



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2015/2016**

COURSE NAME : PRODUCTION FORECASTING
COURSE CODE : BPC 33003
PROGRAMME : 3 BPB
EXAMINATION DATE : DECEMBER 2015 / JANUARY 2016
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL THE QUESTIONS

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

- Q1** (a) The number of defects in the ATB Metal Sdn. Bhd. production line from year 2002 to 2015 is given in the **Table Q1(a)**.

Table Q1(a) : The number of defects

Year	No. of defects	Year	No. of defects
2002	2413	2009	2362
2003	2407	2010	2334
2004	2403	2011	2362
2005	2396	2012	2336
2006	2403	2013	2344
2007	2443	2014	2384
2008	2371	2015	2244

- (i) Compute the first differences (d) for these data. (6 marks)
- (ii) Plot the original data and the difference data as a time series. (5 marks)
- (iii) Determine if the trend exists in these series. (4 marks)
- (b) The ATB Metal Sdn. Bhd., would like to analyse the profit portfolio for the years 2010 to 2015. The data are shown in **Table Q1(b)**.

Table Q1(b) : The profit portfolio

Loans	31 March	30 June	30 September	31 December
2010	2313	2495	2609	2792
2011	2860	3099	3202	3161
2012	3399	3471	3545	3851
2013	4458	4850	5093	5318
2014	5756	6013	6158	6289
2015	6369	6568	6646	6861

- (i) Compute the autocorrelations for time lags 1 and 2. (6 marks)
- (ii) Determine whether these autocorrelation coefficients are significantly different from zero at the 0.05 significant level. (4 marks)

Q2 ATB Southern Inc., the nation’s third largest cement producer, is pushing ahead with a waste fuel burning program. The cost for ATB Southern will total about RM37 million. For this reason, it is extremely important for the company to have an accurate forecast of revenues for the first quarter of 2016. The data are presented in **Table Q2**.

Table Q2: ATB Southern Inc. Revenues, 2002-2015

Year	Quarter			
	1	2	3	4
2002	77.4	88.8	92.1	79.8
2003	77.5	89.1	92.4	80.1
2004	74.7	185.2	162.4	178.1
2005	129.1	158.4	160.6	138.7
2006	127.2	149.8	151.7	132.9
2007	103.0	136.8	141.3	123.5
2008	107.3	136.1	138.6	123.7
2009	106.1	144.4	156.1	138.2
2010	111.8	149.8	158.5	141.8
2011	119.1	158.0	170.4	151.8
2012	127.4	178.2	189.3	169.5
2013	151.4	187.2	199.2	181.4
2014	224.9	317.7	341.4	300.7
2015	244.9	333.4	370.0	326.7

- (a) Forecast the quarterly revenues for the quarter of 2016 by using exponential smoothing with a smoothing constant of 0.4 and an initial value of 77.4. (10 marks)
- (b) Forecast the quarterly revenues for the first quarter of 2016 by using a smoothing constant of 0.6 and an initial value of 77.4. (10 marks)
- (c) Identify the smoothing constant that provides better forecast based on the answer in **Q2(a)** and **Q2(b)**. (5 marks)

Q3 The quarterly production sales levels (measured in millions of RM) for Dunlop Tyre are shown in **Table Q3**.

Table Q3 : Dunlop Tyre production sales (in millions of RM)

Year	Quarter			
	1	2	3	4
2004	2,292	2,450	2,363	2,477
2005	2,063	2,358	2,316	2,366
2006	2,268	2,533	2,479	2,625
2007	2,616	2,798	2,656	2,746
2008	2,643	2,811	2,679	2,736
2009	2,692	2,871	2,900	2,811
2010	2,497	2,792	2,838	2,780
2011	2,778	3,066	3,213	2,928
2012	2,874	3,000	2,913	2,916
2013	2,910	3,052	3,116	3,210
2014	3,243	3,351	3,305	3,267
2015	3,246	3,330	3,340 ^a	3,300 ^a

^a Value Line estimates

- (a) Develop the regression equation for trend line. (4 marks)
- (b) (i) Analyse this time series to get the four seasonal indexes. (4 marks)
- (ii) Determine the extent of the seasonal component in Dunlop production sales. (4 marks)
- (c) Forecast for third and fourth quarters of 2015. (8 marks)
- (d) Compare your forecast to Value Line's. (5 marks)

Q4 Consider the data in **Table Q4** where X = weekly production expenditures and Y = weekly sales.

Table Q4 : X = weekly production expenditures and Y = weekly 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 Sales = $b_0 + b_1$ 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 percentage of the variation in sales that can be explained with the prediction equation. (4 marks)
- (e) Compute the amount of unexplained variation. (4 marks)
- (f) Compute the amount of total variation. (5 marks)