

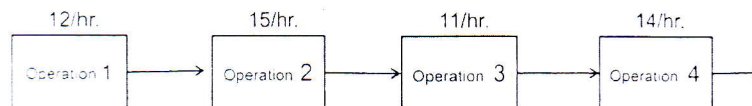
Solve only FOUR of the following FIVE questions:
If you solve the FIVE questions, only the highest FOUR marks will be considered.

Question 1 (25 marks)

- Explain two different techniques for evaluating location alternatives. (8 marks)
- Compare between job shop production and mass production. (8 marks)
- Briefly discuss each of the following manufacturing concepts: cellular manufacturing, flexible manufacturing, and reconfigurable manufacturing? (9 marks)

Question 2 (25 marks)

- Capacity decisions are among the most critical of all the design decisions that managers could make. Explain why decisions related to capacity planning are considered as strategic decisions. (5 marks)
- Compare between design capacity and effective capacity. (4 marks)
- Given the following information for a machining department: Design capacity = 50 units per day, Effective capacity = 40 units per day, Actual output = 36 units per day. Compute the efficiency and the utilization of the machining department. (8 marks)
- The following diagram shows a 4-step process that begins with Operation 1 and ends with Operation 4. The rates shown above each box represent the effective capacity of that operation. (8 marks)
 - Determine the capacity of this process.
 - If you could increase the capacity of one operation, and your goal was to increase the capacity of the entire process, which one would you increase, and by how much? Explain your reasoning.



Question 3 (25 marks)

- Briefly describe each of the costs associated with inventory. (4 marks)
- List only five of major assumptions of the Economic Order Quantity (EOQ) model. (5 marks)
- Provide a detailed derivation of the Economic Production Quantity (EPQ) equation. (8 marks).
- XYZ Company is both a producer and a user of brass couplings. The firm operates 220 days a year and uses the couplings at a steady rate of 50 per day. Couplings can be produced at a rate of 200 per day. Annual storage cost is \$2 per coupling, and machine setup cost is \$70 per run. (8 marks)
 - Determine the Economic Production Quantity (EPQ).
 - Approximately how many runs per year will there be?
 - Compute the maximum inventory level.
 - Determine the length of the pure consumption (only usage) portion of the cycle.

Question 4 (25 marks)

A company is planning to set up an assembly line for a new product. The time to perform each task and the tasks which precede each task in this product are given in the following Table:

Task	Immediate Predecessor	Task Time (in minutes)
a	---	0.2
b	a	0.2
c	---	0.8
d	c	0.6
e	b	0.3
f	d, e	1.0
g	f	0.4
h	g	0.3

Assuming an eight-hour workday,

- Draw the precedence diagram. (4 marks)
- Compute the cycle time needed to obtain an output of 400 units per day. (4 marks)
- Determine the minimum number of workstations required. (4 marks)
- Balance the line using the following heuristics: Assign tasks according to greatest number of following tasks. In case of a tie, use the tiebreaker of assigning the task with the longest processing time first. If ties still exist, assume indifference in choice. (9 marks)
- Compute the resulting percent idle time and efficiency of the assembly line. (4 marks)

Question 5 (25 marks)

- Identify the seven wastes that should be controlled in order to apply the lean concepts in manufacturing. (7 marks)
- Illustrate the use of 5S approach in workplace organization. (5 marks)
- Distinguish between push and pull systems. (5 marks)
- Define each of the following: kanban system, Heijunka, Jidoka, and kaizen. (8 marks)

===== End of Questions =====

With our best wishes

This exam measures the following ILOs

Question Number	Q2-a.	Q1-b,c, Q5-d, Q3-a,b	Q5-a	Q1-a	Q2-b,c Q3-b	Q2-d	Q2-c,d Q4-a	Q3-b	Q5-c, Q4-b	Q3-b	Q3-d Q4-c,d,e	Q4-a	Q2-c
Skills	a1-1	a1-2	a1-3	a3-1	b1-1	b1-2	b2-1	b2-1	b2-2	c1-1	c1-2	c1-3	c2-1
	Knowledge & Understanding Skills				Intellectual Skills				Professional Skills				