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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

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

INDUSTRIAL ENGINEERING
VIII Semester
IE5018 SUSTAINABLE SUPPLY CHAIN MANAGEMENT
(Regulation 2019)

Time:3hrs Max.Marks: 100

CO1	Explain the Sustainable Development and Sustainable Development Goals
CO2	Apprise on concepts, principles and frame work of Sustainability Engineering
CO3	Investigate the Life Cycle Assessment for given environment
CO4	Evaluate the environmental Life Cycle Costing,Social Life Cycle Assessment and Life Cycle Sustainability assessment
CO5	Gain knowledge on Circular Economy

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

PART- A (10x2=20 Marks)
(Answer all Questions)

Q.No.	Question	Marks	CO	BL
1	Define sustainable development (Mention any two definitions given by international agencies).	2	CO1	L1
2	Suggest two strategies that industries can adopt to reduce greenhouse gas emissions.	2	CO1	L2
3	What is Eco-Efficiency?	2	CO2	L1
4	How Green Economy and Sustainable Engineering are related?	2	CO2	L2
5	Differentiate between "Life Cycle Inventory" and "Life Cycle Impact Assessment"	2	CO3	
6	Identify any four commonly used LCA software tools.	2	CO3	L1
7	Why Environmental Life Cycle Costing (ELCC) is necessary?	2	CO4	L2
8	What are Environmental Product Declarations (EPDs)?	2	CO4	L1
9	What is the Butterfly Diagram in the context of Circular Economy?	2	CO5	L1
10	Differentiate between material recovery and waste management in Circular Economy.	2	CO5	L2

PART- B (5x 13=65 Marks)

Q.No.	Question	Marks	CO	BL
11 (a)	You are appointed as a consultant to a mid-sized city facing resource degradation and pollution. Prepare a action plan to promote sustainable urban development.	13	CO1	L3
	OR			

11 (b)	Apply the principles of sustainable development to suggest operational guidelines for industries to manage transboundary environmental issues.	13	CO1	L3
12 (a)	Illustrate with a simple example how the Triple Bottom Line can be applied in a manufacturing company	13	CO2	L3
	OR			
12 (b)	Develop a basic checklist for conducting an Environmental Audit in a small-scale industry.	13	CO2	L3
13 (a)	A company wants to evaluate the environmental impacts of its new packaging product. Outline the steps you would take to set up the LCA study for this case.	13	CO3	L3
	OR			
13 (b)	Develop a simple, hypothetical LCA database structure for a consumer electronics product.	13	CO3	L3
14 (a)	Compare and contrast Environmental Life Cycle Costing and Life Cycle Sustainability Assessment with examples.	13	CO4	L4
	OR			
14 (b)	Examine the role of Life Cycle Assessment (LCA) in improving sustainability in the food and agriculture sector.	13	CO4	L4
15 (a)	Critically evaluate the statement: *"Zero waste is achievable only through a complete shift to circular Economy principles."* Support your answer with real-world examples.	13	CO5	L5
	OR			
15 (b)	Assess the impact of Circular Economy innovations on reducing negative externalities such as pollution and resource depletion.	13	CO5	L5

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

Q.No.	Question	Marks	CO	BL
16.	Propose a research project focusing on Circular Economy and Waste Reduction in urban cities, outlining objectives, methodology, and expected outcomes.	15	CO5	L6