

# **OM 302 Final Exam**

## **Sample Problems**

### **Step-by-Step Guide**

5/11/18

#### **Forecasting Problem 1**

a) Four months moving average for month 4:

- Add sales for months 1-4.
- Divide the sum calculated above by 4.

b) Five months moving average for month 5:

- Add sales for months 2-5.
- Divide the sum calculated above by 5.

## Forecasting Problem 2

This problem requires an algebraic reconfiguration of the exponential smoothing equation. Use this pattern:

$$\text{Knowns} = \text{Unknowns}$$

## Forecasting Problem 3

1. Right click on one of the blue dots.
2. When the dot “lights up”, go to the dialog box on your right and scroll down to the line “Display equation on chart. Click.
3. Substitute the value given in the problem for  $x$  in that equation.

## Forecasting Problem 4

Substitute values of 15 and 16 for  $x$ .

## **Forecasting Problem 5**

1. Subtract the forecasted demand from the actual sales to calculate the forecasting error.
2. Convert each value of the forecasting error into an absolute value by removing the + or - sign.
3. Add absolute values in each column.
4. Divide the sum of these absolute values by the number of months (6).
5. The smaller MAD value points to a better forecast.

## Forecasting Problem 6

1. Click on “Data” on the ribbon.
2. Go to “Data Analysis”.
3. Scroll down to “Regression”, and click on it.
4. Follow instructions on the screen:
  - a) Enter the Y column
  - b) Enter the Xs columns
  - c. Click on the cell where you want the results to be displayed.
5. Find the “Coefficients” column.
6. Write the regression equation using the information from the “Coefficients” area.
7. Substitute the X1, X2, X3 values into the regression equation.
8. Solve for Y.

## **Simulation Problem 1**

1. Add the values in the column “Frequency of Breakdowns”.
2. Calculate the relative probability by dividing each frequency of breakdowns by the total of breakdowns (200).
3. Calculate cumulative probabilities, by adding relative probabilities as shown by the arrows.
4. Structure the RN interval. The first interval: start with 1 and end with 10. The second interval: start with 11 and end with 40.
5. Match the random numbers (given) with the corresponding interval.
6. Find the number of breakdowns corresponding to each RN intervals from step 5.
7. Add all projected breakdowns.
8. To find the average number of breakdowns per week divide the sum of projected breakdowns by 10 (weeks of simulation).

## Simulation Problem 2

1. Repeat steps from the simulation problem 1.
2. Identify weeks where simulated sales exceed 8.  
(These are weeks when Higgins project that the firm will be out of stock.)
3. Since the order lead time is 4 weeks the weeks when the additional orders should be placed are:
  - week  $14 - 4 \text{ weeks} = \text{week } 10$
  - week  $16 - 4 \text{ weeks} = \text{week } 12$

These are weeks during which additional 2 heaters, each of these two weeks, need to be ordered.



## Waiting Lines Problem 1

- Calculate L using the Single-Channel Calculator:
  - Insert the rate of arrivals
  - Insert the rate of arrivals
  - Find the value of L.

2. Calculate L using the Two- Channel Calculator:

- Insert the rate of arrivals
- Insert the rate of arrivals
- Find the ratio of  $\lambda/\mu$  .

3. Go to the first column of the table and find the ratio calculated above.

4. Look up a value corresponding to that ratio.

5. Insert that value in the calculator.

6. Look up the value of L.

7. Calculate Total Costs using the equation that is provided.

The lower total cost represents the more desirable economically configuration. The utilization is the ratio calculated above.

## Waiting Lines Problem 2

a) Using the Single-channel calculator find the value of  $P_w$ :

- enter the corresponding value of  $\lambda$
- enter the corresponding value of  $\mu$
- find  $P_w$  in the Operating Characteristics column

b) Using the Single-channel calculator find the value of  $P_n$ :

- enter the corresponding value of  $\lambda$
- enter the corresponding value of  $\mu$
- enter the corresponding value of  $n$
- find  $P_n$  in the Operating Characteristics column

### Waiting Lines Problem 3

- a) Identify values of:  $\lambda$ , T, and n.
- b) Substitute all values in the Pn equation.
- c) To find the value of  $e^{-2}$  follow these steps in Excel:
  - Formulas > Math & Trig > EXP (-2)
- d) To find the value of 4! follow these steps in Excel:
  - Formulas > Math & Trig > FACT (-2)
- e) Solve for P<sub>4</sub>

## Waiting Lines Problem 4

a) Convert minutes to hours:  $T = 10/60 = 0.167$

b)  $\mu = 3$

c) Substitute into the equation

d) Find the value of P