Roll No.											

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 12-12-2025 **Time:** 01:00pm– 04:00pm

School: SOE	**Program:** B. Tech (Civil Engineering)	
Course Code : CIV2052	**Course Name:** Integration of SDGs in Civil Engineering	
Semester: V	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
Marks	**4**	**5**	**16**	**20**	**26**	**29**

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M

1.	List the three pillars of sustainability.	**2 Marks**	**L1**	**CO1**
2.	What do you mean by intragenerational equity?	**2 Marks**	**L1**	**CO1**
3.	What are digital twins?	**2 Marks**	**L1**	**CO3**
4.	What are smart grids?	**2 Marks**	**L1**	**CO3**
5.	Define resilient infrastructure.	**2 Marks**	**L1**	**CO3**
6.	State any two key targets of SDG 11.	**2 Marks**	**L1**	**CO5**
7.	What is urban design?	**2 Marks**	**L1**	**CO5**
8.	Define inclusive urban mobility.	**2 Marks**	**L1**	**CO6**
9.	What is the main goal of a water supply and sanitation (WSS) system?	**2 Marks**	**L1**	**CO5**
10.	What is decentralization in urban management?	**2 Marks**	**L1**	**CO6**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Explain the key components of resilient infrastructure	**5 Marks**	**L2**	**CO3**
	b.	Describe the major challenges India faces in developing resilient infrastructure	**5 Marks**	**L2**	**CO3**
Or					
12.	**a.**	Compare good vs. bad governance in resilient infrastructure construction	**5 Marks**	**L2**	**CO3**
	b.	Explain civic engagement and citizenship in infrastructure development with examples.	**5 Marks**	**L2**	**CO3**

13.	**a.**	Describe the 7 steps in the planning framework for resilient infrastructure in detail	**10 Marks**	**L2**	**CO4**
Or					
14.	**a.**	Explain the key considerations to be kept in mind while drafting a resilient infrastructure plan.	**10 Marks**	**L2**	**CO4**

15.	**a.**	State any three key targets of SDG 9. Explain how the Delhi Metro demonstrates resilient and sustainable infrastructure.	**10 Marks**	**L2**	**CO4**
Or					
16.	**a.**	Using the 2001 Gujarat earthquake as a case study, describe the structural innovations, governance practices, and lessons for building resilient cities in India.	**10 Marks**	**L2**	**CO4**

17.	**a.**	Explain SDG 11 in detail, covering its need, targets, and the role of civil engineers.	**10 Marks**	**L2**	**CO5**
	b.	Describe the Jal Jeevan Mission in India	**5 Marks**	**L2**	**CO2**
Or					
18.	**a.**	Explain the concept of **urban design** along with the goals and principles that influence sustainable city planning.	**10 Marks**	**L2**	**CO5**
	b.	Explain the challenges to achieving sustainable development.	**5 Marks**	**L2**	**CO2**

19.	**a.**	Explain the different affordable housing construction techniques, highlighting advantages, limitations, and examples.	**10 Marks**	**L2**	**CO5**
	b.	Explain the role of civil engineers in achieving SDG 13 with examples.	**5 Marks**	**L2**	**CO6**
Or					

20.	**a.**	Explain **urban disaster management** in detail, including phases and the role of the civil engineer in disaster management in urban areas	**10 Marks**	**L2**	**CO5**
	b.	What is carbon credit trading? Explain with steps.	**5 Marks**	**L2**	**CO6**

21.	**a.**	An RCC beam has a total volume = 8.0 m^3. The design uses steel reinforcement equal to 2 % of the beam volume. Given: Density of steel = 7850 kg/m^3 Density of concrete = 2400 kg/m^3 Embodied energy of steel = 20 MJ/kg Embodied energy of concrete = 0.8 MJ/kg a) Calculate the total embodied energy of the beam for the original design. b) If higher-strength steel (Fe500) is used so that the required steel volume reduces to 1.3% of the beam volume, calculate the total embodied energy for this Fe500 design. c) Compute the percentage reduction in total embodied energy of the Fe500 design compared to the original design. Which design produces the greater embodied-energy saving?	**15 Marks**	**L3**	**CO6**
	b.	Explain the various factors that are affecting Embodied Energy	**5 Marks**	**L2**	**CO6**
		Or			
22.	**a.**	An RCC beam has a total volume = 15.0 m^3. The design uses steel reinforcement equal to 1.8 % of the beam volume. Given: Density of steel = 7850 kg/m^3 Density of concrete = 2400 kg/m^3 Embodied energy of steel = 35 MJ/kg Embodied energy of concrete = 1.5 MJ/kg a) Calculate the total embodied energy of the beam for the original design. b) If higher-strength steel (Fe500) is used so that the required steel volume reduces to 1.2% of the beam volume, calculate the total embodied energy for this Fe500 design.	**15 Marks**	**L3**	**CO6**

		c) Compute the percentage reduction in total embodied energy of the Fe500 design compared to the original design. Which design produces the greater embodied-energy saving?			
	b.	Explain ways to reduce the embodied Energy	**5 Marks**	**L2**	**CO6**

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