Reg. No.															

Question Paper Code	13384

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Eighth Semester

Civil Engineering

20CEEL806 - LIFE CYCLE ASSESSMENT

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	The primary step in Life Cycle Assessment (LCA) is _____ (a) Inventory analysis (b) Goal and scope definition (c) Impact assessment (d) Interpretation	1	K1	CO1
2.	Which of the following is typically not included in LCA impact assessment? (a) Energy consumption (b) Land use (c) Water pollution (d) Profit margin	1	K1	CO1
3.	_____ ISO standard provides principles and framework for Life Cycle Assessment. (a) ISO 14044 (b) ISO 14040 (c) ISO 9001 (d) ISO 26000	1	K1	CO2
4.	The widely used software tool for conducting LCA is _____ (a) AutoCAD (b) Revit (c) SimaPro (d) MATLAB	1	K1	CO2
5.	Which of the following is NOT considered one of the three pillars of sustainability? (a) Economic (b) Cultural (c) Environmental (d) Social	1	K1	CO3
6.	One of the main principle of green engineering is_____ (a) Avoid using renewable materials (b) Design for commercial advertising (c) Prevent waste rather than treat it (d) Use more energy for durability	1	K1	CO3
7.	_____ of the following materials has a high embodied energy? (a) Timber (b) Rammed earth (c) Aluminum (d) Straw bale	1	K1	CO4
8.	Identify the factor that increases the embodied energy of a material. (a) Local sourcing (b) Minimal processing (c) Use of recycled content (d) Long-distance transportation	1	K1	CO4
9.	Total initial embodied energy is the sum of_____ (a) Operating and recurring energy (b) Construction and lighting energy (c) Direct and indirect embodied energy used before building occupancy (d) Renewable energy and demolition energy	1	K1	CO5
10.	Which of the following is a recognized green building rating system? (a) ISO 9001 (b) GRIHA (c) SWOT (d) PMI	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Recall the goal of Life Cycle Assessment.	2	K1	CO1
12.	Show the purpose of inventory data analysis in Life Cycle Assessment.	2	K1	CO1
13.	List the different Life Cycle Assessment methods to evaluate the environmental impact.	2	K1	CO2
14.	Compare the features of SimaPro and GaBi software tool.	2	K2	CO2
15.	Demonstrate the parameters affecting resource use in the building life cycle.	2	K1	CO3
16.	Define construction ecology.	2	K1	CO3
17.	What is meant by embodied energy?	2	K1	CO4
18.	Recall any two examples of high embodied energy materials.	2	K1	CO4
19.	What are the two ways to reduce the operating energy of a building?	2	K1	CO5

20.	Why is it important to consider demolition energy in LCA of buildings?		*2*	*K2*	*CO5*
21.	Relate the purpose of using carbon footprint calculators in construction projects.		*2*	*K1*	*CO6*
22.	List two benefits of using green building rating systems.		*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the challenges in collecting reliable life cycle inventory data for a multi-material product.	*11*	*K2*	*CO1*
		OR			
	b)	Illustrate how the selections of different Life Cycle Impact Assessment methods influence the decision-making in product design.	*11*	*K2*	*CO1*
24.	a)	Explain how ISO 14044 ensures transparency and consistency in LCA studies.	*11*	*K2*	*CO2*
		OR			
	b)	Demonstrate the role of LCA software tools in reducing human error and increasing efficiency in environmental impact analysis.	*11*	*K2*	*CO2*
25.	a)	Identify how urban construction contributes to climate change, and suggest systemic changes in the built environment to mitigate these impacts.	*11*	*K3*	*CO3*
		OR			
	b)	Construct a roadmap for achieving sustainability in the built environment of a growing city. What policy, design, and stakeholder actions would be essential?	*11*	*K3*	*CO3*
26.	a)	Illustrate a construction strategy for a residential building that minimizes embodied energy without compromising structural integrity.	*11*	*K2*	*CO4*
		OR			
	b)	Interpret how digital tools and embodied energy databases influence green certification outcomes and long-term sustainability planning.	*11*	*K2*	*CO4*
27.	a)	Demonstrate how building use patterns (e.g., residential vs. commercial) influence operating energy demands. Also, explain how the design can adapt to those needs?	*11*	*K2*	*CO5*
		OR			
	b)	Explain the sustainability benefits of designing buildings for disassembly to reduce demolition energy and material waste.	*11*	*K2*	*CO5*
28.	a)	If a construction project switches from conventional to modern construction, how would that impact on-site energy use? Explain the potential benefits and limitations.	*11*	*K2*	*CO6*
		OR			
	b)	Show, with a case study, how integrating real-time energy monitoring tools with LCA and green rating systems could transform post-occupancy sustainability management.	*11*	*K2*	*CO6*