**Roll No:** | | | | | | | | | | | |

# PRESIDENCY UNIVERSITY

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Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
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Bengaluru

**Mid Term Examinations - October 2026**

**Date:** 07/10/2026 **Time:** 11:45 AM - 01:15 PM

**Course Code:** CIV2001 **Course Name:** Sustainability Concepts in Engineering

**Semester:** Seventh Semester **Max. Marks:** 50 **Weightage:** 50%

| CO - Levels | CO1 | CO2 | CO3 |
|---|---|---|---|
| Marks | 10 | 30 | 50 |

**PART A: Answer Following Questions. 10 M**

| Q.N. | Questions | M | CO | BT |
|---|---|---|---|---|
| 1 | Define intergenerational equity. | 2 | CO1 | BT1 |
| 2 | List the three pillars of sustainability. | 2 | CO1 | BT1 |
| 3 | Define the 3Rs and their importance in sustainability. | 2 | CO1 | BT1 |
| 4 | List any 4 sustainable development Goals. | 2 | CO1 | BT1 |
| 5 | What is biocapacity? | 2 | CO1 | BT1 |

**PART B : Answer Any 1 Following Questions. 10 M**

| Q.N. | Questions | M | CO | BT |
|---|---|---|---|---|
| 6 | What are carbon credits? Explain the process of acquiring carbon credits and how they function in reducing greenhouse gas emissions. | 10 | CO3 | BT2 |
| 7 | Explain the concept of climate change, describe its effects, and discuss the measures to mitigate its impact. | 10 | CO3 | BT2 |

**PART C: Answer Any 1 Following Questions. 15 M**

| Q.N. | Questions | M | CO | BT |
|---|---|---|---|---|
| 8 | a) Describe the key features, process and challenges of Multilateral Environmental Agreements (MEAs) and protocols.<br>b) Write a short note on the objectives and key features of Air Act (1981). | 15 | CO2 | BT2 |
| 9 | a) Explain the aim and purpose of the Clean Development Mechanism (CDM) with the help of a flowchart.<br>b) What are the factors influencing ecological footprint, and what strategies can be implemented to reduce it? | 15 | CO2 | BT2 |

**PARTD: Answer Any 1 Following Questions. 15 M**

| Q.N. | Questions | M | CO | BT |
|---|---|---|---|---|



*PTO (Please Turn Over)*

| | | | | |
|---|---|---|---|---|
| 10 | An RCC beam has a total volume of 13 $m^3$. The initial design uses steel reinforcement equal to 2.0% of the beam volume.<br>Given:<br>• Density of steel = 7800 $kg/m^3$<br>• Density of concrete = 2400 $kg/m^3$<br>• Embodied energy of steel = 21 MJ/kg<br>• Embodied energy of concrete = 0.9 MJ/kg<br>a) Calculate the total embodied energy of the beam for the original design.<br>b) If high-strength steel (Fe550) is used, the required steel volume reduces to 1.6% of the beam volume. Calculate the total embodied energy for the modified design.<br>c) Compute the percentage reduction in total embodied energy of the Fe550 design compared to the original design. | 15 | CO3 | BT3 |
| 11 | An RCC beam has a total volume of 14 $m^3$. The initial design uses steel reinforcement equal to 1.8% of the beam volume.<br>Given:<br>• Density of steel = 7850 $kg/m^3$<br>• Density of concrete = 2450 $kg/m^3$<br>• Embodied energy of steel = 22 MJ/kg<br>• Embodied energy of concrete = 1.0 MJ/kg<br>a) Calculate the total embodied energy of the beam for the original design.<br>b) If a revised design uses high-strength steel (Fe550), but due to design requirements the steel reinforcement increases to 2.2% of the beam volume, calculate the total embodied energy for the modified design.<br>c) Compute the percentage increase in total embodied energy of the revised design compared to the original design. | 15 | CO3 | BT3 |