



## 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; July / Aug. - 2022**

**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 Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
I a.	Distinguish between system and system thinking.	2	L2	CO1	PO1
b.	List out the components of "5S".	2	L1	CO2	PO1
c.	Define Job rotation.	2	L1	CO3	PO1
d.	What is Kanban in Lean manufacturing?	2	L1	CO4	PO1
e.	What is PDCA in hoshin planning?	2	L1	CO5	PO1
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			
1 a.	Explain mass production with suitable case study.	9	L2	CO1	PO1
b.	Discuss basic image of lean production.	9	L2	CO1	PO1
c.	Discuss six big losses that downgrade machine effectiveness with respect to T.P.M.	9	L2	CO1	PO1
<b>UNIT - II</b>		<b>18</b>			
2 a.	Define standardized work and discuss in detail element soft standardized work.	9	L2	CO2	PO1
b.	Explain, why analysis with suitable case study?	9	L2	CO2	PO1
c.	What is value stream mapping? Discuss with suitable case study.	9	L2	CO2	PO1
<b>UNIT - III</b>		<b>18</b>			
3 a.	Explain theory of constraints and discuss the steps to improve process flow.	9	L2	CO3	PO1
b.	Discuss practical procedure for reducing setup time with suitable case study.	9	L2	CO3	PO1
c.	Explain improvement activities to reduce workforce with flow diagram.	9	L2	CO3	PO1

**UNIT - IV**

**18**

- 4 a. Explain JIT concept and describe principle of JIT. 9 L2 CO4 PO1
- b. Discuss in details Kanban rules. 9 L2 CO4 PO1
- c. What is Poka-Yoke and discuss three paths of Poka-Yoke. 9 L2 CO4 PO1

**UNIT - V**

**18**

- 5 a. Explain four phases of Hosin planning. 9 L2 CO5 PO1
- b. Discuss Kaizen circle activity with suitable case study. 9 L2 CO5 PO1
- c. Discuss five phases of DMAIC with suitable case study. 9 L2 CO5 PO1

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