King Saud University

College of Business Administration

Quantitative Analysis Department (QUA)

Business Forecasting

SDE 542

TAKE-HOME FINAL EXAM   **Duration: 48 hours**

Note:

- Provide answers for the all enquires in (1) and (2).
- Arrange your answers such that every question has its answer below the question.
- You should interpret all results.
- **You must work in the exam individually and seek NO assistance from anyone.**

Airlines regularly try to predict accurately the revenue passenger-miles (RPM) for future periods; this gives the airline a picture of what equipment needs might be and is helpful in keeping costs at a minimum. The RPM for international flights on major international airlines is shown in the accompanying Excel file (RPM.xls) for the period Jan-1979 to Feb1984. Also shown is personal income during the same period, in billions dollars.

1. Build a multiple regression model for the data.
    a. Check the data for any trend
    b. Check the data for seasonality and account for it.
    c. Is the assumption of independent errors for this model viable?
    d. Check and test for serial correlation in this model
    e. Check for multicollinearity
    f. Examine whether the regression model is appropriate for the data
    g. What percentage of the variation in RPM is explained by this model?
    h. Predict RPM for the next month with a 95% prediction interval.

2. Build an ARIMA model for the data to predict RPM for the next month
    a. Check the data for stationarity and account for non-stationarity if it exists.
    b. Check the data for seasonality and account for seasonality if it exists.
    c. Identify an initial model
    d. Estimate the parameters for the initial model
    e. Checked and test for the adequacy of the model
    f. Modified the initial model If necessary, until the residual indicate no further modification is necessary
    g. Predict RPM for the next month with a 95% prediction interval
    h. Compare the two models (Multiple Regression and ARIMA). Which one you think is better for forecasting?