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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019**

COURSE NAME : PRODUCTION FORECASTING
COURSE CODE : BPC 33003
PROGRAMME CODE : BPB
EXAMINATION DATE : DECEMBER 2018 / JANUARY 2019
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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- Q1** (a) The number of defects in the Roll Forming production line from year 2005 to 2018 is given in the **Table Q1(a)**.

Table Q1(a): Number of defects in the Roll Forming production line

Year	No. of defects	Year	No. of defects
2005	2413	2012	2362
2006	2407	2013	2334
2007	2403	2014	2362
2008	2396	2015	2336
2009	2403	2016	2344
2010	2443	2017	2384
2011	2371	2018	2244

- (i) Compute the first differences from **Table Q1(a)**. (3 marks)
- (ii) Plot the original data and the difference data as a time series. (3 marks)
- (iii) Identify the trend of these series. (4 marks)
- (b) The Roll Forming Sdn. Bhd., would like to analyze the profit portfolio for the years 2013 to 2018. The data are shown in **Table Q1(b)**.

Table Q1(b): Profit portfolio from years 2013 to 2018

Loans	31 March	30 June	30 September	31 December
2013	2313	2495	2609	2792
2014	2860	3099	3202	3161
2015	3399	3471	3545	3851
2016	4458	4850	5093	5318
2017	5756	6013	6158	6289
2018	6369	6568	6646	6861

- (i) Compute the autocorrelations for time lags 1 and 2. (10 marks)
- (ii) Determine whether these autocorrelation coefficients are significantly different from zero at the 0.05 significant level. (5 marks)

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- Q2** Fareed Furniture Supply Chains Company uses an inventory management method to determine the monthly demands for various products. The demand values for the past 12 months of each product have been recorded and are available for future forecasting as presented in **Table Q2**.

Table Q2: Demand for furniture in year 2018

Month	Demand
January	205
February	251
March	304
April	284
May	352
June	300
July	241
August	284
September	312
October	289
November	385
December	256

- (a) Forecast the demand for January 2019 using the exponential smoothing with a smoothing constant of 0.5 and an initial value of 205. (11 marks)
- (b) Evaluate these forecasting methods using the MAPE, MAD and MSD. (9 marks)
- (c) Plot the original data and the difference data as a time series. (5 marks)

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Q3 Consider the data in **Table Q3** where X = weekly production expenditures and Y = weekly sales.

Table Q3: Weekly production expenditures and sales

Y(RM)	X(RM)
1,250	41
1,380	54
1,425	63
1,425	54
1,450	48
1,300	46
1,400	62
1,510	61
1,575	64
1,650	71

The regression equation is $\text{Sales} = b_0 + b_1X$; Expenditure or $\hat{Y} = b_0 + b_1X$

- (a) Determine a significant relationship exist between production expenditures and sales based on r and t value. (4 marks)
- (b) State the prediction equation. (4 marks)
- (c) Forecast sales for production expenditure of RM50. (4 marks)
- (d) Compute the following as shown below;
 - (i) Percentage of the variation in sales that can be explained with the prediction equation. (4 marks)
 - (ii) The amount of unexplained variation. (4 marks)
 - (iii) The amount of total variation. (5 marks)

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Q4 Medium Prima is considering cutting back on its TV advertising in favor of business videos to be given to its customers. This action is being considered after Medium Prima CEO’s read a recent article in the Business Review. Prior taking the action, the CEO would like to investigate the TV advertising history in Malaysia, particularly on the trend cycle. The following **Table Q4** shows information TV advertising expenditure.

Table Q4: TV Advertising expenditure

Year	Expenditure, Y (RM in millions)	Year	Expenditure, Y (RM in millions)
2001	11424	2010	26891
2002	12811	2011	29073
2003	14566	2012	28189
2004	16542	2013	30450
2005	19670	2014	31698
2006	20770	2015	35435
2007	22585	2016	37828
2008	23904	2017	42484
2009	25686	2018	44580

- (a) Plot the time series of Malaysia TV advertising expenditures. (5 marks)
- (b) Fit a trend to the advertising data and plot the fitted line on the time series graph. (7 marks)
- (c) Forecast TV advertising expenditures in RM for 2019. (10 marks)
- (d) Explain the trend in the data based on results in **Q4(b)**. (3 marks)

- END OF QUESTIONS -

