



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020**

COURSE NAME : INDUSTRIAL FORECASTING
COURSE CODE : BWB 31203
PROGRAMME CODE : BWQ
EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

TERBUKA

THIS EXAMINATION PAPER CONSISTS OF **FOUR (4)** PAGES

- Q1** (a) List **THREE (3)** types of graphical plots that can be used for residual diagnosis. Explain how they can be used to determine whether the residual assumptions have been complied. (10 marks)
- (b) Calculate the seasonal periods or frequency for the following conditions:
- (i) Hourly data that have weekly seasonality. (3 marks)
 - (ii) Hourly data that have yearly seasonality. (4 marks)
 - (iii) Weekly data that have yearly seasonality. (3 marks)
- (c) Explain **THREE (3)** differences between seasonality and cyclic. (6 marks)

Q2 Based on the time series plot for monthly data in **Figure Q2**, answer the following questions.

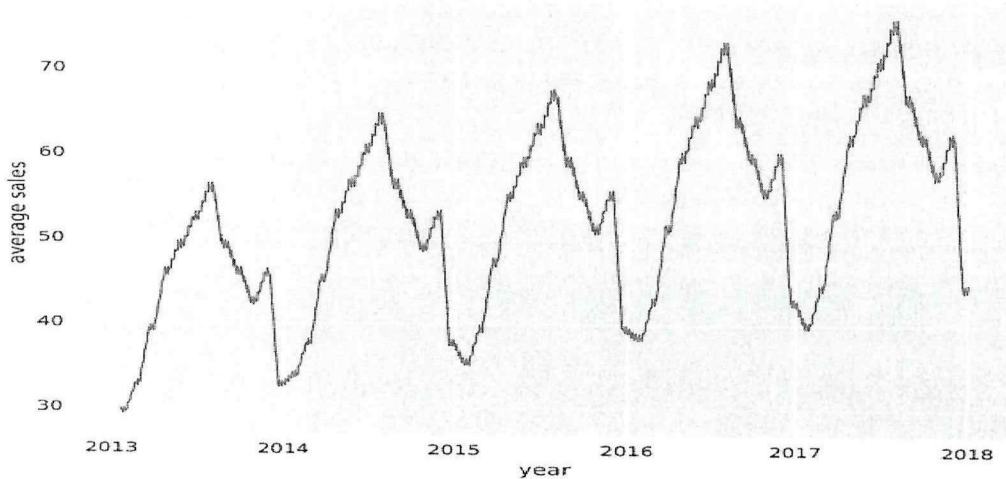


Figure Q2

- (a) Make a conclusion from the time series plot. (7 marks)

TERBUKA

- (b) Suggest the appropriate model of the following forecasting methods.

- (i) Moving average
- (ii) Classical decomposition.
- (iii) Exponential smoothing.
- (iv) Box-Jenkins.

(4 marks)

- (c) Explain what should be done before the data can be analyzed by using Box-Jenkins Method. Explain step-by-step and justify of your answer.

(10 marks)

Q3 Suppose a monthly data that already differencing one time at seasonal lag has a ACF and a PACF plot given in the **Figure Q3**.

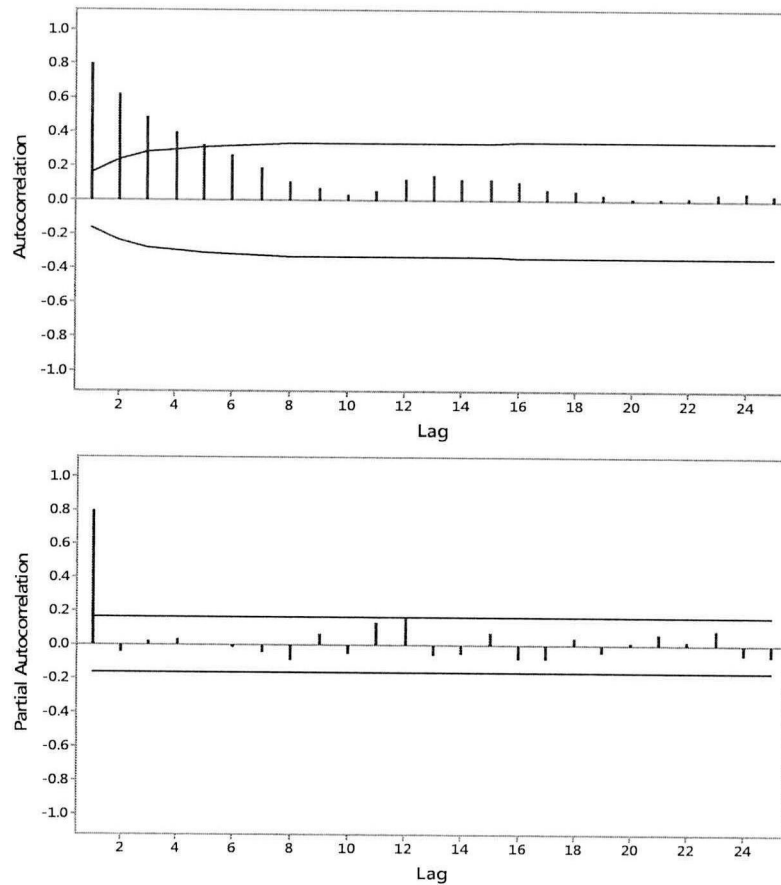


Figure Q3

- (a) Describe the stationarity of the data. Justify your answer.

(3 marks)

TERBUKA

- (b) Suggest a tentative model of Box-Jenkins method. Explain your answer. (7 marks)
- (c) Expand the equation from your model in **Q3(b)** in order to compute the forecast. (7 marks)

Q4 Table Q4 presents quarterly data for the year of 2017 and 2018.

Table Q4

Year	2017				2018			
Time	1	2	3	4	5	6	7	8
Quarter	1	2	3	4	1	2	3	4
Data	72	116	136	96	77	123	146	101

- (a) Calculate the fitted data by using the given equation: $\hat{y}_t = 95.2 + 2.4t$. (4 marks)
- (b) By using your answer in **Q4(a)**, compute the initial seasonal factors for Multiplicative Holt Winters Method by using appropriate normalizing constant. (12 marks)
- (c) By using the information in **Q4(c)**, compute the forecast for the year 2019 using Multiplicative Holt Winters Method. Use constant coefficient of 0.2 for all smoothing equations. (20 marks)

-END OF QUESTIONS-

TERBUKA