



Answer all the following questions:

Question 1 (30 marks)

The following are Multiple Choice Questions. Read the questions carefully and select the most appropriate answer for each question (Choose only **ONE** answer).

1. The word "kanban" means
 - a) low inventory
 - b) card
 - c) continuous improvement
 - d) lot size of one
2. Which one of these is a system for reducing changeover time?
 - a) SMED
 - b) Jidoka
 - c) TPS
 - d) Kiazen
3. One of the major advantages of process layouts is:
 - a) high equipment utilization
 - b) large work-in-process inventories
 - c) flexibility in equipment and labor assignment
 - d) smooth and continuous flow of work
4. A process layout problem consists of 4 departments, each of which can be assigned to one of four locations. The number of different solution alternatives to be considered equals
 - a) 4
 - b) 16
 - c) 24
 - d) None of the above
5. A production line is to be designed for a job with four tasks. The task times are 2.4 minutes, 1.4 minutes, 0.9 minutes, and 1.7 minutes. The maximum cycle time and the minimum cycle time equal.
 - a) 1.6 and 0.9
 - b) 6.4 and 2.4
 - c) 2.4 and 0.9
 - d) none of these
6. A project, as one of the basic process types, would be the most appropriate for which of the following situations?
 - a) assembling automobiles
 - b) producing TV sets
 - c) constructing a highway tunnel or bridge
 - d) refining of crude oil
7. The center-of-gravity method is used primarily to determine what type of locations?
 - a) service locations
 - b) manufacturing locations
 - c) distribution center locations
 - d) supplier locations
8. The special attributes or abilities that give an organization a competitive edge is called
 - a) Functional strategies
 - b) Balanced scorecards
 - c) Core competencies
 - d) Sustainable initiatives
9. In the basic EOQ model, if lead time increases from 5 to 10 days, the EOQ will:
 - a) Double
 - b) increase, but not double
 - c) decrease by a factor of two
 - d) remain the same
10. Heuristic approaches to line balancing will guarantee obtaining an optimal solution.
 - a) True
 - b) False

Question 2 (20 marks)

- a) Identify five differences between production and service operations. (5 marks)
- b) Compare job shop and continuous processes on the basis of variety, volume, equipment utilization, scheduling, and inventory. (5 marks)
- c) What is meant by order winners and order qualifiers? How do these change over time? (3 marks)
- d) Compute the multifactor productivity measure for an eight-hour day in which the usable output was 300 units, produced by three workers who used 600 pounds of materials. Workers have an hourly wage of \$20, and material cost is \$1 per pound. Overhead is 1.5 times labor cost. (4 marks)
- e) A full-service restaurant is considering opening a new facility in a specific city. The table below shows its ratings of four factors at each of two potential sites. Recommend which site should be chosen? (3 marks)

Factor	Weight	Location X	Location Y
Affluence of local population	0.2	30	30
Traffic flow	0.4	50	20
Parking availability	0.2	30	40
Growth potential	0.2	10	30

Question 3 (25 marks)

- a) List only five of the assumptions of the basic Economic Order Quantity (EOQ) model. (5 marks)
- b) Discuss the sensitivity of the EOQ to variations in demand or costs? (2 marks)
- c) Provide a detailed derivation of the Economic Production Quantity (EPQ) equation. (8 marks)
- d) A manufacturing company produces a product for which the annual demand is 10,000 units. Production averages 100 per day, while demand is 40 per day. Holding costs are \$2.00 per unit per year; set-up costs \$200.00. If they wish to produce this product in economic batches, calculate the following: (10 marks)
 - i. The Economic Production Quantity (EPQ)
 - ii. The maximum inventory level
 - iii. The number of run cycles per year
 - iv. The length of the pure consumption (only usage) portion of the cycle
 - v. The total annual cost

Question 4 (25 marks)

- a) In lean manufacturing environment, what are the seven wastes that should be controlled? Also, briefly explain the 5S approach for workplace organization. (6 marks)
- b) Briefly discuss each of the following concepts: value-added, Agility, sustainability, SWOT analysis, Heijunka, outsourcing, Balanced Scorecard (BSC)? (7 marks)
- c) Distinguish between push and pull systems. (2 marks)
- d) A company is designing a product layout for a new product. It plans to use this production line eight hours a day in order to meet a schedule of 400 units per day. The tasks necessary to produce this product are detailed in the table below. (10 marks)

Task	Immediate Predecessor	Task Time (in seconds)
A	---	50
B	A	36
C	---	26
D	---	22
E	B,D	70
F	C, E	30

- i. Draw the precedence diagram.
- ii. Compute the cycle time needed to meet the daily scheduled output.
- iii. Determine the minimum number of workstations required.
- iv. Balance the line using the longest processing time heuristic.
- v. Compute the resulting percent idle time and efficiency of the assembly line.

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

With my best wishes

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This exam measures the following ILOs													
Question Number	Q1 Q2-a.	Q1 Q5-d. Q3-a.b	Q1 Q4.a.b	Q1 Q4c	Q2-b.e Q3-b	Q2-d	Q2-c.d Q4-a	Q3-b	Q2-c, Q4-b	Q2-d	Q3-d Q4-d	Q4-d	Q2-e
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				