

**BACHELOR OF CONSTRUCTION ENGG. EXAMINATION, 2011**  
(4th Year, 1st Semester)

**DESIGN OF STRUCTURE – III**

Time : Three hours

Full Marks :100

Use Separate Answer Script for each part.

**PART – I**

Answer **two** questions. Use of relevant

IS Code, SP-16 are allowed.

Assume suitable data not given.

1. a) Derive the moment of resistance  $MR_c$  &  $MR_t$  expression for rectangular RC section of beam for limit state of collapse in bending. 10
- b) Check the safety of the uni-axially eccentric loaded column of size 400 x 500, made of M20 grade of concrete. The working load = 2000kN, Eccentricity = 0.1m. along the major axis. Check also the safety, if the eccentricity is along the minor axis keeping all other parameter unchanged. 15
2. A eight storied RCC residential building to be constructed at Delhi at terrain category II. The plan & elevation are shown in figure -1. The thickness of outer & inner walls are 250 mm & 125 mm respectively. Assume live

[ Turn Over ]

( 2 )

load =  $3\text{kN/m}^2$ , slab thickness = 125 mm, floor finish = 20mm, ceiling plaster = 8mm.

Based on the above information answer any one question of the following.

- a) i) Calculate the design forces due to seismic load at all floor level of the frame A-B-C-D/3 Evaluate the maximum bending moment and axial force in columns & bending moment in beams of the frame A-B-C-D/3 at 1st floor level, by Portal method.
- ii) Discuss Response Spectrum method indicating the significance of all the parameters. 25

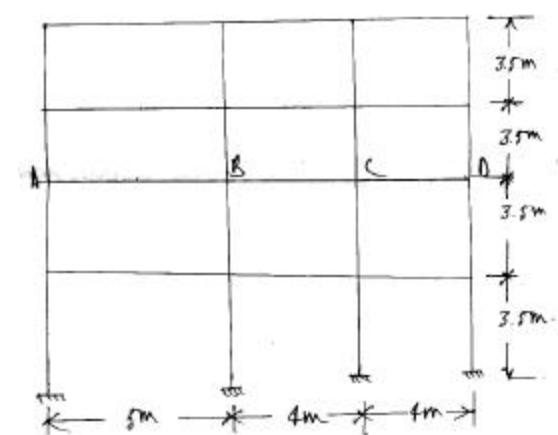
OR

- b) Calculate the design forces due to wind load at all floor level of the frame 1-5/B. Evaluate the bending moment, Shear force and axial forces in beams & columns of the frame 1-5/ B at 3rd floor level by Portal method.

Discuss the Portal method indicating assumption, advantage and limitation of the method. 25

( 5 )

Member	DL (KN/m)	LL (KN/m)
AB	10	15
BC	12	16
CD	10	12



5. Design a simple shear wall of length 5m and thickness 300 mm. Use M25 grade Concrete and Fe415 HYSD with the following loading. 25

SL. NO	Loading	Axial force (kN)	Moment (kNm)	Shear (kN)
1	DL + LL	1950	600	20
2	SL	250	4800	700

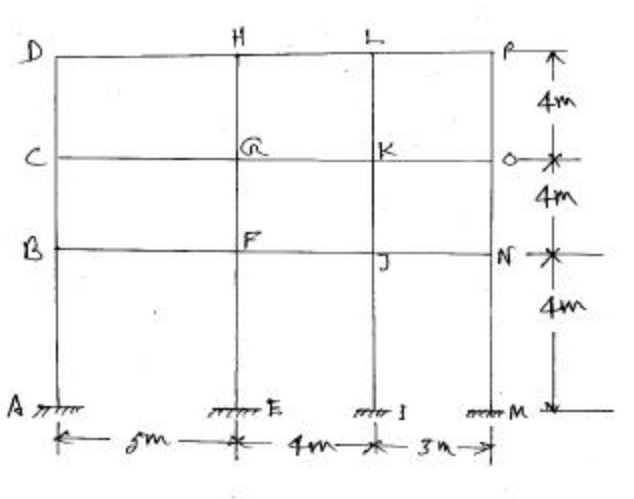
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**PART – II**

Answer any **two** questions.

3. The design wind speed of (G + 2) storied building is 120 kN, 90 kN and 80 kN acting at the nodal points, B.C.D of a frame as shown in figure below. Calculate the moment developed in each column and floor. 25



4. Find the maximum negative moment at points A and B and maximum positive moment at span BC of a frame as shown in below and draw the BMD of the frame of that portion. Assume the suitable stiffness value. 25

( 3 )

