

IEOR 150 Midterm II (Fall 08)

Name:

Student ID #:

1. Observations of the monthly demand of a particular brand of coffee maker at a retail store are the following:

Month	Demand
Jan	200
Feb	250
Mar	175
Apr	186
May	225

- (a) What were the one-step-ahead forecasts of demand for these five months using exponential smoothing with $\alpha = 0.15$ (assume the forecast for Jan was 200 to get started). (4 points)
- (b) If we use $\alpha = 0.35$ instead of $\alpha = 0.15$, do you expect the forecasts to be more stable or more unstable (than what you get in (a))? Please explain. (3 points)
- (c) Keep $\alpha = 0.15$, what is the forecast of demand in August (forecast made at the end of May)? (2 points)
- (d) Give a one-or-two-sentence explanation of why the method is called "exponential smoothing". (1 point)

2. The table below records the quarterly demand of a kind of purse at a small manufacturing company.

	Year 2006	Year 2007
Quarter 1	750	845
2	625	650
3	500	530
4	820	800

(a) Find the seasonal factors based on these two years of data using 4-period moving average. You could stop without normalizing the seasonal factors to save a bit of computation. (7 points)

(b) Suppose we use Regression Analysis on the two years of deseasonalized demand data and have got a and b in the equation $Y=a+bX$. (where X is time and Y is the demand) What is the trend (in terms of a and/or b)? And what is your forecast for the demand in the second quarter in Year 2008? (in term of a and/or b) (3 points)

3. The time-phased net requirements for the base assembly in a table lamp over the next six weeks are

Week	1	2	3	4	5	6
Requirements	335	200	140	440	300	200

The setup cost for the construction of the base assembly is \$200, and the holding cost is \$0.30 per assembly per week.

(a) Determine the lot sizes using the Silver-Meal heuristic.(5 points)

(b) Solve the above problem assuming the following production capacities $c=(350,350,350,350,350,350)$. i.e. use the technique in Section 7.4 to find a feasible policy with the lowest cost. (5 points)

4. The personnel department of the A&M Corporation wants to know how many workers will be needed each month for the next four-month production period. The following is a monthly demand forecast for the four-month period.

Month	Forecasted Demand
July	1250
August	1100
September	950
October	1500

The inventory on hand at the end of June was 500 units. The company wants to maintain a minimum inventory of 300 units each month and would like to have 400 units on hand at the end of October. Each unit requires five employee-hours to produce, there are 20 working days each month, and each employee works an eight-hour day. The workforce at the end of June was 35 workers. Determine the minimum constant workforce required to meet demand over the next four months. (5 points)