Department of Statistics
STATS 326: Applied Time Series
Summer Semester, 2019
Test 2
Total Marks = 100

1. Based on the plots of the Residential Gas Usage in Iowa on page 1 of the Appendix, briefly explain why we should use the log transformed data in our models.

(10 marks)

2. Are the assumptions satisfied for the Seasonal Factor model of the Residential Gas Usage in Iowa on pages 2 and 3 of the Appendix. Explain.

(15 marks)

3. Calculate the predictions for January to March 1979 using the Seasonal Factor model on page 3 of the Appendix. Calculate the RMSEP statistic for those predictions. (Note: the actual values for January to March 1979 are given on page 1 of the Appendix.)

(20 marks)

4. What would the predictions and RMSEP statistic be for a Full Harmonic model of the Residential Gas Usage in Iowa for January to March 1979? (Note: the model output is not included in the Appendix.)

(5 marks)

5. Calculate the RMSEP statistic for the predictions of the Reduced Harmonic model that retains any harmonic pairs where at least one of the harmonics is significant on page 4 of the Appendix. (Note: the actual values for January to March 1979 are given on page 1 of the Appendix.)

(10 marks)

6. Which model is the best predicting model of the Residential Gas Usage in Iowa for January to March 1979? Justify your answer. (Note: the RMSEP statistics from Test 1 are on page 4 of the Appendix and the RMSEP statistic for a Reduced Harmonic model that retains only significant harmonics was 41.22526.)

(5 marks)

7. Why are the RMSEP statistics used in both of the tests in this course likely to be unreliable when used to choose the best predicting model of the Residential Gas Usage in Iowa?

(5 marks)

8. What Stationary model would you initially fit to each of the 4 simulated Stationary Time Series (`sim1`, `sim2`, `sim3` and `sim4`) on pages 5 – 8 of the Appendix? Justify your choice of model in each case.

(20 marks)

9. What are the values of the 95% confidence limits for the acfs and pacfs of the Stationary Time Series on pages 5 – 8 of the Appendix? Write down both the formula and your answer (T = 1000).

(10 marks)