Ref. No.: Ex/CE/5/T/501/2024

Bachelor of Engineering (Civil Engineering), Fifth Year, First Semester Examination, 2024

DESIGN OF STRUCTURES – IV

Time : Three hours | Full Marks : 100

(50 Marks for each Part)

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 2.5 m (depth) is to be supported at 8 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 10 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 propped construction. 25

3. Design and detail the deck of a concrete deck-steel girder composite foot bridge of span 10 m and overall width including kerbs as 5.0 m suggesting the general arrangement .Take live load = 5 kN/sq.m . Assume M25 concrete . 25

[Turn over

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Bachelor of Engineering (Civil Engineering) Fifth Year First Semester Exam. - 2024

DESIGN OF STRUCTURES – IV
PART - II

- **Answer ANY TWO Questions.** **Full 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, 3935, and SP 6(1).**

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1. The cross-section of a Gantry Girder of span 10 meters is composed of the following plates-
Top and Bottom Flange Plates: 400 mm x 20 mm
The thickness of the Web Plate: 10 mm
Overall Depth: 900 mm
The plates are connected by Weld.
The section is subjected to a Major axis Bending Moment of 480 kN.m and a Vertical Shear Force of 150 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 Column Section and Design the Base Plate with the following details:
The Column section is ISHB 450.
The height of the Column is 4.0 meters, and the Column is hinged at both ends.
Factored Axial Load = 720 kN. and Factored Moment = 80 kN.m.
Use M30 Grade of Concrete for the column base.
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 150 x 150 x 10
Maximum Axial Compressive Force = 180 kN
Maximum Axial Tensile Force = 40 kN
The member is welded at both ends.
Assume any other data required for the design and mention it specifically.