Reg No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

Manufacturing Engineering
Semester VII

MF5072 SUSTAINABLE MANUFACTURING

(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	Identify the opportunities for sustainable manufacturing practices in industries and organization
CO2	Describe the various policies for sustainable manufacturing
CO3	Implement lean principles to reduce industrial wastes
CO4	Look for selection of sustainable machinery with lower energy consumption
CO5	Recognize hazardous management techniques and safe practices

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

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	What are the are the aspects of economic sustainability?	2	1	1
2	Write a note on "Horizon Europe" initiative.	2	1	1
3	How does housekeeping contribute towards sustainable manufacturing?	2	2	2
4	Compare the concepts Reuse and Recycle.	2	2	2
5	How does the Lean manufacturing support sustainable manufacturing?	2	3	2
6	How does agile manufacturing concepts contribute towards sustainable manufacturing?	2	3	2
7	What are the factors to be considered in selection of appropriate Machine for sustainable manufacturing.	2	4	1
8	Name a few significant energy consuming applications in manufacturing industries.	2	4	1
9	What are the challenges associated with Hazardous Waste Management?	2	5	1
10	What is cradle to grave analysis concept of Life Cycle Assessment.	2	5	1

PART- B (5 x 13 = 65 Marks)

Q.No.	Questions	Marks	CO	BL
11 (a)	Compare and contrast the concepts of green manufacturing, eco manufacturing, eco machining, clean manufacturing, and sustainable manufacturing.	13	1	4
	OR			
11 (b)	Critically evaluate the effectiveness of legislative, cultural, societal, and political factors in promoting the adoption of sustainable manufacturing practices.	13	1	4

12 (a)	Evaluate the importance of the following in the context of sustainable product design. (i) Manufacturing process compatibility, (ii) Cost and market Acceptance, (iii) Regulatory and Compliance Issues (iv) Performance and (v) Waste and by product Management	13	2	3
	OR			
12 (b)	How do the factors of functionality, serviceability, maintainability, and upgradability collectively contribute to the overall sustainability of a product?	13	2	3
13 (a)	Discuss about the seven types of waste identified in Lean Manufacturing, and how do they impact the manufacturing process?	13	3	3
	OR			
13 (b)	Discuss about the different techniques used in Lean Manufacturing to eliminate waste?	13	3	3
14 (a)	Discuss the common causes of inefficiencies in machinery.	13	4	3
	OR			
14 (b)	Consider you are performing an Energy audit to a manufacturing industry. What are the key steps involved in conducting an energy audit, and what are the primary objectives of such an audit?	13	4	3
15 (a)	Summarize the Risks Associated with Improper Handling of Hazardous Substances and Need for Hazardous Waste Management	13	5	3
	OR			
15 (b)	Discuss about training the Next Generation Workforce for Sustainable Manufacturing and Evaluate the importance of the training.	13	5	3

PART – C (1 x 15 = 15 Marks)
(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	How can the integration of Circular Design, Biomimicry, Lean Design, Inclusive Design, and Clean Design principles contribute to the creation of sustainable jobs and economic growth while promoting social equity and inclusivity?	15	1, 2	5