

K. J. SOMAIYA INSTITUTE OF MANAGEMENT STUDIES AND RESEARCH

Program: PG IB (Batch 2018-20)

**Subject: Operations Management
(Ist Trimester end term examination)**

Maximum Marks: -50

Duration: 3 hours

Date : 28/09/2018

Note: - Attempt any 5 questions (each carry 10 marks).

1. a) Explain the meaning of Process Capability and Process Control. Explain the meaning of process capability index C_p and C_{pk} . (5)

b) Suppose that a refrigeration process at Coolfoods Ltd. has a normally distributed output with a mean of 25.0 and a variance of 1.0.

(5)

- i. If the specifications are 25 ± 3.25 , compute process capability ratio C_p . Is the process capable and centered?
- ii. Suppose the mean shifts to 23 but the variance remains unchanged, find out the process capability index C_{pk} .
- iii. The management has decided to improve the quality levels to Six Sigma, in such a case assuming no process shift (zero bias), what would be the new standard deviation required from the process (hint...for Six Sigma, $C_p=2$)

2. a) What is the use of measures for operational excellence? Explain some measures for quality, cost, delivery and flexibility. (5)

b) The following table shows data on the average number of customers processed by several bank service units each day in the US. The hourly wage rate is US\$ 25, the overhead rate is 1.0 times labour cost, and material cost is \$ 5 per customer

Unit	Employees	Customers processed/day
A	4	36
B	5	40
C	8	60
D	3	20

- i) Compute the labour and multi factor productivity for each unit. Use an eight hour day for the employees.

- ii) Suppose a new standardized procedure is to be introduced that will enable each employee to process one additional customer per day, compute the new labour and multi factor productivity for each unit. (5)
3. a) Briefly sketch the product development process. How can the effectiveness of the product development process be measured? (5)
- b) Following data is available about actual sales quantities for the past 10 months

Year	1	2	3	4	5	6	7	8	9	10
Sales	230	220	200	240	230	260	300	240	280	320

Find the forecast for month 11 using exponential smoothing (with smoothing constant $\alpha=0.25$), as well as three month moving averages. Forecast for month 1 in case of exponential smoothing method can be taken as 220 units. Which of the two forecasts is more reliable on the basis of Mean absolute deviation (MAD) and mean squared error (MSE) criterion. (5)

4. a) Describe aggregate production planning, master production scheduling, material requirement planning and Bill of Materials. How are these plans interrelated? (5)

b) PQR Tubes Ltd are the manufacturers of picture tubes for T.V. The following are the details of their operations during the current financial year.

Annual demand is 5000 tubes

Ordering cost (per order) Rs 100

Inventory carrying cost (per annum) 20%

Cost of tubes (per tube) Rs 500

Normal usage (tubes) during lead time is 200, with a SD of 50

- i) Assume 50 weeks in a year, find out the EOQ, holding cost and ordering cost
- ii) What would be the safety stock and Reorder point for a 98% service level? (5)

5. a) Explain the concept of supply chain management, and the four foundation elements of supply chain management. Describe some activities within each element.

(5)

b) Explain the various wastes as defined by Japanese manufacturing systems. What is lean management and why do organizations need it? (5)

6. a) What are the different types of layouts? How should an organization decide on which layout to use? How should an organization decide on which layout to choose? Identify an appropriate layout for each of the following situations
- i. A manufacturer of garments for Van Heusen
 - ii. A multi cuisine restaurant in a posh area
 - iii. An eye hospital
 - iv. The overhaul of helicopters
 - v. A manufacturer of large turbines for power sector applications
 - vi. A fabricator of large turbines for power sector applications. (5)

b) Consider the following problem of assembly line balancing: (5)

Task	A	B	C	D	E	F	G	H
Immediate predecessor	-	A	B	C	D	E	F	G
Task time (min)	0.9	0.4	0.6	0.2	0.3	0.4	0.7	1.1
Total task time (min)								4.6

Assuming that 55 minutes per hour are productive, compute the cycle time needed to obtain 50 units per hour as the output.

- i. Determine the minimum number of workstations required and assign tasks based on longest task time rule.
- ii. Compute line utilization

7. Write short notes (any four) (10)

- a) Group Technology
- b) Product process matrix
- c) ABC classification of inventory
- d) 7 QC Tools
- e) Value Engineering
- f) Dependent vs. independent demand

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