Ref. No EX/PG/CE/T/127A/2018

M. E. CIVIL ENGINEERING FIRST YEAR SECOND SEMESTER EXAMINATION, 2018

SUBJECT – Analysis and Design of Tall Structures
(Name in full)

Time: Three hours

Full Marks 100
40 marks for this part)

Use a separate Answer-Script for each part

PART I

(IS 456, IS13920, IS 4998 , SP 16 are allowed in the hall)

1.Design and detail a concrete shear wall (4000mm X 300mm) as per IS 13920 with the following data

Factored axial load = 4500 kN , factored shear force = 350 kN, factored bending moment = 2500 kN-m.

Assume M30 concrete and Fe500 steel.

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OR

1.Calculate the resultant wind shear and moment at the base section of a concrete chimney with the following details considering the simplified approach for both along and across wind effects as per IS 4998 - I :

Chimney height - 20 m

Bottom and top diameters – 2 m and 1.6 m respectively.

Wall thickness – 200 mm

Location - Gangtok

Assume M30 concrete and Fe500 steel.

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ME Civil Engineering Examination , 2018

(1st year – 2nd semester)

Analysis and Design of Tall Structures

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The figures in the margin indicate full marks

Part II (60)

Assume reasonable value of any data if required

Answer any two questions

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1. A 90 m high RCC chimney has to be constructed in Kolkata on medium soil . External diameter of the chimney is 5m and wall thickness is 500mm. Calculate approximate bending moment and shear force at the base level due to earthquake . Apply "Modal analysis technique" considering two lumped mass model. Calculate also base shear using "Response spectrum method" as per IS 1893 and compare with the results using "Modal analysis technique" . Make comments.

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2. Estimate the base shear of a G+2 RCC building in Agartala on isolated footing on medium soil . Size of building = 15m x 15m. Four columns in both the direction. Spacing of columns = 5m. Column dimensions = 400mm x 400mm. Beam dimensions =250mm x 450mm. Grade of concrete M25. Load on each floor = 7KN/m^2 .Foundation to first floor = 5.8m . Floor to floor height = 3m.

5 x 6 = 30

3(a) Discuss with example the effect of irregularities on base shear and ductility.

(b) Discuss " Probabilistic Dynamic Analysis"

(c) What is "Strong column week beam concept" and "Performance Driven design"

(d) Discuss " Hydro-dynamic effect" in elevated water tank in seismic condition

(e) Discuss " Push over analysis"