

Ref. No.: Ex/CE/5/T/501/2025

Bachelor of Engineering (Civil Engineering), Fifth Year, First Semester Examination, 2025

DESIGN OF STRUCTURES – IV

Time : Three hours

Full Marks : 100

(Use separate answer script for each part.)

Part - I

Marks – 50

Answer any two questions

(IS 456,875,1893,800,801,804,3935 and SP 6(1) are allowed in the hall)

1. A square pressed steel tank 5m X 5 m X 3.75 m (depth) is to be supported at 10 m height above ground in Delhi. Suggest a suitable staging system and calculate the seismic force and moment acting at the foundation level (2 m below ground level). Assume practical value of any other data that you may need. 25
2. Design and detail the girders including shear connectors of a concrete deck-steel girder composite foot bridge of span 12 m and overall width including kerbs as 4.5 m suggesting the general arrangement .Take live load = 4 kN/sq.m . Assume M25 concrete . Assume unpropped construction. 25
3. Design and detail the deck of a concrete deck-steel girder composite foot bridge of span 12 m and overall width including kerbs as 4.5 m suggesting the general arrangement .Take live load = 4 kN/sq.m . Assume M25 concrete . 25

[Turn over

Bachelor of Engineering (Civil Engineering) Fifth Year First Semester Exam. - 2025**DESIGN OF STRUCTURES – IV
PART - II**

- Answer ANY TWO Questions. Marks – (25x2=50)
 - Use Separate Answer Scripts for Each Part.
 - The use of the following IS Codes is allowed in the examination hall –
IS-456, 875, 1893, 800, 801, 802, 804, 808, 1161, 4923, and SP 6(1).
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1. The cross-section of a Plated Gantry Girder of span 12 meters is composed of the following plates -

Top and Bottom Flange Plates: 450 mm x 20 mm

The thickness of the Web Plate: 10 mm

Overall Depth: 1000 mm

The plates are connected by Weld.

The section is subjected to a Major axis Bending Moment of 500 kN.m and a Vertical Shear-Force of 120 kN. Check the adequacy of the cross-section only against the Major Axis Bending Moment and Vertical Shear Force.

2. Check the adequacy of the compound Column Section with the following details:
The Column section is two numbers ISHB 300 (unit weight 63 kg/meter) placed side by side, separated by a distance of 400 mm (centre to centre of webs).
The height of the Column is 5.0 meters, and the Column is hinged at both ends.
Factored Axial Load = 600 kN. and Factored Moment = 120 kN.m.
Also Design the batten system.
Assume any other data required for the design and mention it specifically.
 3. Check whether the section provided is adequate as LEG Member of Length 3.5 m. of a Transmission Line Tower Structure subjected to the following forces -
The section of the Leg Member is ISA 200 x 200 x 12
Factored Design Axial Compressive Force = 300 kN
Factored Design Axial Tensile Force = 120 kN
The member is welded at both ends.
Assume any other data required for the design and mention it specifically.
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