

Problem 1

The Seiko Watch Company has developed its aggregate plan for quartz watches. Each employee can produce about 300 watches per month and earns an average of \$1,800 per month. It costs \$100 to hire a new employee and \$200 to lay off one. Determine total employee-related costs of the following aggregate plan if work force is varied to meet production.

Month	Planned Production
Jan.	10,000
Feb.	12,000
Mar.	12,000
Apr.	9,000
May	9,000
June	10,000
July	12,000
Aug.	15,000

(Hint: show the monthly cost, then the total costs).

Problem 2

The assembly of aluminum storm windows requires the following tasks:

Task	Task Definition	Preceding Task	Time (sec)
A	Assemble Frame	-	65
B	Install rubber molding	A	80
C	Insert frame screws	A	50
D	Install frame latch	A	30
E	Install frame handle	A	38
F	Install Glass Pane	B, C	35
G	Cover frame screws	C	60
H	Pack window unit	D, E, F, G	50

This company operates on 9-hour shift and allows one hour for coffee breaks, lunch, and cleanup of work stations. The daily demand for storm windows is 360 units.

Do the following:

- Determine the cycle time.
- Determine the minimum number of workstations.
- Group the line for balance and determine the level of efficiency of this line.

Problem 3

Given the following layout of 6 different departments and the frequency of movements among them along with the distance between each department, determine if less material handling is achieved by switching departments D and F. Assume diagonal distances to be 2 units and horizontal/ vertical distances between adjacent departments to be 1.

Frequency of movements

TO

FROM

	A	B	C	D	E	F
A	0	10	-	5	5	10
B	5	0	-	5	10	5
C	2	10	0	5	5	1
D	5	10	2	0	5	5
E	10	5	0	0	0	5
F	0	10	5	0	5	0

Present Layout

A	B
C	D
E	F

Proposed Layout

A	B
C	F
E	D

Problem 4

A detergent manufacturer uses a single facility for filling and packaging all its 4 major types of detergents. The inventory at the beginning of a particular week, the average demand, the production rate, and lot size are given below (in ounces). If run out time is used for scheduling this activity, how would the activity be scheduled during the first 4 weeks?

Product	Inventory	Weekly demand	Production Rate/ Week	Lot Size
Brand A Size A	10000	5000	20000	10000
Brand A Size B	12000	4000	5000	5000
Brand B Size A	15000	3000	12000	6000
Brand C Size A	6000	1000	2000	1000