UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2014/2015

COURSE NAME	:	INDUSTRIAL FORECASTING
COURSE CODE	:	BWB 31203
PROGRAMME	:	3 BWQ
EXAMINATION DATE	:	DECEMBER 2014/JANUARY 2015
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) State the definition of Forecasting and Time Series.

(2 marks)

(b) State and define two groups in forecasting method.

(4 marks)

(c) Describe the historic patterns that exist in Forecasting and sketch it.

(8 marks)

(d) Explain four (4) types of the measuring forecasting accuracy.

(4 marks)

(e) What does the Correlation Coefficient do? What does it mean by the Fit is Good?

(2 marks)

Q2 Ministry of Transportation has come out with the statistics of accident for the past nineteen years. Table **Q2(a)** shows the rate of accident by year from 1995 until 2013.

Table Q2(a) : Rates of Accident

Year	Rates of Accidents
1995	5,712
1996	6,304
1997	6,302
1998	5,740
1999	5,794
2000	6,035
2001	5,849
2002	5,891
2003	6,286
2004	6,228
2005	6,200
2006	6,287
2007	6,282
2008	6,527
2009	6,745
2010	6,872
2011	6,661
2012	6,430
2013	5,999

(a) Compute the naive forecast from 1996 until 2014.

(4 marks)

(b) Compute the two period of moving average until 2014.

(9 marks)

(c) Find the Mean Absolute Error for both **Q2(a)** and **Q2(b)**.

(7 marks)

Q3 (a) A company uses exponential smoothing with trend to forecast usage of its lawn care products. At the end of July the company wishes to forecast sales for August. The July demand was 62. The trend through June has been 15 additional gallons of product sold per month. Average sales have been 57 gallons per month. The company uses alpha+0.2 and beta +0.10. Forecast for August.

(6 marks)

(b) A woman society managed to gather some data for the number of birth in Ukraine for the past ten years as shown in Table **Q3(b)**. They wish to predict the number of birth in 2014.

Table Q3(b) : Number of Birth in Ukraine

Year	Baby Born
2003	212,037
2004	223,166
2005	188,123
2006	235,645
2007	211,000
2008	288,653
2009	286,098
2010	328,264
2011	342,252
2012	299,765

Solve the problem using Holt's Winter Method with alpha 0.2 and beta 0.1.

(14 marks)

Q4 (a) A university must develop a forecast for the fourth year of enrollments in Advance Diploma in Science. It has collected quarterly enrollments for the past three years as shown in Table **Q4(a)**. It has also forecast total enrollment for fourth year to be 580 students. What is the forecast for each quarter of the fourth year?

Table Q4(a) : Number of Enrollments

Year	Quarter	Enrollments
1	1	145
1	2	185
1	3	132
1	4	94
2	1	140
2	2	190
2	3	135
2	4	90
3	1	145
3	2	188
3	3	130
3	4	95

(6 marks)

(b) Suppose we want to predict job performance of Chevy mechanics based on mechanical aptitude test scores and test scores from personality test that measures conscientiousness as shown in Table **Q4(b)**.

Table Q4(b) : Job performance of Chevy Mechanics

Job Performance	Mechanical Aptitude	Test Score
1	40	25
2	45	20
1	38	30
3	50	30
2	48	28
3	55	30
3	53	34

Predict the job performance when Mechanical Aptitude is 56 and Test Score is 3.

(14 marks)

Q5 (a) The data below indicates the daily usage of gas (in liters) in a motorcycle. A sample of 15 days of usage is selected and shown in the Table **Q5(a)**.

Table Q5(a) : Daily usage of gas (in liters)

Day	Gas
1	6.1
2	5.0
3	5.0
4	8.4
5	7.1
6	7.3
7	7.7
8	5.3
9	4.0
10	4.8
11	5.5
12	4.5
13	3.8
14	5.0
15	5.9

(i) Solve the forecasting problem by using Random Walk Method.

(10 marks)

(ii) Find the Tracking Signal for **Q5(a)(i)**.

(5 marks)

(b) Table **Q5(b)** shows the result of forecasting with an AR(2) Autoregressive Model and the Minitab program compute the least squares estimate $\phi_0 = 115.2, \phi_2 = 0.0055$ and the forecast value for time 76 is 77.2. Find the value of ϕ_1.

Table Q5(b) : AR(2) Autoregressive Model Output

Time	Actual Value	Forecast	Residual
71	90	76.4	13.6
72	78	67.5	10.5
73	87	74	13
74	99	69.1	29.9
75	72	62.7	9.3

(5marks)

-END OF QUESTION-