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School of Engineering
B.TECH Civil Engineering
Semester End Examination - Nov 2023

Duration : 180 Minutes
Max Marks : 100

Sem VII - BCE01T5703 - Bridge Engineering

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Define loads to be considered for bridge design. K1 (2)
- 2) Explain Courbon's method, considering different load scenarios. K2 (4)
- 3) Explain the effectiveness of Courbon's method in managing loads in high-rise structures compared to conventional methods. K2 (6)
- 4) Illustrate the spacing and size of reinforcement bars required for a T-beam bridge girder subjected to a given load combination. K3 (9)
- 5) A highway bridge is planned to be constructed in a seismic zone with high traffic density. The bridge needs to accommodate a Class 70R vehicle according to IRC codes. Illustrate the design live load on the bridge if the weight of the Class 70R vehicle is 350 kN. K3 (9)
- 6) Assess the impact of structural irregularities on load distribution when using Courbon's method. K5 (10)
- 7) Analyze the potential failure modes in a T-beam bridge girder and propose appropriate mitigation measures. K4 (12)
- 8) Design the maximum bending moment (M) at the midspan of the T-beam bridge deck. Width of the deck slab (b): 3.0 meters Depth of the T-beam (d): 0.7 meters Concrete grade (f_{ck}): 30 MPa Reinforcement grade (f_y): 415 MPa Live load (P): 80 kN (uniformly distributed) K5 (15)
- 9) Develop a comprehensive load rating procedure for T-beam bridges to assess their capacity for accommodating different types of vehicles. K5 (15)
- 10) A railway bridge deck is subjected to a concentrated load of 600 kN from a passing locomotive. Using the effective width method, Synthesize the required depth of the reinforced concrete slab if the permissible flexural stress is 8 MPa. The breadth of the deck is 8 meters. K6 (18)