



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 |
|----------------------|--|-----------|-----|-----|-----|
| I : PART - A | | 10 | | | |
| 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 |
| II : PART - B | | 90 | | | |
| UNIT - I | | 18 | | | |
| 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 |
| UNIT - II | | 18 | | | |
| 2 a. | Define standardized work and discuss in detail element soft standardized work. | 9 | L2 | CO2 | PO1 |
| b. | Explain why 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 |
| UNIT - III | | 18 | | | |
| 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**

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|------|---|---|----|-----|-----|
| 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**

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|------|--|---|----|-----|-----|
| 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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