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ONLINE FINAL EXAMINATION**

COURSE NAME : INTRODUCTION TO STATISTICS
COURSE CODE : DSM1063
EXAMINATION : DECEMBER 2021
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
5. Each answer sheet must have a page number written at the bottom right corner.
6. 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 **10** printed pages including front page*

PART A

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

Answer ALL questions in Answer Booklet.

QUESTION 1

The weight (kg) of 12 customers registered for ABS fitness studio are as follows.

110	90	65	100	95	75
90	85	80	70	75	90

- a) Find the mean and the mode.

(3 marks)

- b) By comparing the mean and the mode in (a), determine the shape of the distribution for the above data.

(1 mark)

QUESTION 2

The weight loss recorded by 60 EmRZ Gymnasium male customers in January 2020 are recorded as follows.

Weight loss (kg)	Number of Customers
0-1	12
2-3	10
4-5	20
6-7	10
8-9	8

- a) Calculate the mean and standard deviation.

(4 marks)

- b) Given the mean and standard deviation for the weight loss by female customers in January 2020 were 6 and 1.5, respectively. Determine which gender has a more consistent distribution.

(2 marks)

[10 MARKS]

PART B

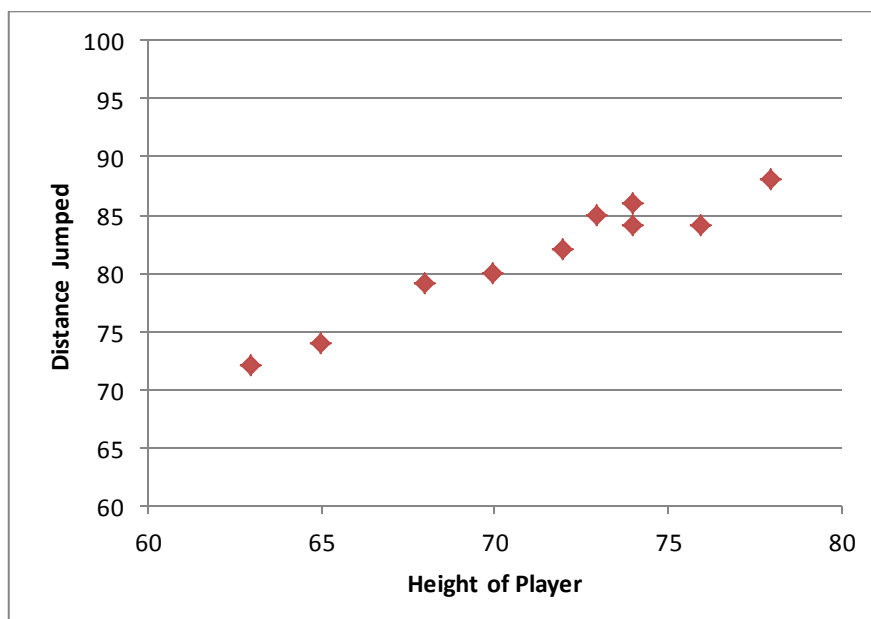
This part contains of **THREE (3)** questions.

Answer ALL questions in Answer Booklet.

QUESTION 1

A long jump coach believes that the distance jump depends on the height of the players. A sample of ten players was selected and their height was measured. The information gathered is shown below:

Height of Player (inches)	Distance Jumped (inches)
78	88
72	82
65	74
68	79
65	72
73	85
74	84
70	80
76	84
74	86



- a) Based on the scatter diagram above, briefly describe the relationship between the height of player and the distance jumped.
(1 mark)
- b) Calculate the Pearson's Product Moment Correlation coefficient.
(3 marks)
- c) Find the linear regression equation using the least square method.
(3 marks)
- d) Explain the meaning of the slope coefficient obtained in (c).
(1 mark)
- e) Estimate the distance jump for a player who is 75 inches tall.
(2 marks)

QUESTION 2

The following table shows the price and quantity of four brands of washing machine sold in year 2019 and 2020.

Brand	2019		2020	
	Price (RM)	Quantity (kg)	Price (RM)	Quantity (kg)
P	1500	50	1600	45
Q	1700	37	1800	40
R	1600	30	1500	40
S	1900	20	1700	50

Using the year 2019 as the base year, calculate:

- a) the simple aggregate quantity index in 2020 and explain the meaning.
(3 marks)

- b) the Laspeyres' price index for the year 2020 and interpret the value obtained.
(4 marks)

- c) the Paasche's quantity index for the year 2020.
(3 marks)

QUESTION 3

The following table shows the number of customers registered for ADY swimming classes from the years 2018 to 2020.

Year	Quarter			
	1	2	3	4
2018	60	50	40	80
2019	70	40	30	70
2020	80	40	40	90

- a) Find the trend values for the number of customers using the moving average method.

(4 marks)

- b) The seasonal indices for the Quarter 1, 2, 3 and 4 are given below:

Quarter	1	2	3	4
Seasonal Index (%)	134.156	70.978	X	132.534

Find the seasonal index of the Quarter 2 marked as **X** and comment on the value obtained.

(2 marks)

- c) By using the value of the seasonal index in (b), forecast the number of customers registered in the Quarter 3 of 2021.

(4 marks)

[30 MARKS]

END OF QUESTION PAPER

APPENDIX 1

Sample Measurements

1. Mean

$$\bar{x} = \frac{\sum x}{n} \quad \text{or} \quad \bar{x} = \frac{\sum fx}{n}$$

2. Median

$$\tilde{x} = L_m + \left[\frac{\frac{\sum f}{2} - \sum f_{m-1}}{f_m} \right] \times C$$

3. Mode

$$\hat{x} = L_{mo} + \left[\frac{\Delta_1}{\Delta_1 + \Delta_2} \right] \times C$$

4. Standard Deviation,

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

5. Coefficient of Variation

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

Where:

- n : total frequency
- L_m : lower boundary of median class
- L_{mo} : lower boundary of modal class
- $\sum f_{m-1}$: Cumulative frequency for the classes before the median class
- f_m : median class frequency
- Δ_1 : (modal class frequency) – (frequency for the class before the modal class)
- Δ_2 : (modal class frequency) – (frequency for the class after the modal class)
- C : class size

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

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

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

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

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

Where:

- p_o : price of the base year
- p_t : price of the current year
- q_o : 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