Y\right)}{n}}{\sum X^2 - \frac{\left(\sum X\right)^2}{n}}$$

ii.

$$a = \overline{Y} - b\overline{X} \quad \text{or} \quad \frac{\sum Y}{n} - b\frac{\sum X}{n}$$

Index Numbers

1. Laspeyres' price index $= \dfrac{\sum (p_t q_o)}{\sum (p_o q_o)} \times 100$
2. Paasche's price index $= \dfrac{\sum (p_t q_t)}{\sum (p_o q_t)} \times 100$
3. Simple aggregate price index $= \dfrac{\sum p_t}{\sum p_o} \times 100$
4. Weighted aggregate price index $= \dfrac{\sum p_t w}{\sum p_o w} \times 100$

Where

p_0 : price of the base year
p_t : price of the current year
q_0 : quantity of the base year
q_t : quantity of the current year
w : weights

