Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

MANUFACTURING ENGINEERING
Second Semester
MF23201 - EVOLUTION OF MANUFACTURING ENGINEERING (R2023 Revision1(2024))

Time: 3hrs Max. Marks: 100

CO1	By exploring the history and economic impact of manufacturing, students will gain a comprehensive understanding of its evolution and significance in society.
CO2	Students will critically evaluate the General Motors–Toyota NUMMI Joint Venture, analyzing its successes and failures within the context of manufacturing.
CO3	Through studying the emergence of the factory system and mass production techniques, students will analyse the impact of technological advances on manufacturing processes.
CO4	By examining the role of computers in manufacturing and lean production methodologies like the Toyota Production System, students will create innovative solutions for improving efficiency and productivity in manufacturing operations.
CO5	Students will apply their knowledge of manufacturing history and contemporary practices to assess and address challenges such as the downfall of the industry, demonstrating practical problem-solving skills in real-world contexts.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Define 'specialization' and how it relates to the division of labor.	2	CO1	2
2	What is the primary objective of manufacturing engineering?	2	CO1	2
3	What were the key factors contributing to Ambrose Crowley's success in the nail manufacturing industry?	2	CO2	2
4	How did Josiah Wedgwood revolutionize pottery production through scientific methods and experimentation?	2	CO2	2
5	How did the division of labor impact the processing speed in the Chicago slaughterhouses?	2	CO3	2
6	What marketing strategy did Singer use to make sewing machines more accessible to customers?	2	CO3	2
7	How did Japan's period of isolation impact the development of TPS?	2	CO4	2
8	How does the "Five Whys" method contribute to continuous improvement in manufacturing?	2	CO4	2
9	How can understanding the history of manufacturing help address contemporary challenges such as the decline of the industry?	2	CO5	2

10	How might self-driving cars affect other modes of public transportation like trains and buses?	**2**	CO5	2

PART- B(5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Explain the principle of standardization practiced in the Harappan culture and describe how this principle is relevant to modern manufacturing practices.	13	CO1	2
	OR			
11 (b)	Discuss the historical context and debate surrounding the invention of the assembly line at Ford Motor Company. Explain how this innovation transformed manufacturing productivity and evaluate the key social, economic, and technological factors that contributed to its success.	13	CO1	2
12 (a)	Analyse the case of NUMMI (New United Motor Manufacturing, Inc.) in the United States as a pioneering example of collaborative manufacturing between Toyota and General Motors.	13	CO2	4
	OR			
12 (b)	Analyze the failure of General Motors to transfer NUMMI's cultural lessons to its other divisions.	13	CO2	4
13 (a)	Apply the principles of work time measurement to compare and contrast the methodologies of REFA and MTM, highlighting their respective strengths and weaknesses in evaluating work time efficiency.	13	CO3	3
	OR			
13 (b)	Apply the principles of the American System of Manufacturing to modern production lines.	13	CO3	3
14 (a)	Critically analyse the strengths and weaknesses of the Toyota Production System (TPS) in enhancing manufacturing efficiency and quality.	13	CO4	4
	OR			
14 (b)	Analyse the consequences of emphasizing buzzwords over a deep understanding of Lean principles. How does this influence the success and sustainability of Lean initiatives?	13	CO4	4
15 (a)	Analyze the downfall of traditional automotive industries in light of emerging disruptive technologies.	13	CO5	4
	OR			
15 (b)	Analyze the potential benefits and challenges of self-driving cars on society and the environment.	13	CO5	4

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	Design a strategic plan for an automotive company to adapt to the rise of self-driving cars and car-sharing services.	15	CO5	6