



Fig. 1 Shear wall

7. (a) What is the magnitude of crack width allowed in the concrete structure? 10

(b) Explain with derivation how span/depth ratio can be used to control deflection in beams. 10

8. A simply supported reinforced concrete beam of rectangular section 300mm wide by 550mm overall depth is used over an effective span of 6m. The beam is reinforced with 4 nos. 20mm dia Fe415 at an effective depth of 500mm. Two hanger bars of 10mm dia are provided. The self weight together with dead load on the beam is 4kN/m and service live load is 10 kN/m. Using M20 grade concrete and Fe415 grade steel compute (a) Short term deflection (b) Long term deflection (c) Maximum crack width at tension face directly under bar. 20

Roll No. _____

23379

M. Tech. 1st Semester Civil Engg.
(Elective-I) Examination – February, 2022

ADVANCED REINFORCED CONCRETE DESIGN

Paper : CE-61A

Time : Three Hours] [Maximum Marks : 100

Before attempting the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

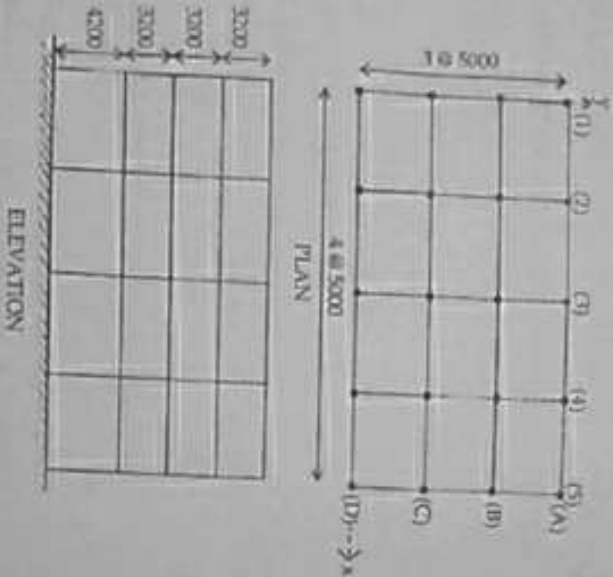
Note : Attempt any five questions. All questions carry equal marks. Use of IS: 456, IS: 1993 is allowed. Assume suitable data whenever necessary.

1. (a) List the design procedure of deep beam according to IS code. 10
(b) What is percentage and spacing of steel to be provided as vertical and horizontal reinforcement in deep beam as per the IS code? 10

2. Consider a four-storey reinforced concrete office building shown in Fig. The building is located in Shillong (seismic zone V). The soil conditions are

medium stiff and the entire building is supported on a raft foundation. The R. C frames are infilled with brick-masonry. The lumped weight due to dead loads is 12 kN/m^2 on floors and 10 kN/m^2 on the roof. The floors are to cater for a live load of 4 kN/m^2 on floors and 1.5 kN/m^2 on the roof. Determine design seismic load on the structure as per new code.

20



3. Explain the provision of wind load for loading in detail as per IS 1875 for a water tank of 80m height situated at Delhi. Assume suitable data.

20

23379-

-IP-4)(Q-6)(22)

(2)

4. A single span deep beam has an overall depth of 4.6 m and an effective span 7 m. The width of the beam is 400 mm. The supports are of 305 kN/m over the entire span. Use M30 grade concrete and Fe415 grade steel. Sketch the reinforcement details.

20

5. The following are the details of an internal beam column of type 2 joint subjected to reversal which are not due to earthquake :

20

- (i) Column 400×400 mm with 6 nos-25mm dia bars. Column factored load = 1200 kN . Storey height = 3m.
- (ii) Beams on either side are 300×400 mm with 3 nos of 28 mm dia on the top and 3 nos of 25 mm dia at bottom. Assuming $f_c = 25 \text{ kN/mm}^2$ and $f_y = 415 \text{ N/mm}^2$. Design the joint.

6. Design a shear wall of length 6 m and thickness 275 mm subjected to the following forces. Assume moderate exposure condition. Assume $f_{ck} = 30 \text{ Mpa}$ and $f_y = 415 \text{ N/mm}^2$ and the wall is a high wall with the following loadings : Sketch the reinforcement details :

20

Loading	Axial Force (kN)	Moment (kNm)	Shear (kN)
Dead Load + Live Load	2050	650	40
Seismic Load	300	5200	650

23379-

-IP-4)(Q-6)(22)

(3)

P. T. O.