Department of Statistics
STATS 326: Applied Time Series

First Semester, 2019
Test 2
Total Marks = 100
6.30 to 7.30 pm

1. Briefly discuss the plot of the Arctic Sea Ice data on page 1 of the Appendix.
(5 marks)

2. Are the assumptions satisfied for the Seasonal Factor model of the Arctic Sea Ice on page 2 of the Appendix? Explain briefly.
(10 marks)

3. Calculate the predictions for January to March 2018 using the Seasonal Factor model on page 2 of the Appendix. Calculate the RMSEP statistic for those predictions. (Note: the actual values for January to March 2018 are given on page 1 of the Appendix.)
(15 marks)

4. What would the predictions and RMSEP statistic be for a Full Harmonic model of the Arctic Sea Ice for January to March 2018? (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 on page 3 of the Appendix. (Note: the actual values for January to March 2018 are given on page 1 of the Appendix.)
(10 marks)

6. Briefly comment on the SARIMA model of the Arctic Sea Ice (`SARIMA.Ice.fit`) at the top of page 4 of the Appendix.
(5 marks)

7. Using the SARIMA model (`SARIMA.Ice.fit7`) on page 4 of the Appendix, write down the model in backshift notation, multiply out the model and show it in the form y_t = ….. with lagged values of y used as the common factor.
(20 marks)

8. Is the SARIMA model (`SARIMA.Ice.fit7`) on page 4 of the Appendix a better model to use for prediction than the Seasonal Factor, Full Harmonic or Reduced Harmonic models? Justify your answer.
(10 marks)

9. What Stationary model would you initially fit to each of the 4 simulated Stationary Time Series (`TS1`, `TS2`, `TS3` and `TS4`) on pages 5 – 8 of the Appendix? Justify your choice of model in each case. Write down the equation of the model you have chosen for each series.
(20 marks)