Exam Date & Time: 09-May-2024 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

IV SEMESTER END SEMESTER EXAMINATION
MAY 2024

LEAN MANUFACTURING AND SIX SIGMA [MIE 2230]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates:
Answer ALL questions
Missing data may be suitably assumed

1)	A)	An ad agency is regularly falling behind its delivery schedule. Upon inspection, it was understood that the graphic designer was tasked with video editing. According to lean philosophy, which waste can this be categorized under? Further, in a generic sense, explain what the various causes of such waste are and how to eliminate them.	(3)
	B)	Explain how 5S can be implemented in a small car service garage.	(4)
	C)	Analyze the key benefits of employing the Hoshin Kanri approach in any organization.	(3)
2)	A)	Imagine yourself to be an electric motor assembly line supervisor. You observe that many products are being rejected by the quality control department. Also, the production lead times are not effectively controlled and visualized. Which lean principle/tools need to be implemented on the line so that defective products do not reach the end of the line?	(3)
	B)	Appraise the benefits of implementing the following Kaizen tools in a service sector (a) PDCA Cycle (b) Pareto Analysis.	(4)
	C)	Evaluate the various factors that maintain the stability of the Toyota House.	(3)
3)	A)	The textile industry is repeatedly facing issues with the quality of the final product. The management of a textile industry decides to upgrade their production process to Six Sigma. Which approach/methodology should a Six Sigma expert employ to achieve this goal? Explain the methodology thoroughly.	(4)
	B)	Evaluate the benefits of employing a Lean Six Sigma approach.	(3)
	C)	Imagine you are a value stream manager in a manufacturing setting. Describe your role, strategies for optimizing production flow, methods for reducing waste, and integration of lean manufacturing concepts. Discuss the challenges and propose solutions.	(3)
4)		Describe the concepts of production Kanban and withdrawal Kanban in lean manufacturing. Explain with neat sketches illustrating how these Kanban systems	(4)

A) contribute to improving workflow efficiency and inventory management within a manufacturing environment.

B) Draw and explain six key value stream mapping icons commonly used in lean manufacturing. Provide detailed descriptions of each icon's representation and significance within a value stream analysis context. (3)

C) Explain strategies adopted as a production manager to ensure production smoothing amid market demand fluctuations. (3)

5) How would you implement Kanban in a production environment? Describe the key steps involved, including designing Kanban boards, setting WIP limits, visualizing workflow, and fostering collaboration. (3)

A)

B) What is the replenishment interval, and why is it important in supply chain management? (3)

C) Create a detailed present and future state map for a hypothetical manufacturing company with 8 distinct machines. In your explanation, outline the current workflow, cycle times, work-in-progress (WIP) inventory levels, bottlenecks, quality control points, and information flow between machines. Then, redesign the workflow for the future state, highlighting improvements in efficiency, cycle time reduction, WIP management, quality enhancements, integration of technology or automation, application of lean principles, and strategies for employee training and skills development. Justify your decisions and explain how the future state map aligns with operational excellence and continuous improvement principles in manufacturing. (4)

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