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**Second Semester M.Tech. Degree Examination, June/July 2013**  
**Computer Aided Production and Operation Management**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Maximize  $Z = 3x_1 - x_2 + 4x_3 + 2x_4$   
 Subject to constraints  $2x_1 - x_2 + x_3 + x_4 \leq 5$   
 $2x_1 + x_2 + 3x_3 + 2x_4 \leq 35$   
 $3x_1 + x_2 + 2x_3 + 4x_4 \leq 30$   
 $x_1, x_2, x_3, x_4 \geq 0$
- solve the problem by simplex method. (15 Marks)
- b. What do you mean by degeneracy in transportation problem? How to resolve it? (05 Marks)
- 2 a. Discuss the difference between simple moving average and weighted moving average forecasting techniques. (05 Marks)
- b. Two type of trucks are available for transportation use. They are needed for 10 years. The details are,

	Truck A	Truck B
First cost	Rs.10,00,000	Rs.15,00,000
Estimated annual maintenance cost	Rs.20,000	Rs.15,000
Estimated life	5 years	10 years
Estimated salvage value	Rs.2,00,000	Rs.5,00,000

Both the truck deliver same amount of work. Assume interest rate of 7%. Which truck is to be preferred on present worth basis? (15 Marks)

- 3 a. A new plant to be established will receive raw material from three suppliers P, Q and R and supply finished products to three warehouses U, V and W. The sources of raw material and the destination points may be considered as the existing facilities. The coordinates of the existing facilities and the amount of material movement between the existing facilities and the new facility are as follows:

Sl. No.	Existing facility	Coordinates		Material movement to and from new facility $w_i$
		x	y	
1	P	300	300	400
2	Q	350	500	600
3	R	280	180	700
4	U	100	500	300
5	V	500	600	500
6	W	350	700	450

Find the optimal location for the new plant. Also find the total cost. (15 Marks)

- b. What is a precedence diagram? How can you construct a precedence matrix from a precedence diagram? (05 Marks)

- 4 a. What are costs associated with inventory policy? (06 Marks)  
 b. Write a note on ABC analysis. (04 Marks)  
 c. A company has a monthly demand of 800 units of a product. The company can produce 8 products per hour when it starts a production run. It costs Rs.3000 for shop set up to start a production run. The inventory carrying cost amounts to Rs.1.5 per unit per month. What is the optimal batch size? Assume 25 working days in a months and 8 hours in a day. How frequently should the production run be undertaken and what should be the length of each run? (10 Marks)

- 5 a. What are the objectives of the MRP system? (08 Marks)  
 b. Five jobs are required to be machined on 3 machines A, B and C in that order. The processing durations of the jobs on different machines are as under:

Job	1	2	3	4	5
Machine A	3	8	7	5	4
Machine B	4	5	1	2	3
Machine C	7	9	5	6	10

Find the optimal sequence to complete the jobs in minimum time. Also find the total elapsed time and idle time of each machine. (12 Marks)

- 6 a. Discuss the significance of chance causes and assignable causes. (08 Marks)  
 b. A single sampling plan is designated by  $n = 80$ ,  $r = 3$ . Find the consumers risks and producer's risks given that AQL is 3% and LTPD as 10%. (12 Marks)
- 7 a. Explain how bench marking and six sigma concepts are useful in improvement of product quality. (08 Marks)  
 b. Write the Deming's fourteen point rule in improving total quality. (12 Marks)
- 8 Discuss the following related to production and operation management:  
 a. Supply chain management.  
 b. System simulation.  
 c. Factory of future.  
 d. Technology innovation in manufacturing. (20 Marks)

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