



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : INDUSTRIAL FORECASTING

COURSE CODE : BWB 31203

PROGRAMME CODE : BWQ

EXAMINATION DATE : JANUARY / FEBRUARY 2021

DURATION : 3 HOURS AND 30 MINUTES

**INSTRUCTION : ANSWER ALL QUESTIONS
OPEN BOOK EXAMINATION**

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THIS EXAMINATION PAPER CONSISTS OF FIVE (5) PAGES

- Q1 (a) **Figure Q1** shows the time series plot of residual from a time series model. Discuss on the time series model that can be concluded from the time series plot of its residual.

(7 marks)

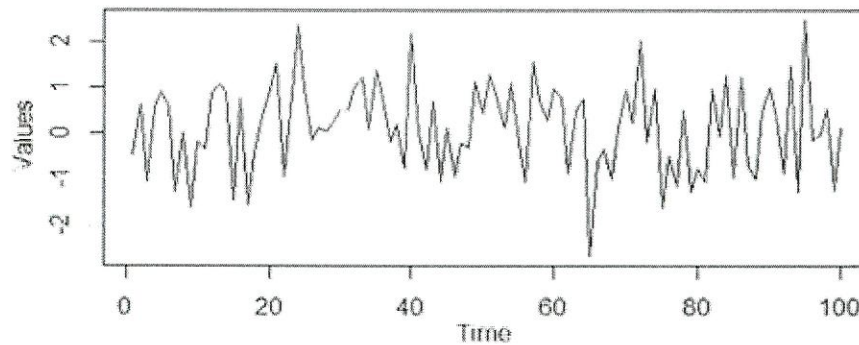


Figure Q1

- (b) Suppose you have rice prices from year 1994 to 2020 and wish to forecast for year 2021. State the data adjustments or transformation that you may consider. Justify your answer.

(3 marks)

- (c) Justify the importance each of the following data partition:

- (i) In sample
- (ii) Out sample
- (iii) Fitted
- (iv) Ex-post forecast
- (v) Ex ante forecast

(10 marks)

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

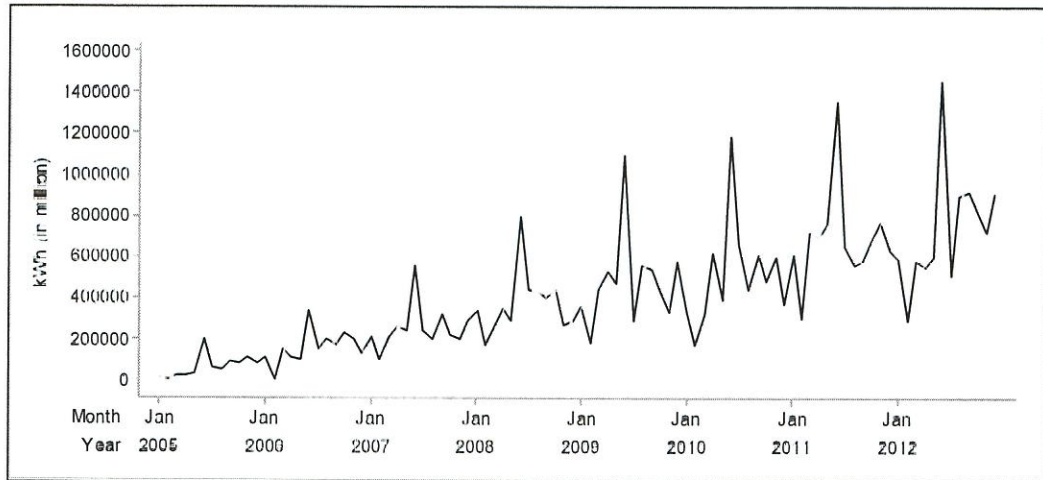


Figure Q2

- (a) Comment what can be observed from the time series plot. (7 marks)
 - (b) Recommend **THREE (3)** appropriate forecasting models for the data. (3 marks)
 - (c) Explain what should be done before the data can be analyzed by using Box-Jenkins method. Explain step by step and give justification of your answer. (10 marks)
- Q3**
- (a) Differentiate between decomposition method and exponential smoothing method in terms of the advantages and disadvantages. (8 marks)
 - (b) Interpret the importance of moving average method. (4 marks)
 - (c) Explain the differences between Multiplicative and Additive Decomposition Method. (8 marks)



Q4 Suppose a monthly data that already differencing at non-seasonal and seasonal lag has a ACF and a PACF plot given in the **Figure Q4**. Based on the plots, answer the following questions.

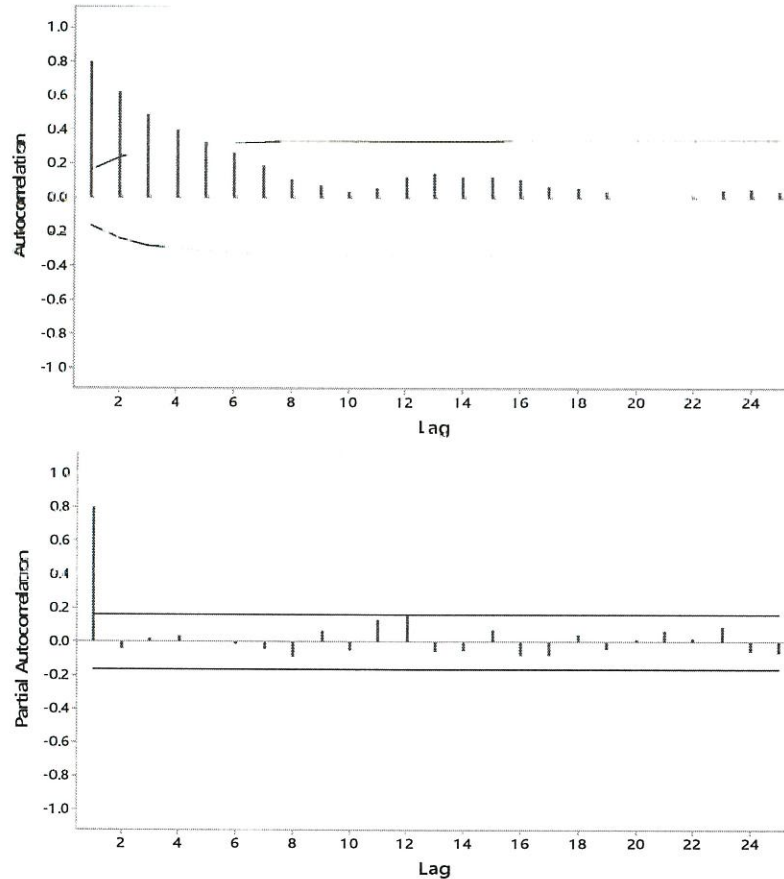


Figure Q4

- (a) Describe the stationarity of the data. Justify your answer. (4 marks)
- (b) Suggest a tentative model of Box-Jenkins methods. Justify your answer. (7 marks)
- (c) Expand the equations of your models in **Q4(b)** in order to compute the forecast. (9 marks)

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- Q5** Table Q5 shows a quarterly time series data. Suppose that the data were used to forecast two steps ahead by using Holt’s Trend Corrected Exponential Smoothing method. Given the trend line equation for initial estimate is $\hat{y}_t = -117 + 2.65t$ and all the smoothing parameters has the value of 0.3.

Table Q5: Quarterly Sales Data

<i>t</i>	1	2	3	4	5	6	7	8
Year	2018	2018	2018	2018	2019	2019	2019	2019
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales	123.99	121.93	126.33	125.99	133.43	128.09	128.45	129.77

- (a) Compute the fitted error. (10 marks)

- (b) Conclude whether the forecasting model is bias (3 marks)

- (c) Compute the two steps ahead forecast and their forecast errors. (7 marks)

-END OF QUESTIONS-

