OPERATIONS PLANNING AND CONTROL.

(University Paper)

Con. 5917-11. (FURTHER & REVISED COURSE) EN–3452

30-11-11

(OLD & REVISED COURSE)

(3 Hours) [Total Marks : 60

MMS – III 4 SEM
OPERATIONS.

N.B. : (1) Answer any **three** questions from **Section I**.
(2) **Section II** is **compulsory**.
(3) Maximum marks for **each** question are indicated on the **right** side of the question.

Section I

1 a) Why are forecasting errors important? What deductions can be made using the forecasting errors? Explain why tracking signal is advantageous as compared to MAD or MSE.

5 Marks.

b) Following data is available about the "Actual Sales quantities" for the past 12 years.

Year	1	2	3	4	5	6	7	8	9	10	11	12
Sales	75	80	98	128	137	119	102	104	100	102	82	73

Find the forecast for the year 13 by fitting a trend line.

5 Marks.

2a) Explain the service segmentation matrix for grouping the various services.

4 Marks.

b) A machine operator has to perform three operations, Turning, Milling and Grinding, on a number of jobs. The time required in minutes for each of these jobs is as given in the below table,

Job	Time for Turning (Mins)	Time for Milling (Mins)	Time for Grinding (Mins)
1	5	4	7
2	6	4	8
3	7	6	10
4	5	3	8
5	8	7	12
6	6	7	14

Determine the order in which the jobs should be processed in order to minimize the total time to complete all the jobs. Also find the total processing time (cycle time) and the machine idle time and job waiting time. (Job waiting time is the time the job waits in between processing. Job waiting time can be considered only after the job has been processed on the first machine.)

6 Marks.

3 a) Can any organisation achieve more than 100% capacity utilization? Discuss your thoughts on this in detail.

4 Marks.

b) A stockist expects the demand for a particular product to be 15,000 per year. The demand is expected to be fixed and

constant per year. He has an arrangement of instantaneous replenishment, due to which he has no problems of stock-out. The inventory holding cost per unit per annum is Rs 2.40 and the ordering cost is Rs 300/- per order. Determine,
(i) The optimal lot size (EOQ).
(ii) The optimum cycle time.
(iii) Total annual cost with the order quantity being EOQ.

4 Marks.

3) c) How to identify the bottleneck operations in a manufacturing system?

2 Marks.

4) a) Explain any one Batch scheduling process / method that you are familiar with.

4 Marks.

b) For the given predecessor relationship & task time in minutes, find out the cycle time, theoretical minimum number of workstations and the efficiency of the assembly line. Use the longest operation time for line balancing

Task	Precedence Requirement	Task Time (mins)
A	---	40
B	A	20
C	---	10

D	C	20
E	D	30
F	-	10
G	F	20
H	A	60
I	--	20
J	I	10
K	B, E, G, H, J	60

6 Marks.

5) Write short notes (any 2) : 10 Marks.

(a) JIT manufacturing & Kanban.

(b) Aggregate Planning.

(c) Assembly Line Balancing.

(d) Decision Tree analysis for Capacity Planning.

Section II

Chopra's Creative Concepts, designs and manufactures wooden furniture. Founded by Vijay Chopra, the company began by

producing custom-made wooden furniture for vacation cabins. Creative concepts developed a solid reputation for its creative designs and high-quality workmanship. Sales eventually encompassed the entire northern region. Along with this growth came additional opportunities.

Traditionally, the company had focused entirely on custom-made pieces of furniture, with the customer specifying the king of wood from which the piece would be made. As the company's reputation grew and sales increased, the sales force began selling some of the more popular types of furniture pieces to retail furniture outlets. This move into retail outlets led Creative Concepts into the production of a more standard line of furniture. Buyers of this line were much more price sensitive and imposed more stringent delivery requirements than did clients for the custom line. The custom designed furniture continued to dominate the company's sales, accounting for 60 percent of the volume and 75 percent of the rupees sales. Currently, the company operates a single manufacturing facility where both custom and standard furniture pieces are manufactured. The equipment is mainly general purpose in nature in order to provide the flexibility needed for producing custom pieces of furniture. The layout groups saws together in one section of the facility, lathes in one another, and so on. The quality of the finished product reflects the quality of the wood chosen and the craftsmanship of the individual workers. Both the custom and the standard furniture pieces compete for processing time on the same equipment by the same craftspeople.

During the past few months, sales of the standard line readily increased, leading to more regular scheduling of this line. However, when scheduling trade-offs had to be made, the custom furniture, was always given priority because of its higher sales and profits margins. Thus scheduled lots of standard furniture pieces were left sitting around the plant in various stages of completion. As he reviews the progress of Creative Concepts, Vijay is pleased

to note that the company has grown: Sales of custom furniture remain strong, and sales of standard pieces are steadily increasing. However, finance and accounting have indicated that profits aren't what they should be. Costs associated with the standard furniture line are rising. Rupees are being tied up in inventory, both of raw materials and work in process. Expensive public warehouse space has to be rented to accommodate the inventory volume. Vijay also is concerned with increased lead times for both custom and standard orders, which are causing longer, promised delivery times. Capacity is being pushed, and no space is left in the plant for expansion. Vijay decides that the time has come to take a careful look at the overall impact this new standard furniture line is having on his operations.

Questions for discussion:

1. What might Vijay have done differently to avoid some of the problems he now faces?

2. Apply techniques of Operations Planning & control to ease out some of the problems Vijay is facing now.

3. Can mass production techniques be successfully applied to jobs that require a large component of workmanship? Discuss.

4. If you were appointed as the Manager for solving some of the problems that Vijay is facing, which areas would you have targeted for correction, first? Why?

30 Marks.