SAMPLE EXEMPTION EXAMINATION

This is a CLOSED BOOK EXAM. Its purpose is to determine whether you know a significant portion of the material taught in the course. You need not get everything right to be exempt. You have one hour to complete this exam.

1. (a) Within the Economic Order Quantity [EOQ] model, what two costs are balanced?
   (b) The EOQ model yields the least costly production lot size. Yet the Just-In-Time approach advocates production lot sizes of a single unit. Reconcile this contradiction.
   (c) Within the Newsvendor (or Newsboy) model, (a single-product model with one chance to buy and sell) what two costs are balanced?

2. (a) In words, how would one calculate the capacity of a manufacturing process consisting of a series of sequential tasks?
   (b) What symbol is typically used to represent a “decision” in a process flow diagram? What symbol is often used to represent a buffer of inventory?

3. The following questions concern the long-run average behavior of a service system in which the arrivals and service times have some level of randomness.
   (a) Draw a rough graph that describes the relationship between the average time a customer spends waiting in line and the proportion of time the server is utilized. (Put “server utilization” on the horizontal axis.) Describe (in a few words) what happens to these two quantities as demand for the service increases.
   (b) Describe the relationship between average waiting time per customer and average number of customers waiting in line.

4. (a) Briefly describe an Operations Management situation for which Monte Carlo simulation (i.e. simulation using random numbers) would be a particularly appropriate modeling tool, and how the results from a simulation would be used by a decision maker in that situation.
   (b) Identify one of the major drawbacks of using Monte Carlo simulation in Operations Management.

5. (a) Briefly describe acceptance sampling and statistical process control.
   (b) Can a process be “in control” but “outside spec?”
6. An automobile manufacturer wants to deliver a customer’s automobile within seven days of the order after allowing the customer to select all options. They are trying to decide which of the following production strategies to use: Produce to order, Produce to semi-finished stock, or Produce to finished stock.
   (a) Which of these should they use? Describe the strategy you recommend, and explain why it should be used.
   (b) Assuming the company accepts your recommendation from (a), what forecasts would be needed to develop production plans?

7. What is exponential smoothing? What would be an alternative?

8. Briefly (a sentence or two) address the following questions:
   (a) Identify a demand characteristic that suggests a significant need for aggregate/intermediate range production planning.
   (b) What are PERT/CPM methods and what are they used for?
   (c) List the major (no more than four) types of data necessary to apply PERT/CPM techniques.

9. The following questions (concern) Linear Programming (LP):
   (a) LP can only be used in situations where fractional values are permissible for the decision variables. (True/False).
   (b) The decisions recommended by an LP are not affected by adding a constant to the LP objective function or multiplying the LP objective function by a positive constant. (True/False).
   (c) What part of an LP restricts the decisions to satisfy restrictions imposed by the real situation?
   (d) Differentiate between the terms “feasible solution” and “optimal solution.”
   (e) Define the dual (or shadow) price of an LP constraint. Of what use is such a number to an Operations Manager?
   (f) What is the purpose of sensitivity analysis?
   (g) Give an example of a situation in which it would be very important to include variables that can only take the values of 0 or 1.