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HILL UNIVERSITY
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Term Evaluation (Even) Semester Examination March 2025

Roll no.....

Name of the Course: MBA
Semester: IV
Name of the Paper: *Lean supply chain Management*
Paper Code: **MB401 (SC)**
Time: 1.5 hour **Maximum Marks: 50**

Note:

(i) This question paper contains two Sections - A and B
(ii) Both Sections are compulsory
(iii) Answer any two sub questions from a, b & c in each main question of Section A. Each sub question carries 5 marks.
(iv) Section B, consisting of a case study, is compulsory. It is of 20 Marks.

Section A

Q1. (2X5 = 10 Marks)

a. How does the concept of Lean differ from traditional process improvement methodologies, and why is it crucial in modern industries? CO1, CO2

b. How has the evolution of Just-in-Time (JIT) and Lean Manufacturing influenced global supply chain strategies, and what challenges arise in their implementation? CO1

c. Discuss ways to use lean to improve one of the following: a pizza restaurant, a hospital, or an auto dealership. CO3

Q2. (2X5 = 10 Marks)

a. How do the core principles of TPS, such as Just-in-Time (JIT) and Jidoka, contribute to waste reduction in manufacturing and supply chain processes? CO2

b. A 2024 study by McKinsey suggests that companies using IoT-based predictive maintenance report a 20-30% reduction in downtime and a 10-15% increase in OEE. How can small and mid-sized manufacturers adopt AI-driven predictive maintenance without excessive capital investment? What risks might arise from over-reliance on technology for maintenance decisions? CO3, CO4

c. As manufacturers move towards Industry 4.0, will traditional OEE metrics need to be redefined? How should companies measure success in a highly automated, AI-driven production environment? CO3

Q3. (2X5 = 10 Marks)

a. What are the key similarities and differences between the Toyota Production System (TPS) and Lean Manufacturing, and how do they impact supply chain efficiency? CO1, CO2

b. How have Lean principles evolved to be applicable across diverse industries, such as healthcare, construction, and retail, beyond manufacturing? CO3

c. What are the biggest barriers to implementing Lean Supply Chain Management, and how can organizations overcome resistance to change? CO2

Section B

Q5. **Case Study** (20 Marks) CO4, CO5

DEF Electronics Ltd. is a mid-sized electronics manufacturer specializing in printed circuit boards (PCBs) for consumer electronics. The company operates two production lines running three shifts of 8 hours each to meet market demand. However, recent inefficiencies in machine utilization led to increased production delays, lower throughput, and higher defect rates.

The production team identified three major challenges:

1. Frequent machine breakdowns, leading to unplanned downtime.

2. Suboptimal production speeds, reducing actual output below expected levels.
3. High defect rates, increasing rework and scrap.

To address these issues, the company decided to measure and improve its Overall Equipment Effectiveness (OEE). The company first collected data to establish baseline OEE performance. The key metrics were availability, performance, and quality.

Table 1: Production Data Before Improvement

Metric	Value
Planned Production Time (per day)	1,440 minutes (24 hours)
Unplanned Downtime	240 minutes (4 hours)
Ideal Cycle Time per Unit	2 minutes
Maximum Possible Output	720 units
Actual Output	600 units
Defective Units	50 units

DEF Electronics Ltd. introduced several corrective measures:

1. Preventive Maintenance: Introduced scheduled machine servicing to minimize breakdowns and downtime.
2. IoT-based Monitoring: Installed real-time sensors to detect early machine faults and prevent unexpected failures.
3. Operator Training: Conducted workshops to optimize machine handling and reduce idle time.
4. Process Optimization: Adjusted machine speed settings for consistent production rates.
5. Quality Control Enhancement: Implemented automated defect detection systems to minimize rework and scrap.

Table 2: Production data after improvement

Metric	Value
Unplanned Downtime	60 minutes (1 hour)
Actual Output	680 units
Defective Units	30 units

By focusing on preventive maintenance, process optimization, and quality enhancements, DEF Electronics Ltd. significantly improved its OEE performance. This case study demonstrates the power of data-driven decision-making in manufacturing efficiency. Companies facing similar challenges can replicate these strategies to achieve higher productivity and operational excellence.

QUESTIONS

Q1.Using the data provided before improvement, calculate the OEE value step-by-step.

Q2. After improvements, the actual output increased to 680 units, while the maximum possible output remained 720 units. Calculate the new Performance metric and determine the percentage increase in performance.

Q3 The number of defective units reduced from 50 to 30. Calculate the percentage decrease in the defect rate and its impact on the Quality metric.