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FINAL EXAMINATION**

COURSE NAME : BUSINESS STATISTICS
COURSE CODE : MAT1023
EXAMINATION : JUNE 2023
DURATION : 3 HOURS

INSTRUCTION TO CANDIDATES

1. This examination paper consists of **TWO (2)** parts:
PART A (20 Marks)
PART B (30 Marks)

2. Candidates are not allowed to bring any material to the examination room except with the permission from the invigilator.

3. Please check to make sure that this examination pack consist of:
 - i. The Question Paper
 - ii. An Answering Booklet

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

This examination paper consists of 9 printed pages including front page

PART A

This part consist of **TWO (2)** questions.

Answer ALL questions in Answering Booklet.

QUESTION 1

The following are the numbers of clients for 20 days recorded by a sales (RM'000) representative for a publishing company RXZ.

20	8	10	10	20	18	14	22	13	26
10	16	30	19	10	7	18	24	15	30

- i. Calculate the sample mean and standard deviation of the data.
(3 marks)
- ii. Identify and explain the mode of the data.
(1 mark)
- iii. Construct a stem-and-leaf plot of the data. Determine the shape of the data distribution.
(3 marks)
- iv. The mean and standard deviation for sales representative for a publishing company Y15 were 16.23 and 4.55 respectively. Determine which company is more consistent in their sales.
(3 marks)

QUESTION 2

An online survey about stress at work are shown in table below.

Gender	Felt Stressed Out At Work	
	Yes	No
Male	224	494
Female	282	480

One of these 1480 employed adults is selected at random. Find the probability that:

- i. the selected employed adult felt stressed out at work was a male.
(2 marks)
- ii. the selected adult was a female and did not feel stressed out at work.
(2 marks)
- iii. the selected adult was a male or he felt stressed out at work.
(3 marks)
- iv. the employed adult is a female, given that she felt stressed out at work.
(3 marks)

[20 MARKS]

PART B

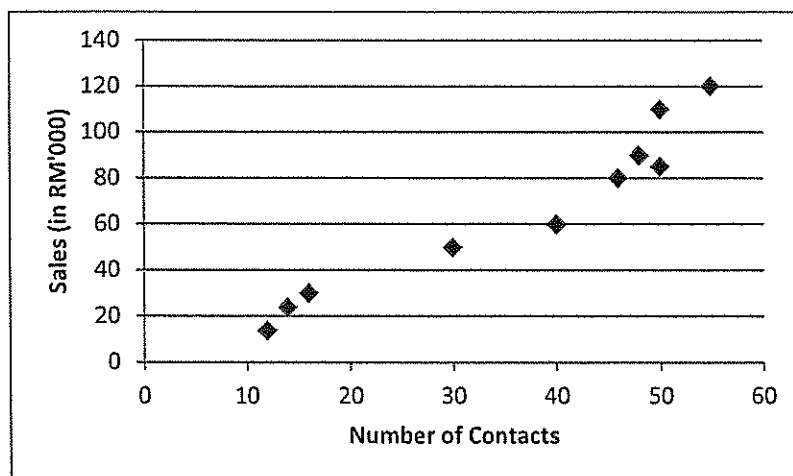
This part consists of **THREE (3)** questions.

Answer ALL questions in the Answering Booklet.

QUESTION 1

A sales manager for a takaful agency believes there is a relationship between the number of contacts and the amount of the sales (in RM'000). To verify this belief, the following data were collected. The information for 10 recent number of contacts and the amount of sales is given below:

Number of Contacts	Sales (in RM'000)
8	14
12	33
30	50
16	30
46	110
20	60
48	90
40	85
55	80
50	120



- i. Based on the scatter diagram above, briefly describe the relationship between the number of contacts and sales.
(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 sales against the number of contacts.
(3 marks)
- iv. Explain the meaning of the slope coefficient obtained in (iii).
(1 mark)
- v. Estimate the amount of sales (in RM'000) if the number of contacts is 35.
(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 2015 and the year 2018 are given in table below.

Supplier	2015		2018	
	Price (RM)	Quantity	Price (RM)	Quantity
A	35	300	35	270
B	30	350	28	250
C	20	400	24	360

Using the year 2015 as the base year:

- i. Calculate the simple aggregate price index in 2018 and explain the meaning.
(3 marks)
- ii. Calculate the Laspeyres' price index for the year 2018 and interpret the value obtained.
(4 marks)
- iii. Calculate the Paasche's quantity index for the year 2018.
(3 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	1	2	3	4
Seasonal Index	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

Sample Measurements

1. Mean

$$\bar{x} = \frac{\sum x}{n}$$

2. Standard Deviation,

$$s = \sqrt{\frac{1}{n-1} \left(\sum fx^2 - \frac{(\sum fx)^2}{n} \right)}$$

3. Coefficient of Variation

$$CV = \frac{s}{\bar{x}} \times 100$$

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

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

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

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

$$4. \text{ Weighted aggregate price index} = \frac{\sum wp_t}{\sum wp_0} \times 100$$

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

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

Where:

- T_L : last trend
- T_1 : first trend
- $S.I$: seasonal index
- n : number of trend
- t : time

v

p

C

C

