



# P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Industrial and Production Engineering

Semester End Examination; August - 2023

Lean Manufacturing System

Time: 3 hrs

Max. Marks: 100

## Course Outcomes

The Students will be able to:

CO1: Recognize the underlying philosophy and different standards of Toyota production system.

CO2: Analyze the elements of standards and different lean tools in lean system.

CO3: Explain improvement activities to reduce workforce and increase worker moral, setup reduction and bottleneck analysis.

CO4: Illustrate the concepts and implementation Jidoka, JIT and poka-yoka systems.

CO5: Explain importance Lean Six Sigma and how to manage people in lean environment in order to sustain improvements in production method.

**Note:** I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
1 a.	Expand PQCDMS.	2	L1	CO1	PO1,2
b.	List any two common layouts of lean manufacturing.	2	L2	CO2	PO1
c.	Define theory of constraints.	2	L1	CO3	PO2
d.	List two types of Kanban.	2	L2	CO4	PO1
e.	Define Six Sigma.	2	L1	CO5	PO1
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			
2 a.	Enumerate the importance of system and systems thinking with model diagram.	9	L2	CO1	PO1
b.	Briefly explain Toyota productive maintenance and its six big losses.	9	L2	CO1	PO1
c.	Briefly explain the lean activities that take place in lean house.	9	L2	CO1	PO1
<b>UNIT - II</b>		<b>18</b>			
3 a.	Define standardized work and explain elements of standardized work.	9	L1	CO2	PO1
b.	Briefly discuss 5s standard.	9	L2	CO2	PO1
c.	Briefly explain different types of charts use to define standardized work.	9	L2	CO2	PO1
<b>UNIT - III</b>		<b>18</b>			
4 a.	Enumerate the practical procedure for reducing setup-time.	9	L2	CO3	PO1
b.	What are the improvement activities involved to reduce workforce and increase worker morale.	9	L1	CO3	PO1
c.	What are the steps taken to improve the process flow?	9	L1	CO3	PO1

**UNIT - IV**

**18**

- 5 a. Briefly explain Murphy's Law rules during Kanban implementation. 9 L2 CO4 PO1
- b. Explain Poko Yoke Detection methods. 9 L2 CO4 PO1
- c. Explain different types of inspection methods. 9 L2 CO4 PO1

**UNIT - V**

**18**

- 6 a. Briefly explain DMADV and IDOV methodology. 9 L2 CO5 PO1
- b. Write a note on Kaizen circle Activity and KCA administration. 9 L2 CO5 PO2
- c. Briefly explain the phases of Hoshin planning. 9 L2 CO5 PO1

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