

**JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA**  
**PGDM / PGDM (M) / PGDM (SM)**  
**SECOND TRIMESTER (Batch 2022-24)**  
**END TERM EXAMINATIONS, JANUARY 2023**  
**SET-1: MAIN QP**

<b>Course Name</b>	<b>Operations Management</b>	<b>Course Code</b>	<b>20502</b>
<b>Max. Time</b>	<b>2 Hours</b>	<b>Max. Marks</b>	<b>40 MM</b>

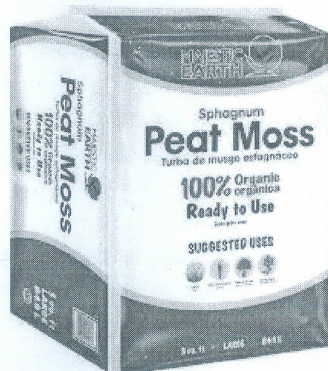
**INSTRUCTIONS:**

- This is a Closed Book examination.
- Attempt all four questions.
- Only Scientific Calculators allowed for calculations
- Answers should be rich in content, pointwise and precise. Avoid unnecessary long answers.

**Q1)**

**Caselet: Green Garden Products**

Christina Phillips is the Operations Manager at Green Garden Products, a large house gardening store. The store's owners have recently initiated a directive to reduce the store's operating costs and also improve customer service. As Operations Manager, Christina would like to find the ways to reduce inventory related costs. She would also like to help improve customer service by better managing potential stockout situations. Last semester, Christina took a course on operations management at the local university and became familiar with simple inventory models. Now, she would like to investigate the use of the EOQ model for the store's products. Christina has selected one popular product to start with: Peat Moss. *(Peat Moss is a soil amendment that is a dark-brown fibrous material used as a planting medium for growing plants. Peat Moss is naturally made or formed and harvested from peat bogs. It's soilless but is often added to soil to lighten, aerate, and help retain moisture).*



Peat Moss is sold in two-cubic foot cubes, which cost the stores \$6.20 each to purchase from a vendor. Stan Harrison, the store cost accountant, has determined that the annual carrying cost rate is 35% of the cost of product. Stan also determined that the average cost of placing and receiving an order from a vendor is \$80 per order, regardless of the order quantity. Store is open for 360 days in a year.

Year 2022 has just ended and Christina has collected the monthly sales data of cubes for the last year.

S. No.	Months (Last Year-2022)	Sales (nos. of peat moss cubes)
1	January	1050
2	February	1080
3	March	1050
4	April	1020
5	May	1000
6	June	995
7	July	985
8	August	990
9	September	965
10	October	1110
11	November	990
12	December	1010

- a) Develop a 5-month moving average forecasts for the months of the last year and for January, 2023 this year.
- b) Comparatively analyze in brief how the *longer period* moving average forecast (i.e. more number of periods to determine moving average) differs from *shorter period* moving average forecast.
- c) To forecast demand of cubes for the first month i.e. January, 2023 of this year, Christina plans to 3-month weighted moving average forecasting method. Christina is of the view that the decrease in demand of cubes in November last year was due to some random unexplained causes. Accordingly, she decides to use weight of 50% for the October sales data, 10% for November sales data and 40% for December sales data to compute a three-month weighted moving average forecast. Determine the demand forecast for January this year.
- d) Using the EOQ model, recommend how many cubes Christina should order each time she places the order (in the year 2023) of the cubes on the vendor of Green Garden Products. Assume that the monthly forecasted demand for Jan'23 is the expected monthly average demand for the year 2023.
- e) Determine the expected Annual Ordering Costs and Inventory Holding Costs.
- f) Recommend how many orders of cubes should Christina place this year to satisfy the annual demand of cubes.

(Marks 3+3+3+3+3+3= 18)

Q2)

#### Caselet: Holiday Candle Company

Bob Gray is the owner of Holiday Candle Company which specializes in manufacturing and delivering wax candles. For the past two years Bob has sold the candles via internet. However, sales have steadily grown beyond his ability to produce the candles alone from his garage workshop. Because the future sales growth looks very promising, Bob has decided to open a small manufacturing plant to produce the candles and expand his company's operations.

In general, wax candles come in a range of sizes, shapes and colors. Types of wax candles include Taper Candles, Pillar Candles, Votive Candles, Tea Light Candles, Candle Pot, Container Candles, Floating Candles etc. Presently, Holiday Candle company is manufacturing only Taper Candles and Pillar Candles in limited sizes and colors. Bob gives lot of emphasis on quality of the candles which primarily depends on quality of wax, wick & oil alongwith quality of manufacturing processes.

Sales of Holiday Candle Company have primarily been to customers in the United States with occasional orders from other countries. With the new manufacturing plant, Bob Gray plans to continue selling candles via the internet. However, Bob would also like to start selling his candles to specialty stores in the United States.

- a) Discuss the competitive priorities (i.e. competitive dimensions or performance objectives of operations) which Bob Gray should focus as part of his Operations Strategy for the new manufacturing unit.
- b) Examine various strategic decisions under operations which Bob Gray need to consider while expanding his company's operations and setting the new manufacturing plant.

(Marks 4 + 4= 8)

Q3)

- a) Manager of a local grocery store is concerned about the rising complaints from its customers. With a aim of quality improvement, Manager collects data of customer complaints over last six-month period. Construct a Pareto Chart based on Pareto Analysis of the given data and determine the percentage of total complaints represented by three most common categories.

Complaint	Nos. of Customers	Complaint	Nos. of Customers
Product Quality	87	Return Policy & Procedure	40
Product Request not considered	105	Service level	55
Checkout Queue	33	Grocery Checker's behavior	59
Stock Availability	170	General	58
Incorrect Price Marking	45	All Other	71

- b) Apex Hospital is the 250 bedded flag ship hospital of Apex Healthcare. It is a state of the art multi super specialty hospital in the city providing a complete spectrum of advanced medical and surgical interventions with a comprehensive mix of inpatient and outpatient services.

For past few months, Manager-Hospital Operations of Apex Hospital is facing patient flow problem on account of high Bed Turnaround Time. Bed Turnaround Time is the duration between a patient's discharge and the next patient gets bed assigned. With the objective to reduce delays in patient bed turnaround, Manager is brainstorming with his Team to identify potential causes of high bed turnaround time. To help the Manager, create a Cause-and-Effect Diagram to assist in the diagnosis of the potential causes of high bed turnaround time.

(Marks 4 + 4= 8)

Q4)

The Noodle fast –food restaurant chain uses a distribution center to deliver food products to its five restaurants. The company is attempting to determine the location of a new distribution center that will service five restaurants. The grid-map coordinates of the five restaurants and number of 40-foot trailer trucks transported annually to each restaurant is as follows:

Restaurant	Coordinates		Truck shipments
	x	y	
A	120	300	25
B	210	190	24
C	24	380	35
D	280	170	40
E	400	200	38

- a) Propose the least – cost location for the distribution center which minimizes the distribution cost. Also, determine the distance between the recommended location of upcoming distribution center and Restaurant A.
- b) Recommend the type of layout that will be appropriate for i) Grocery Store ii) Home Construction iii) Electronic Assembly. Also, indicate the trade-offs in fixed and variable costs among these layouts.

(Marks 4 + 2 = 6)