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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **Ph. D Course Work End Term Examinations – JAN-FEB 2025** |
| **Date:** 04 – 02- 2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOE | **Program:** Ph. D |
| **Course Code:** CIV824 | **Course Name:** Railway Infrastructure Planning and Design |
| **Semester**:  | **Max Marks**:100 | **Weightage**:50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **20** | **40** | **40** | **-** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 10 marks. 6Q x 10M=60Marks** |
| **1** | Explain the functions of rails and describe the composition and properties of rail steel used in Indian Railways. | **10 Marks** | **L1** | **CO1** |
| **2** | Discuss the requirements and selection criteria for an ideal rail joint, and compare traditional rail joints with modern welding techniques. | **10 Marks** | **L1** | **CO1** |
| **3** | Compare the operational characteristics of light rail transit systems and bullet trains, focusing on urban and intercity transport. | **10 Marks** | **L2** | **CO2** |
| **4** | Explain the factors influencing the selection of gauges in railway tracks and discuss the implications of gauge standardization on freight and passenger traffic. | **10 Marks** | **L2** | **CO2** |
| **5** | Discuss the evolution and success of metro rail systems in India, focusing on case studies of Delhi Metro, Bengaluru Metro, and Kolkata Metro. | **10 Marks** | **L2** | **CO2** |
| **6** | Elaborate on the functions and types of ballast and its importance in providing track stability and drainage. | **10 Marks** | **L2** | **CO2** |

**Part B**

**Answer all the Questions. Each question carries 20 marks. 2Q x 20M=40Marks**

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| **7.** | Provide an overview of the Mumbai-Ahmedabad High-Speed Rail Corridor, highlighting its design and implementation challenges. A maglev train travels a distance of 400 km in 2 hours with an average passenger load of 500 per trip. Calculate the energy efficiency (in passenger-kilometers per hour) and evaluate its potential against traditional high-speed rail systems. | **20 Marks** | **L3** | **CO3** |
| **8.** | Discuss the requirements and classifications of sleepers, and analyze their role in maintaining track stability. A track section requires 20 sleepers per rail length, with rails of 13 m each. If the total track length is 5 km, calculate the number of sleepers required and the volume of ballast needed, assuming 1 m³ ballast per sleeper. | **20 Marks** | **L3** | **CO3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***