



JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA
PGDM (M)
SECOND TRIMESTER (Batch 2019-21)
END-TERM EXAMINATIONS, DECEMBER 2019
Set-I

Course Name	Operations Management	Course Code	OM 202
Max. Time	2 hours	Max. Marks	40 MM

INSTRUCTIONS:

Please put your name on the above line and check that your exam has **five** questions and **four** printed sides (including title sheet). Carefully read through each problem before starting and think about each problem before writing. Be as neat as possible; if your work cannot be read, it will not be graded. Show all work as that is the only way to get partial credit.

All five questions are required; each question is worth the points indicated. Maximum possible points are 40.

This exam is open-book, open-notes are allowed. All work must be the individual's only.

Question 1) Nocaf Drinks, Inc., a producer of decaffeinated coffee, bottles Nocaf. Each bottle should have a net weight of 12 ounces. Recent measurements made from 100 samples were recorded as follows:

Average net weight for the sample tested = 12 oz

Standard deviation of sample tested: 0.2 Oz

- a) A bottle of Nocaf is considered to be within specification limits if the net weight is 12 ounces \pm 0.5 ounces. Based on this information, what is the value of C_{pk} of the above process? (4 points)
- b) Assuming that the output from the filling process follows a normal distribution, what fraction of the output will **not** meet the specification limits? (4 points)

Question 2) Consider the following information pertaining to a project: You have collected the data for a CPM Scheduling model analysis. The time is in weeks and the project "direct costs" are given below.

<u>Activity</u>	<u>Immediate Predecessor</u>	<u>Normal Time (wks)</u>
A	None	3
B	A	4
C	A	3
D	B	1
E	B, C	4
F	D, E	4

- Construct the network diagram for the project from the information provided above. (2 points)
- For each activity, calculate the ES, LS, EF, and LF times. Also calculate the slack for each activity (2 points)
- Based on the results of CPM, what is the minimum time in which the project will be completed, Which activities are critical? (2 points)
- If the start of activity D is delayed by 2 weeks (from its early start time), what effect does it have on the overall project duration? (2 points)

Question 3) Safety Bank, a regional bank with several branches in the mid-Atlantic region has recently decided to add drive thru facilities to several of its locations in order to provide its customers more service options. However, the bank wants to ensure that customers do not have to wait for an unreasonable amount of time and adequate space is available to customers in while they wait in their vehicles for service.

Assume the following:

Customer Arrivals = 12 vehicles per hour

Average Service Times = 3 minutes per customer

Number of drive thru windows = 1

- Based on the above information, what is the probability that a customer arriving at the drive thru window will have to wait for service to begin? (3 points)
- What will be average waiting time for a customer in line, W_q and the average number of customers (vehicles) waiting in line, L_q ? (3 points)
- In order to ensure that adequate space is available to the drive through customers, what is the minimum number of spaces needed (including space for the vehicle in service), such that

the probability of being able to join the queue is at least 90% (2 points)

Question 4) Airline ticket consolidators are companies that will buy bulk space on an airline usually at deeply discounted fares. The general idea is that they can turn around and sell these tickets at a profit to consumers at a price that is significantly lower than if the consumer bought the same seat directly from the airline. This phenomenon is observed quite frequently, especially in the international airfare market. From the airline's point of view, it makes sense as it reduces its risk of flying at low passenger loads resulting in very high operating costs.

Now imagine that you are an airline consolidator. The two most important decisions facing you are how much space to buy on a particular flight and what price to pay for it. Specifically, suppose you can buy space in advance from an airline for a particular flight at a cost of \$350 per seat. In the market that you compete in, you have established that the price that you can fetch from your customers is \$600 per seat. Furthermore, the deeply discounted tickets are required to be bought at least one week in advance. Past data on this particular segment has indicated that your customer demand follows a normal distribution with a mean of 50 and standard deviation of 30 within the booking period. Assuming that any unsold seats that remain with you (within the week prior to the flight) can be sold to a travel warehouse club for \$200 each, how many seats should you purchase in advance. Clearly state all your assumptions. (8 points).

Question 5) Technology Solutions Inc. (TSI) is a retail store that buys complete computer systems from a particular vendor and resells them to end users through its outlet. For a particular kind of computer it stocks and sells the firm has estimated an annual demand of 400 units. Order Costs are \$250 per order and inventory holding costs per unit are 10% per year. TSI currently purchases this computer from the vendor for \$1,250 per unit. Order lead-time is 1 week (assume 50 weeks per year for calculation purposes).

Assuming that demand is known and constant, lead times are constant, and all other conditions for implementing the standard EOQ model are met, answer the following questions:

- a) What is the optimal order size (EOQ) for TSI? (2 points)
- b) What is the reorder point? (i.e., the inventory level when TSI must reorder the computers)? (2 points)
- c) What is total annual holding cost and annual order costs if the optimal order size is ordered.? (2 points)
- d) Assume now that the lead-time changes from 1 week to 2 weeks. What should the new order quantity Q and reorder point R' be? (2 points)