PGPBABI-TIME SERIES Assignment

The attached data shows monthly sales (in 10,000 rupees) of a certain company (Company X) from January 2011 to May 2017. The ultimate objective of this exercise is to predict sales for the period June 2017 to December 2018.

1. Read the data as a time series object in R. Plot the data. What are the major features you notice in this series? Is this a stationary series?
2. Use a moving average to smooth the data.
3. Using multiplicative seasonality estimate seasonal indices.
4. Does the de-trended and de-seasonalized data for a stationary series? You do not have to do any formal test of stationarity. Plot the data and make your conclusion.

For the above parts you can do calculations in MS Excel or you may use R. The final output must be presented in MS Excel under the following column headings.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | Month | Sales | MA | Detrended Data | Seasonal Index | Random Component |

For the parts below you need to use R. MAPE calculation may be done in R by writing your own code, or you can copy the forecasted values in MS Excel and do the calculation.

1. Use the last 17 months as hold-out sample (Jan 2016 – May 2017). Fit a suitable model to the rest of the data and calculate MAPE. You may try out different models and use the one which has minimum MAPE. Note that the forecasted values are saved in the component $mean.
2. Use the ‘best’ model obtained from above to forecast for the period June 2017 to December 2018. Provide forecasted values as well as their upper and lower confidence limits.