

Second Exam

Write all answers in your blue book and show all work there. Return your exam and printout(s) in your blue book.

23 pts.

- 1) The sales of your firm have been growing on quarterly basis along the following trend: $S = 100(1.01)^Q$ where Q is the quarter.
- By what percentage do the sales grow per quarter?
 - What are the sales expected to be in the 16th quarter?
 - You have seasonal variation reflected by the following seasonal indices for quarters 1 to 4; 90, 110, 85, 115. Do these values add up as they should? Explain.
 - Rework b to take seasonality into account.
 - What is the deasonalized value of sales in the 3rd quarter of a year if the observed sales are 120. Of what use is a deseasonalized value like this?

23 pts.

- 2) Empirical work shows you a production function where $\ln Q = 4 + .4\ln L + .3\ln K + .4\ln E$
- Write out the Cobb Douglas (exponential) form of the equation.
 - Derive the marginal product equations.
 - Describe the returns to scale.
 - If $K = e^3$ and $P_L = 5$ and $P_E = 4$, find the cost minimizing combination of L and E to make $Q = 4915$.

23 pts.

- 3) a) Two research projects are under consideration for the development of a product improvement. Option 1 may cost 5 or 10 million, each equally likely. Option 2 may cost 6 or 8 million, higher cost having a 70 percent likelihood. a1) If you must choose one or the other with no parallel development, which one would you chose? Why? a2) If after 1 million is spent the final cost becomes known, would you chose parallel development? Why?
- b) A diffusion model has been estimated such that $\ln(p(t)/(1-p(t))) = 10 - 2t$. At what time period do we expect the innovation to be adopted by 50 percent of the industry. Why?

Over

16 pts.

- 4) a) Why must we look past book value toward opportunity cost to make good decisions regarding cost?
- b) Why must we take care to notice changes in either factor prices or technology when estimating cost functions.
- c) Why must we be careful with allocated overhead figures, when assessing the profitability of new business?

15 pts.

5) Consider the following data and **use the computer** to find the best cost function that you can from it. Be sure to describe what it is about your model that makes it better than others that you tried.

q	tc
25	13080
30	18060
28	15800
27	14630
30	18110
31	19280
33	22290
29	16800
30	18200
28	15780

I have neither given nor received unfair aid on this test nor am I aware of anyone else who has.
