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ONLINE FINAL EXAMINATION**

COURSE NAME : INTRODUCTION TO STATISTICS
COURSE CODE : DSM1063
EXAMINATION : JUNE 2022
DURATION : 3 HOURS

INSTRUCTION TO CANDIDATES

1. This examination paper consists of **TWO (2)** parts: /
PART A (10 Marks)
PART B (30 Marks)
2. Please refer to the detailed instructions in this question paper.
3. Answer ALL questions in the answer sheet which is A4 size paper (or other paper with the consent of the relevant lecturer).
4. Write your details as follows in the upper left corner for each answer sheet:
 - i. Student Full Name
 - ii. Identification Card (I/C) No.
 - iii. Class Section
 - iv. Course Code
 - v. Course Name
 - vi. Lecturer Name
6. Each answer sheet must have a page number written at the bottom right corner.
7. Answers should be neat and clear in handwritten form.

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

This examination paper consists of 7 printed pages including front page

PART A

This part contains **TWO (2)** questions. Answer **ALL** questions in Answer Booklet.

QUESTION 1

The data below give the time (in minutes) that 20 customers spent waiting to report to a customer service employee about their internet problem at company A.

7	29	15	32	20	16	10	14	17	8
22	25	25	18	10	6	22	16	13	16

- i. Calculate the sample mean and median of the data.
(4 marks)

- ii. Calculate the standard deviation of the data.
(2 marks)

- iii. Calculate the range of the data.
(1 mark)

- iv. The mean and standard deviation for sales representative for a publishing company B were 22.55 and 9.55 respectively. Determine which company is more consistent in spent waiting to report to a customer service employee about their internet problem.
(3 marks)

[10 MARKS]

PART B

This part contains **THREE (3)** questions. Answer **ALL** questions in Answer Booklet.

QUESTION 1

A sample of seven households from a low to moderate income neighborhood was selected and the information (in RM'00) on their incomes and food expenditures for the past month is given below.

Income	Food Expenditure
35	9
49	15
21	7
39	11
15	5
28	8
25	9

Table 1

- i. Based on the table above, identify the dependent variables for the data.
(1 mark)

- ii. Calculate the Pearson's Product Moment Correlation coefficient and comment on the value obtained.
(3 marks)

- iii. Find the linear regression equation of food expenditure against the income.
(3 marks)

- iv. Explain the meaning of the slope coefficient obtained in (iii).
(1 mark)
- v. Estimate the amount of food expenditure (in RM'00) if the income is 22.
(2 marks)

QUESTION 2

A manufacturing firm purchases an identical component from three independent suppliers that differ in unit price and quantity supplied. Data on unit price and quantities for the base year 2018 and the year 2020 are given in Table 2.

Supplier	Unit Price (RM)		Quantity	
	2018	2020	2018	2020
A	5.45	6.00	150	160
B	5.60	5.95	200	250
C	5.50	6.20	120	140

Table 2

Using the year 2018 as the base year:

- i. Calculate the simple aggregate price index in 2020.
(2 marks)
- ii. Calculate the Laspeyres' quantity index for the year 2020 and interpret the value obtained.
(4 marks)
- iii. Calculate the Paasche's price index for the year 2020 and interpret the value obtained.
(4 marks)

QUESTION 3

The following table shows the sales for the beauty product (in RM'000) of Euphora Sdn. Bhd. for the year 2019 to 2021.

Year	Sales (RM'000)			
	1st quarter	2nd quarter	3rd quarter	4th quarter
2019	48	44	26	38
2020	65	32	30	35
2021	73	38	34	46

- i. Find the trend values for the sales using the moving average method.
(4 marks)
- ii. The seasonal indices for the 1st to 3rd quarter are given below:

Quarter/ <i>Sukuan</i>	1	2	3	4
Seasonal Index/ <i>Indeks Bermusim</i>	163.57	81	68.51	X

Find the seasonal index of the 4th quarter marked as **X** and comment on the value obtained.

(2 marks)

- iii. By using the value of the seasonal index in (ii), forecast the sales for the second quarter of 2022.

(4 marks)

[30 MARKS]

END OF QUESTION PAPER

APPENDIX 1

Correlation and Regression

1. Pearson's Product Moment Correlation Coefficient

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

2. The least-square regression line, $y = a + bx$

$$i. \quad b = \frac{(\sum xy) - \left(\frac{(\sum x)(\sum y)}{n} \right)}{\left(\sum x^2 - \frac{(\sum x)^2}{n} \right)}$$

$$ii. \quad a = \frac{\sum y}{n} - b \left(\frac{\sum x}{n} \right)$$

Index Numbers

$$1. \text{ Laspeyres' price index} = \frac{\sum p_t q_0}{\sum p_0 q_0} \times 100$$

$$2. \text{ Paasche's price index} = \frac{\sum p_t q_t}{\sum p_0 q_t} \times 100$$

$$3. \text{ Simple Aggregate price index} = \frac{\sum p_t}{\sum p_0} \times 100$$

$$4. \text{ Weighted aggregate price index} = \frac{\sum w p_t}{\sum w p_0} \times 100$$

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

Time Series Data Analysis

1. Trend Variation Value (TVV)

$$TVV = \frac{T_L - T_1}{n-1}$$

2. Projected Trend Value (PTV)

$$PTV = T_L + TVV(t)$$

3. Forecasting

$$Forecast = PTV \times \frac{S.I}{100}$$

Where:

T_L : last trend

T_1 : first trend

$S.I$: seasonal index

n : number of trend

t : time