Form A: Paper Setting Blank Ref. No EX/PG/CE/T/127A/2019

M. C. E. FIRST YEAR SECOND SEMESTER EXAMINATION, 2019

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

1.Design and detail a concrete shear wall (4500mm X 300mm) as per IS 13920 with the following data

Factored axial load = 4500 kN , factored shear force = 400 kN, factored Bending moment = 2000 kN-m.

Assume M30 concrete and Fe500 steel. 40

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ME Civil Engineering First year Second semester examination – 2019

Analysis and Design of Tall Structures

Time – 3 hour Full marks – 100

The figures in the margin indicate full marks

Part – II (60 marks)

Assume reasonable values of any data, if required

Relevant IS1893, 875-Part III, IS 456, SP 16 and papers containing formulas duly signed are allowed in the examination hall.

Answer any two questions

10+20 = 30

1. (a) Discuss the effect of irregularities on the response of tall buildings with examples

   (b) Calculate the base moment and shear of a 120m uniform RCC Chimney to be constructed in Kolkata on medium soil on pile foundation, due to wind. External diameter of chimney = 6m and wall thickness is 600mm. M40 concrete.
   Apply " Gust factor method" as per IS 875-Part III .

30

2. Calculate the base shear of a G+15 RCC office building to be constructed in Kolkata on medium soil on pile foundation, due to earthquake. Size of the building is 20m x 20m . Columns are equally spaced in both the directions. Column spacing=5m. Column dimensions may be considered 800mmx800mm. Beam dimensions may be considered 350mmx600mm . Column and beam dimensions may be considered uniform for all the floor levels. Grade of concrete M45.
   Load on each floor = 7.5 KN/m^2 . Pilecap top to first floor =6m. Floor to floor height = 3m.
   Apply " Modal analysis technique "considering only first mode effect . Calculate also base shear as per IS 1893 and compare.

6 x 5 =30

3. Discuss the following topics with examples
   (a) Ductility of tall buildings and Push over analysis
   (b) Strong column and weak beam concept in earthquake resistant design
   (c) Wind – Structure interaction effect
   (d) Hydro-dynamic effect in elevated water tank under seismic excitation
   (e) Gradient height & Turbulence.