

ADSCM - SEM I

PGDSCM  
SEM - II

SVKM's NMIMS University  
School of Distance Learning  
OPERATIONS MANAGEMENT

DATE: 5.01.2010

TIME: 11 A.M. TO  
2 P.M.

Duration: 3 hours]

DECEMBER 2009

[Total Marks: 100

- Instructions:** 1] Attempt **all four** questions  
2] Attempt sub questions as instructed.  
3] Use of graph paper, non programmable calculator permitted

**Q. No: 1** Attempt **ANY TWO** from the following 4 sub-questions [ Marks:10]

- A] Differentiate between 'Product Layout' and 'Process Layout'.  
B] Define and illustrate with suitable examples 'Total Productivity Index', 'Partial Productivity Index', and 'Multifactor Productivity Index'.  
C] Describe seven QC tools for problem solving and process improvement  
D] Differentiate between Breakdown Maintenance and Preventive Maintenance

**Q. No: :2** Write short notes on **ANY THREE** [ Marks: 15]

- A] ABC Analysis in Inventory Control  
B] Group Technology Layout [ Cellular Layout]  
C] Process capability Indices  
D] Total Productive Maintenance  
E] Work Study

**Q. No: 3** Attempt **ANY THREE** from the 5 sub questions [ Marks: 45]

A] State criteria for Good Layout  
B] Quick Money Bank {QMB} orders cash from RBI to meet daily transaction requirement. Ms Jyoti, the operations manager of QMB, estimates that Rs 50 Crs in cash will be needed next year. She has estimated that the cost to order, receive and place each shipment of cash from the RBI will be Rs 6000 per shipment. Quick Money Bank is open for business 250 days each year. The bank's related carrying cost for cash is 0.5 percent per month.

- 1] How much should Ms. Jyoti order from RBI each time a cash order is placed?  
2] What is the expected total ordering cost plus total carrying cost for the year?  
3] How many working days should one shipment of cash last for Quick Money Bank?

C] In a factory producing metal sheets, a sample of 5 sheets is taken every hour. The mean thickness and the range observed for each sample was noted as given in the following table. Draw control charts for  $\bar{X}$  [ mean] and R [ range] and examine whether the process is under control or not.

{ Given: for sample size of 5,  $A_2 = 0.58$ ,  $D_3 = 0$ ,  $D_4 = 2.15$  }

| Sample No:           | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----------------------|------|------|------|------|------|------|------|------|------|------|
| Mean Thickness [cms] | 0.25 | 0.32 | 0.62 | 0.22 | 0.28 | 0.10 | 0.06 | 0.46 | 0.10 | 0.32 |
| Sample Range [cms]   | 0.25 | 0.48 | 0.12 | 0.12 | 0.19 | 0.10 | 0.06 | 0.46 | 0.10 | 0.32 |

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D] A manufacturing unit producing electrical appliances require 4,000 switches per year. The ordering cost is Rs 60 per order. The inventory carrying cost is 8 percent of purchase price per unit on an annual basis. The switches are priced as follows:

| Range of Order Quantity-units | Unit price applicable—Rs |
|-------------------------------|--------------------------|
| 1 to 499                      | 9.00                     |
| 500 to 999                    | 8.50                     |
| 1000 and more                 | 8.00                     |

Find out the optimal order quantity and the total annual cost

E] Explain the core concept of Just In Time [ JIT]

**Q. No: 4**      CASE STUDY [ Compulsory]      [ Marks: 30]

*Read the case carefully and answer the questions listed at the end.*

**PLAY-WELL TOY COMPANY**

When Pradeep arrived at his office on Monday, July 1, 2009, to review end-of-the-year sales, several matters commanded his attention. . The most urgent was that sales of his Toy Company were growing more than anticipated and it had already stretched his production capacity. To meet further sales growth projection, he needed to decide on an alternative.

His company was founded in 1985 with a mission to “reach children’s imagination and bring out their creativity.” He called these toys as “learning toys.” The keys to success in this market were continual development of innovative products and a high level of product quality. Toys needed to be creative or durable, available to consumers easily and on time. New toys were to be introduced in the Diwali toy show, so that orders could be fulfilled by Christmas. The capacity decision had to be made soon so that next season’s production needs could be met.

Pradeep, considering the nature of his decision, requested his marketing director, Ms Preeti to come up with sales projections for the next four years. The projections showed that the sales increases were attributed to the following.

- Baby boomers reaching pre school and elementary school.
- Growth of international markets @ 25 percent per year.
- The latest range was patterned after robotic cartoon characters and was showing strong sales or sales potential.

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**OPTIONS**

1. Pradeep's first option was to expand existing facilities. However, even if space was available, adding to the facility would put a strain on the already thin management. The concentration of manufacturing activity at the existing location would also render Pradeep to be more prone to probable labour pressures in future.
2. The process was labor intensive, with plastic parts moulding being the only skilled position. The process consisted of moulded parts being assembled into kits and packaged for shipment. This rendered the process easily replicable. The operating cost breakdown across three toy lines was estimated to

30% Materials  
20% Overheads  
30% Labor  
20% Transportation and distribution.

The raw material was not a problem at any location. This made it possible for Pradeep to consider an alternative location, A<sub>1</sub> and A<sub>2</sub>.

- A<sub>1</sub> was just across the border but recent regional integration agreement had resulted in reduction of trade barriers. The labor costs were low and if skilled labor was not available shipping of parts from the original plant could be done.
- A<sub>2</sub> was to located in Europe which was one to two years behind the home country. This was due to lack of television programming targeting children. A plastic moulding company was looking for a buyer, but labor costs would be equal comparable to home country and transportation costs would increase by 0 to 15 percent on account of toys being shipped back. However, the entry ensured EU as a market allowing free movement of factors of production and attractive financial incentives.

**Questions :** 1] In making your location decision , what factors would you consider to be dominant and which would you consider secondary?

2] How would the company be affected by expanding to multi-site operations?

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