

ANALYSIS AND DESIGN OF BRIDGES

Paper code: ETCE-406

Paper: Analysis and Design of Bridges

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INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To help students in understanding the various concepts of structural analysis and design of concrete and steel bridges.

UNIT-I

Selection of bridge site, preliminary data to be collected, preliminary drawings, design discharge, linear water way, economical span, location of piers and abutments, vertical clearance, width of carriageway.

Standard Specifications of Bridges, IRC Bridge codes, clearances, Dead load, live loads, application of LL on deck slabs, impact effect of wind load, longitudinal forces, centrifugal forces, Force due to water currents, buoyancy effect, temperature effects, secondary stresses, erection seismic force, specifications for railway bridges, forces due to earthquake on railway bridges.

[T1,T2][No. of Hours: 12]

UNIT-II

Reinforced concrete bridges, box culvers, T-beam bridges, hollow girder bridges, continuous bridges, balanced cantilever bridges, arch bridges, [Illustrative examples of culverts, T-beam bridges, balanced cantilever bridge and arch bridges.

[T1,T2][No. of Hours: 10]

UNIT-III

Steel bridges, plate girder bridges, box girder bridges, cable stayed bridges, suspension bridges [Illustrative examples of plate girder, truss bridge and suspension bridges].

Importance of bearings, and joints, bearings for slab bridges, bearing for girder bridges, expansion bearings, modern trend in bearing designs, joints, expansion joints.

[T1,T2][No. of Hours: 11]

UNIT-IV

Design of prestressed concrete slab deck, post tensioned prestressed concrete, T-Beam and Slab, Bridge deck-structural components, Load distribution methods and design, Assembly of prestressing steel and grouting of ducts, Expansion joints for bridge decks.

Design of two span continuous prestressed concrete bridge deck, Cellular Box girder bridges.

[T1,T2][No. of Hours: 12]

Text Books:

[T1] Narendra Taly, Design of Modern Highway Bridges, McGraw Hill Companies.

[T2] O'Connor C., Design of Bridge Super Structure

References Books:

[R1] D. Johnson Victor, Essentials of Bridge Engineering, Indian Book House Pvt. Ltd.

[R2] Edward Arnold, The theory of Suspension Bridges, Selperg A, London

[R3] Troystsky M.S., Cable Stayed Bridges, Crosby Lockwood Staples, London.

[R4] Libby and Perkins, Modern Pre stressed Concrete Highway Superstructure, CBS.

[R5] T. R. Jagadeesh, M.S.Jayaram, Design of Bridge Structures, Prentice Hall of India, New Delhi