M.E. Civil Engineering - First Year - Second Semester

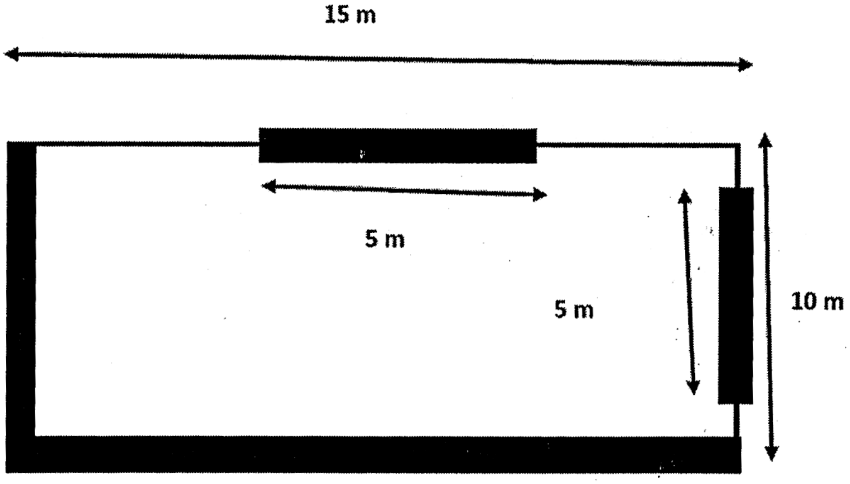
Analysis and Design of Tall Structures (SE)

PART-I

Time: Three Hours Full Marks 100

Use a separate Answer-Script for each part

[IS1893 is allowed only, assume any suitable data]

No. of questions	Part I (60 marks) (Answer 1 and Any three Questions)	Marks (4X15=60)
1 (CO-1)	Consider a five bay two storey R.C. framed building. The floor is rigid. The mass at the first floor and at roof are 15 ton/m^2 and 7.5 ton/m^2 respectively. Area of floor is 20 m^2. Each slab having dimension 4mX4m. The column size at ground floor is 500X500 and at first floor is 450X450. Floor to floor height is 4m in each floor. The building is located at Kolkata (zone III). Determine the storey stiffness, frequencies and mode shapes and storey shear. Assume M30 grade of concrete. Analyse with response spectrum method only.	20
2 (CO-4)	Define different type of seismic analysis carried out for a structure. What is Pushover analysis? Explain the step by step procedure of push over analysis according to ATC 40 with relevant diagram.	13
3 (CO-1)	What is the basic philosophy of ductile detailing according to IS 13920 2016. Draw briefly ductile detailing of a beam column joints and write their features.	13
4 (CO-3)	Explain with figure different type of tall structure with schematic diagram. Briefly describe about their lateral load resistance capacity.	13
5 (CO-3)	 Consider the shear wall system of height 5m and 4m upto roof and 1m from parapet having thickness of wall 175mm. Determine the torsional moment considering design and accidental eccentricity if it is situated in zone IV and roof weights are 5kN/m^2.	13

[Turn over

Ref. No. : Ex/PG/CE/T/127A/2024

M.E. CIVIL ENGINEERING
FIRST YEAR
SECOND SEMESTER EXAM 2024

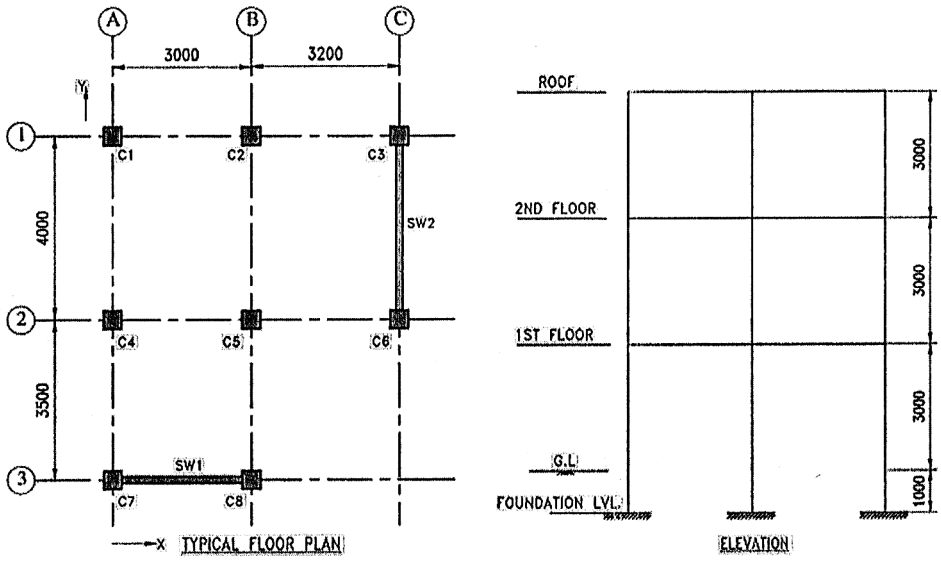
SUBJECT – Analysis and Design of Tall Structures

Part - II

40 marks for this part

Answer any one question

1. Calculate the along and across dynamic wind design peak base bending moment for wind blowing along positive X – direction. Take time periods from code stipulated approximate formulae as per Clause – 9.1 , Note – b of IS 875 (Part - 3) -2015. 40



All column sections are 350 mm X 350 mm, shear walls are 175 mm thick. Assume suitable values of other data, if required. Assume M30 concrete and Fe500 steel.

OR

2.Design and detail a concrete shear wall 4000mm X 200 mm as per IS 13920

with the following data : 40

Factored axial load = 3000 kN , factored shear force = 500 kN, factored bending moment = 3000 kN-m.

Assume M40 concrete and Fe500 steel.